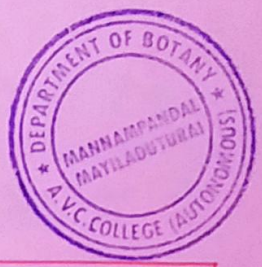

B.Sc. BOTANY - SYLLABUS

(For the Students Admitted from 2018-2019 onwards).

A.V.C.COLLEGE (AUTONOMOUS)

Nationally Reaccredited with "A" Grade by NAAC (3rd Cycle – CGPA=3.34/4.0)
Recognized by UGC as "College with Potential for Excellence – Phase I &II"
Ranked 43rd at National level by MHRD through NIRF-2017.

(Affiliated to Bharathidasan University, Tiruchirappalli)

MANNAMPANDAL - 609 305, MAYILADUTHURAI

TAMIL NADU.

Since 1955

DEGREE OF BACHELOR OF SCIENCE
IN
BOTANY

(CHOICE BASED CREDIT SYSTEM)

SYLLABUS AND COURSE STRUCTURE FOR B.Sc. BOTANY

(FOR THE STUDENTS ADMITTED FROM THE ACADEMIC YEAR 2018 – 2019 ONWARDS)

B.Sc., BOTANY COURSE STRUCTURE (FOR THE STUDENTS ADMITTED FROM THE ACADEMIC YEAR 2018 – 2019 ONWARDS)

Semester	Course & Code	Hours	Credits	Total Credits
I	LC I	6	3	20
	ELC I	6	3	
	CC I –Algae and Bryophytes - 18BO 101	5	5	
	CC II – Major Practical – I – 18BOP 102	2	2	
	AC I – Theory	7	4	
	AC II – Practical	2	1	
	VBC –Human Values and Ethics – 18 VBC 101	2	2	
II	LC II	6	3	20
	ELC II	6	3	
	CC III –Fungi, Lichens, Viruses & Bacteria, – 18 BO203	5	5	
	CC IV – Major Practical – II - 18 BOP 204	2	2	
	AC III – Theory	7	4	
	AC IV – Practical	2	1	
	ES – Environmental studies -18 ES 201	2	2	
III	LC III	6	3	20
	ELC III	6	3	
	CC V –Pteridophytes, Gymnosperms and Palaeobotany – 18 BO 305	5	5	
	CC VI – Major Practical – III – 18 BOP 306	2	2	
	AC V – Theory	7	4	
	AC VI – Practical	2	1	
	SBC I **Herbal Home Remedies – 18 SBO 301**	2	2	
IV	LC IV	6	3	20
	ELC IV	6	3	
	CC VII – Morphology &Taxonomy of Angiosperms – 18 BO 407	6	6	
	CC VIII – Major Practical – IV – 18 BOP 408	2	2	
	AC VII – Theory	7	4	
	AC VIII – Practical	2	1	
	EA I – Gender Studies - 18 EA 401	1	1	

V	CC IX - Anatomy Embryology & Micro Techniques – 18 BO 509	5	5	30
	CC X –Cytology, Genetics, Evolution & Plant Breeding – 18 BO 510	5	5	
	CC XI – Microbiology & Plant pathology – 18 BO 511	4	4	
	CC XII – Major Practical – V 18 BOP 512	5	5	
	EC I- Bioinstrumentation, Bio Statistics & Computer Application 18 BOE 501	5	5	
	NMEC I	2	2	
	SBC II - Horticulture and Landscape design – 18 SBO 502	2	2	
	SSD – Soft skills development – 11 SSD 501	2	2	
VI	CC XIII – Plant Physiology and Biochemistry – 18 BO 613	4	4	29
	CC XIV – Principles of Biotechnology – 18 BO 614	4	4	
	CC XV –Plant Ecology & Phytogeography – 18 BO 615	4	4	
	CC XVI – Major Practical – VI - 18 BOP 616	6	5	
	EC II Plants and Society – 18 BOE 602	4	4	
	EC III Bio fertilizers – 18 BOE 603	4	4	
	NMEC II	2	2	
	SBC III - Mushroom Technology – 18 SBO 603	2	2	
	EA II – 18 EA 602		1	1
			Total	140

Allied Course – Botany for Zoology (Day) & Microbiology (Eve) &
Non Major Elective Courses for Zoology (Day) offered by Botany Department
(For the candidates admitted from the academic year 2018-2019 onwards)

Sem	Part	Course	Title & Code	Int. Hrs./ Week	Credit
I	III	AC 1	Allied Botany Theory – I 18 ABO 101	07	04
I	III	AC 2	Allied Botany Practical I 18 ABOP102	02	01
II	III	AC 3	Allied Botany Theory – II 18 ABO 203	07	04
II	III	AC 4	Allied Botany Practical II 18 ABOP 204	02	01
V	III	NMEC 1	Economic Botany 18 NMBO 501	02	02
VI	III	NMEC 2	Biofertilizers & Mushroom Technology 18 NMBO 602	02	02

B.Sc., Botany (for the students admitted from 2018-19 onwards)				
Semester	Paper Title	Paper code	Hours/ week	Credits
I	**Core Course – I:** **ALGAE &BRYOPHYTES**	**18 BO 101**	5	5

OBJECTIVES:

- *To understand the major groups of Algae and their Characteristics.*
- *To study in detail on classification and characters of Bryophytes.*
- *To trace their interrelationships and to study their economic importance.*

ALGAE

UNIT-I: **15Hrs**

General characteristics
Algal Habitats (fresh water marine &soil algae)
Classification of Algae (Fritsch 1935)
Range of thallus organisation in Algae
Economic importance of Algae

UNIT-II: **15Hrs**

A detailed study (vegetative forms, size, cell structure, pigmentation, food reserves, methods of reproduction) of the following genera
Oscillatoria, Volvox, Chlorella, Oedogonium, Caulerpa,

UNIT-III: **15Hrs**

Diatoms, Gracillaria, Dictyota, Polysiphonia, Sargassum.

BRYOPHYTES

UNIT-IV: **15Hrs**

General characteristics
Classification of Bryophytes (Rothmaler 1951)
Range of thallus structure
Reproduction in Bryophytes
Ecology of Bryophytes
Economic Importance of Bryophytes.

UNIT-V: **15Hrs**

A detailed study of the structure, reproduction and lifecycle of the following genera:
Marchantia, Anthoceros and *Funaria* .

REFERENCES:

1. Sharma, O.P (2011). Algae, Tata McGraw Hill Education Private limited, New Delhi.
2. Vashishta, BR, Sinha AK, and SinghVP (2011). Botany For Degree Students Algae, S. Chand. Pub.New Delhi
3. Pandey, B.P (1994). Algae.S. Chand & Company Ltd. New Delhi.
4. Bold, H.C &Wynne, MJ (1985).Introduction to the Algae. Prentice Hall of India, New Delhi.
5. Fritsch, F.E (1945). Structure and reproduction of Algae. Cambridge University press.
6. Pandey, S.N, P.S.Trivedi(2008).A text book of Botany Vol –I – 11thEdt, Vikas publishing House, Noida.
7. Pandey, S.N, P.S.Trivedi (2008). A text book of Botany Vol –II, Vikas publishing House, Noida.
8. Sharma, OP (2013). Bryophytes, McGraw Hill education (India) Pvt..Ltd, New Delhi
9. Vashishta, Sinha AK (2011). Bryophytes, S.Chand&Company ltd., New Delhi
10. Rashid, A (1998).An Introduction to Bryophyta, VikasPub.Ltd, Newdelhi
11. PremPuri (1981). Bryophytes: Morphology, Growth and differentiation. Atma Ram and Sons, New Delhi.

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B.Sc., Botany (for the students admitted from 2018-19 onwards)				
Semester	Paper Title	Paper code	Hours/ week	Credits
I	**Core Course – II MAJOR PRACTICAL – I (covering the core course – I, Algae and Bryophytes)**	**18BOP 102**	**2**	**2**

-To make suitable micro preparations and detailed microscopic analysis of vegetative and reproductive parts of the following - *Oscillatoria, Volvox, Chlorella, Oedogonium, Caulerpa,Diatoms, Gracillaria, Dictyota, Polysiphonia, Sargassum.*

-To identify types from algal mixtures.

-To make suitable micro preparations and detailed microscopic analysis of vegetative and reproductive parts of the following - *Marchantia, Anthoceros* and *Funaria* .

-To maintain observation and record note book.

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A.V.C.COLLEGE (AUTONOMOUS), MANNAMPANDAL, MAYILADUTHURAI

(NAAC Reaccredited 'A' Grade Institution)

DEPARTMENT OF CHEMISTRY

Class: I B.Sc., Chemistry Human values and Ethics.

Title of the Paper: VBC-Value Based Education

Subject Code: 18VBC101 **Semester:** I

Hours: 30 **Credits:** 2

OBJECTIVE: To understand the concept of Ethics, War, Peace and Terrorism, International Law and Human Rights, Happiness and Contentment.

UNIT I **(06 Hrs)**

Introduction: Value education and its relevance to present day – Meaning of Value Education – Value education in Kural – personal values – Love – Compassion – Gratitude – Courage – Optimism – Friendship.

UNIT II **(06 Hrs)**

Ethics: Ethical Question for the society – Overcoming Dilemma – Ethical and Ethics – Value System – Definition of Value – Categorization of Values – Method of Building – Value System – Desired and Desirable Values – Changing values.

UNIT III **(06 Hrs)**

War, Peace and Terrorism: War – Avoiding wars – Terrorism – What is Terrorism – Perception of Terrorism – U.N. definition of Terrorism – Different types of Terror Acts – Peace – Signs for an everlasting Peace.

UNIT IV **(06 Hrs)**

International Law and Human Rights: Laws of States – International Laws – Human Rights – Implementing and Safeguarding Human Rights – The fundamentals of International law – International Law in Operation.

UNIT V **(06 Hrs)**

Happiness and Contentment: Courage and Resilience – Love, Patience and Empathy – Relationship – Citizenship – Personal Values – Troubleshooting – Cultivating good manners – Being persuasive – Being Authentic.

TEXT BOOK:

1. Value Education - N.S. Raghunathan , Margham Publications, Chennai – 2010.

REFERENCE BOOKS:

1. Human Values and professional Ethics - Jayshree Suresh & B.S.Raghavan S.Chand & Company Ltd,

New Delhi. 2009.

2. Professional Ethics and Human Values - D.R.Kiran, Tata McGraw-Hill Publishing Company, Ltd., New Delhi – 2007.

S. Rajan 21/06/18.

Verified.

B.Sc., Botany

(for the students admitted from 2018-19 onwards)

Semester	Paper Title	Paper code	Hours/ week	Credits
II	**Core Course – III** **FUNGI, LICHEN, VIRUSES & BACTERIA**	**18BO 203**	**5**	**5**

OBJECTIVES:

- *To understand the major groups of microbes and their Characteristics.*
- *To study in detail on general characters& special structures of Lichen.*
- *To trace their interrelationships and to study their economic importance.*

FUNGI

UNIT-I: **15Hrs**

General characteristics
Vegetative organization
Nutrition
Reproduction
Classification (Ainsworth 1973)
Economic Importance of Fungi.

UNIT-II: **15Hrs**

Detailed study of Occurrence, Morphology, Reproduction& Lifecycle of the following genera:
Plasmodiophora, Albugo, Saccharomyces, Peziza, Puccinia, Polyporus.

LICHENS

UNIT-III: **15Hrs**

General Characteristics, Occurrence, Distribution, Components of the *Lichen*
Morphological types, Special structures of *Lichen* thallus,
Reproduction-Economic importance of *Lichen.*

VIRUSES

UNIT-IV: **15Hrs**

Characteristics of Viruses, Nature of Viruses
General account of Bacteriophages (structure and multiplication of T4 phage)
Plant Virus(TMV)
Mycoplasma (PPO)
Transmission of viruses.

BACTERIA

UNIT-V: **15Hrs**

Major characteristics
Morphology&Ultra-structure of Bacterial cell
Modeof nutrition
Reproduction of Bacteria -Binary fission, Endospore formation, Conjugation
Economic importance of Bacteria.

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REFERENCES:

1. Sharma, OP (2011). Fungi and allied microbes The McGraw –Hill companies, New Delhi
2. Sharma, PD (2003).The Fungi. Rastogi Publications, Meerut
3. Bessey, E.A (1979). Morphology and Taxonomy of fungi, Vikas publishing House Pvt. Ltd, New Delhi.
4. Mehrotra, RS, Aneja KR (1990).An Introduction to Mycology , New Age International Pub, New Delhi
5. Webster,J (1970) Introduction to fungi , Cambridge university press ,London.
6. Muthukumar, S. and Tarar, JL (2006).Lichen Flora of Central India, Eastern book Corporation , New Delhi.
7. DharaniDharAwasthi (2000). A Handbook of Lichens Vedams eBooks (P) Ltd. New Delhi
8. Biswas,SB, Biswas, A(1997). An introduction to viruses (4th Edition .Vikas .pub.House . Pvt. Ltd New Delhi
9. NayuduMV(2008) . Plant viruses, Tata McGraw - Hill Education, New Delhi
10. MandaharCl (1987). Introduction to plant viruses, S. Chand & company, Pvt . Ltd , New Delhi
11. Sharma ,PD. (1992). Microbiology , Rastogi& Co., Meerut
12. Pelzer, MJ, Chan, ECS and Krieg, NR .(1983). Microbiology , Tata MaGraw Hill Publishing House , New Delhi
13. Power andDagainwala .(1994). General Microbiology , Himalayan publishing House, New Delhi

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B.Sc., Botany (for the students admitted from 2018-19 onwards)				
Semester	Paper Title	Paper code	Hours/ week	Credits
II	**Core course – IV MAJOR PRACTICAL – II - (covering the core course – III-FUNGI, LICHEN, VIRUSES & BACTERIA)**	**18 BOP 204**	**2**	**2**

-To make suitable micro preparations and detailed microscopic analysis of vegetative and reproductive parts of the following - *Plasmodiophora, Albugo, Saccharomyces, Peziza, Puccinia, Polyporus.*

- Study of vegetative and reproductive structures of Lichens.

- Study of viruses using electron micrographs (Photographs).

- Study of structure of Bacteria using permanent slides/ Photographs.

-To maintain observation and record note book.

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A.V. C. College (Autonomous), Mannampandal – 609 305.

Choice Based Credit System (CBCS)

(For the Students Admitted from 2018 – 2019 onwards)

GENERAL INTEREST COURSE

ENVIRONMENTAL STUDIES

SEMESTER II

SUBJECT CODE: 18ES 201

CREDIT: 2

HOURS: 2/WEEK

SMN

Unit: 1 The Multidisciplinary nature of environmental studies (2 lectures)

Definition, scope and importance.

Need for public awareness

SMN

Unit: 2 Natural Resources:

Renewable and non-renewable resources:

Natural resources and associated problems.

a) Forest resources: use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.

b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams benefits and problems.

c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

e) Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Case studies.

f) Land resources: Land as a resources, land degradation, man induced Landslides, soil erosion and desertification.

- Role of an individual in conservation of natural resources.
- Equitable use of resources for sustainable lifestyles.

(8 lectures)

Unit: 3 Ecosystems

SR

- Concept of an ecosystem.
- Structure and function of an ecosystem.
- Producers, consumers and decomposers
- Energy flow in the ecosystem
- Ecological succession.
- Food chains, food webs and ecological pyramids
- Introduction, types, characteristic features, structure and function of the following ecosystem:

- a. Forest ecosystem
- b. Grassland ecosystem
- c. Desert ecosystem
- d. Aquatic ecosystems, (ponds, streams, lakes, rivers, oceans, estuaries)

(6 lectures)

SNK Unit: 4 **Biodiversity and its conservation**

- Introduction – Definition : Genetic, species and ecosystem diversity
- Biogeographical classification of India
- Value of biodiversity : consumptive use, productive use, social, ethical, aesthetic and option values
- Biodiversity at global, National and local levels
- India as a mega-diversity nation
- Hot-spots of biodiversity
- Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts.
- Endangered and endemic species of India
- Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

(8 lectures)

SM Unit: 5 **Environmental Pollution**

Definition

Causes, effects and control measures of :

a. Air Pollution
b. Water Pollution
c. Soil Pollution
d. Marine Pollution
e. Noise pollution
f. Thermal Pollution
g. Nuclear hazards

- Solid waste Management: Causes, effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution
- Pollution case studies
- Disaster management: floods, earthquake, cyclone and landslides.

(8 lectures)

Unit: 6 **Social Issues and the Environment**

- From Unsustainable to Sustainable development
- Urban problems related to energy
- Water conservation, rain water harvesting, watershed management
- Resettlement and rehabilitation of people; its problems and concerns.

Case studies

- Environmental ethics: Issues and possible solutions
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies
- Wasteland reclamation
- Consumerism and waste products.
- Environment Protection Act
- Air (Prevention and Control of Pollution) Act
- Water (Prevention and Control of Pollution) Act
- Wildlife Protection Act
- Forest Conservation Act
- Issues involved in enforcement of environmental legislation
- Public awareness

(7 lectures)

Unit: 7 **Concepts and Definitions of Disaster Management**

- Hazard and Vulnerability profile of India
- Components of Disaster Relief: Water, Food, Sanitation, Shelter, Health, Waste Management
- Institutional arrangements (Mitigation, Response and Preparedness, DM Act and Policy, Other related policies, Plans, programmes and legislation

Unit: 8 **Risk Effects of Disasters**

- Man - Environment and Climate Change - Hazards and Calculations of Hazards and Health Hazards. Types of Fire - Types and Uses of Fire Extinguishers - Hazards and Safety - Creating Awareness on Evaluating the Usage of Hazards

Unit: 9 **Field Work**

- Visit to a local area to document environmental assets-river / forest/ grassland/ hill / mountain

References:

1. Agarwal, K.C. 2001 Environmental Biology, Nidi Public Ltd Bikaner.
2. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt ltd, Ahamedabad 380013, India, E-mail: mapin@icenet.net(R)
3. Brunner R.C. 1989, Hazardous Waste Incineration, McGraw Hill Inc 480 p
4. Clark R.S. Marine Pollution, Clanderson Press Oxford (TB)
5. Cunningham, W.P.Cooper, T.H.Gorbani E & Hepworth, M.T. 2001.
6. De A.K. Environmental Chemistry, Wiley Eastern Ltd
7. Down to Earth, Centre for Science and Environment (R)
8. Gleick, H.P. 1993. Water in crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute Oxford University, Press 473p.
9. Hawkins, R.E. Encyclopedia of India Natural History, Bombay Natural History Society, Bombay (R)
10. Heywood, V.H & Watson, R.T. 1995. Global Biodiversity Assessment. Cambridge University Press 1140 p.
11. Jadhav, H & Bhosale, V.M. 1995. Environmental Protection and Laws Himalaya Pub. House, Delhi 284 p.
12. Mckinney, M.L. & Schoch R.M. 1996. Environmental Science systems & Solutions. Web enhanced edition 639 p.
13. Mhaskar A.K. Matter Hazardous, Techno-Science Publications (TB)
14. Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co. (TB)
15. Odum, E.P. 1971 Fundamentals of Ecology. W.B. Saunders Co. USA. 574 p
16. Rao MN & Datta, A.K. 1987 Waste Water treatment, Oxford & IBH Publication Co. Pvt Ltd 345 p.
17. Sharma B.K. 2001 Environmental chemistry Goel Publ House, Meerut.
18. Survey of the Environment, The Hindu (M).
19. Townsend C. Harper, J and Michael Begon, Essentials of Ecology, Blackwell science (TB)
20. Trivedi R.K. Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol. I and II, Enviro Media (R).
21. Trivedi R.K. and P.K. Goel, Introduction to air pollution, Techno-Science Publications (TB).
22. Wagner K.D. 1998 Environmental Management. W.B. Saunders Co. Philadelphia USA 499 p

(M) Magazine (R) Reference (TB) Textbook

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10/12/2018

B.Sc., Botany *(for the students admitted from 2018-19 onwards)*				
Semester	Paper Title	Paper code	Hours/ week	Credits
III	**Core Course -V: PTERIDOPHYTES, GYMNOSPERMS AND PALAEOBOTANY**	**18 BO 305**	**5**	**5**

OBJECTIVES:

- *To study the classification, morphology and life cycle of Pteridophytes.*
- *To study the classification, morphology and life cycle of Gymnosperms.*
- *To study in detail about the various types of fossils.*

Unit -1 Pteridophytes : General characteristics, Classification (Reimer's 1954), Apogamy, Apospory, Stelar evolution, Homospory, Heterospory and Seed habit, Economic importance.

Unit -2 Pteridophytes : Detailed study of morphology, anatomy and life cycle of *Lycopodium, Selaginella, Equisetum, Adiantum, Marsilea.*

Unit -3 Gymnosperms : General characteristics, distribution, Classification (Sporne, 1965). Salient features of Pteridospermales, Bennettitales, Cycadales, Cordaitales, Coniferales and Gnetales, Economic Importance.

Unit -4 Gymnosperms : Detailed study of morphology, anatomy and life cycle of *Cycas, Pinus* and *Gnetum.*

Unit – 5 Palaeobotany : Fossils, Fossilization process, Types (compressions, impressions, petrifactions, coal balls), Geological time scale, Radiocarbon dating technique, Detailed study of morphology and reproduction in *Rhynia, Lepidodendron, Calamites* and *Williamsonia.*

REFERENCES:

1. Vashishta , P.C , Sinha and Anilkumar (2010). Pteridophytes, S.Chand & company Ltd, New Delhi

2. Sharma, O.P. (2012). Textbook of Pteridophyta, TATA MacMillan India Ltd., New Delhi

3. Rasheed, A. (1999). An Introduction to Pteridophyta, Vikas Publishing Co., NewDelhi.

4. Sporne,K.R. (1972) . The Morphology of Pteridophytes, B.I. Publications, Madras

5. Bhatnagar and Moitra, (1996). Gymnosperms. New age International Publishers, New Delhi.

6. Johri , RM, Lata S , Tyagi K (2005), A text book of Gymnosperms , Dominate pub and Distributer, New Delhi

7. Biswas, C. and Johri, B.M. (2004). The Gymnosperms. Narosa Publishing House, New Delhi.

8. Chamberlain, C.J. (1934). Gymnosperms: Structure and Evolution. Chicago Reprinted (1950) New York.

9. Arora M.P. (1990). Evolutionary biology, Himalaya Publication House, Delhi.

10. Kirkaldy, J.E. (1963). The study of Fossils. Hutchinson Educational, London

B.Sc., Botany

(for the students admitted from 2018-19 onwards)

Semester	Paper Title	Paper code	Hours/ week	Credits
III	**Core Course – VI** **MAJOR PRACTICAL – III (Covering the core course – V, Pteridophytes, Gymnosperms and Palaeobotany)**	**18 BOP 306**	**2**	**2**

1. Morphological and anatomical study of the Pteridophytes and Gymnosperms specimens mentioned in the syllabus.
2. Identification of fossil specimens
3. To conduct field trip (to study about fossils)
4. To maintain observation and record note book.

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B.Sc., Botany *(for the students admitted from 2018-19 onwards)*				
Semester	**Paper title**	**Paper code**	**Hours / week**	**Credits**
III	**Skill Based Course –I – Herbal Home Remedies**	**18 SBO 301**	**2**	**2**

Objectives :

- *To study the scope and importance of medicinal plants*
- *To learn about the basic home remedies using herbs for common ailments*
- *To study the preparation of various herbal products.*

Unit 1

Introduction - Basic principles of Siddha, Ayurveda, Unani and Naturopathy medicines, Classification of drugs based on the usable parts : roots, rhizomes, stems, barks, leaves, flowers, fruits, seeds, etc. – Growing medicinal plants at Homes (culture and care)

Unit 2

Beneficial aspects of herbal plants as food – common greens, vegetables and edible Oils (general account only).
Study of some common plants used as medicine –
Centella asiatica, Cissus quadrangularis, Piper betel, Ocimum sanctum, Curcuma longa, Zingiber officinalis and Azadirachta indica.

Unit 3

Herbal remedies for some common ailments – Common Cold andCough, Fever, headache, indigestion, Diarrhoea, Diabetes, Dental care, Hypertension, Jaundice, Ulcers and Intestinal worms.

Unit 4

Herbal remedies for Poisonous bites (scorpion, spider and wasps), Herbal cure for cuts and burns, Preventive ways for premature graying, dandruff and loss of hair, Herbal remedies for pimples, spots and boils.

Unit 5

Preparation of herbal food products – Soups (*Moringa, Murraya, Alternanthera),* Vegetable salads, Preparation of herbal refreshments, Herbal tea, Juice (*Cyanodon dactylon*), *Hibiscus* drinks, Medicated water (*Ocimum sanctum*), Decoctions and Insect repellents.

References:

1. Bhattacharjee, S.K. (2004). Hand Book of Medicinal plants. Pointer Publishers, Jaipur.
2. Vasudevan Nair. R. (2008), Herbal Home Remedies, Universities Press (India) pvt.ltd. Hydrabad.
3. Handa, S. S. and V. K. Kapoor, (1993). Pharmacognosy. VallabhPrakashan, New Delhi.
4. Harbourne, J. B. (1998). Phytochemical methods: A Guide to Modern Techniques of Plant Analysis (3rd edition). Chapman and Hill Co., New York.
5. Jain, (2001). Medicinal plants. National Book Trust, New Delhi.

B.Sc., Botany *(for the students admitted from 2018-19 onwards)*				
Semester	**Paper title**	**Paper code**	**Hours / week**	**Credits**
IV	**Core Course – VII – Morphology and Taxonomy of Angiosperms**	**18 BO 407**	**6**	**6**

Objectives :

- *To study the basic systems of classification and salient features of few families*
- *To learn herbarium techniques*
- *To study the floral characters with an aim to identify taxa authentically*
- *To prepare taxonomic keys with the help of morphological and floral characters*

Unit – 1 Reproductive Morphology :

Inflorescence – types : Racemose, Cymose, Mixed and Special types.
Flowers – description of a typical dicot and monocot flowers
Fruits – Simple, Aggregate and Multiple fruits.

Unit – 2 Taxonomy and Systematics :

Systems of classification of plants – Artificial (*Linnaeus*), Natural (*Bentham and Hooker*) and Phylogenetic (*Engler and Prantl*), APG – IV (introduction only), ICBN/ICN – Principle, Priority, Citation, Type concept, Herbarium techniques, Floras and Monographs.

Unit – 3 Modern Trends in Taxonomy :

Chemotaxonomy, Karyotaxonomy, Serotaxonomy, Molecular taxonomy (molecular systematic/ molecular phylogenetics), Numerical taxonomy.
DNA barcoding, Cladistics.

Unit – 4 Angiosperm families :

Detailed study of the salient features and economic importance of the following families – *Dicot families :* Annonaceae, Rutaceae, Rosaceae, Fabaceae, Cucurbitaceae, Apiaceae, Rubiaceae, Compositae.

Unit – 5 Angiosperm families :

Detailed study of the salient features and economic importance of the following families – Dicot families – Solanaceae, Labiatae, Amaranthaceae, Moraceae, *Monocot families* : Orchidaceae, Liliaceae, Arecaceae, Gramineae.

REFERENCES

1. Lawrence, GHM. (1995). The Taxonomy of vascular Plants (Vol I - IV) ,Central Book, Dept., Allahabad
2. Heywood VH. (1967). Plant Taxonomy, Edward Arnold , London
3. Jeffery C. (1982). An introduction to Plant Taxonomy, J& A Churchill Ltd., London
4. Mathew, K.M. (1983). The Flora of Tamil Nadu Carnatic, The Rapinat Herbarium, Trichy
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6. Gamble,J.S , Fisher,L.E.F .(1967). The Flora of The presidency of madras (Vol- III) BSI, Calcutta
7. Davis , P.H and Heywood ,V.M. (1965). Principles of Angiosperm Taxonomy ,Oliver and Boyd Edinburgh
8. Jain S.K. and Rao R.R. 1976. A hand book of field and herbarium technique. Today and
tomorrow's Publishers, New Delhi.
9. Jeffery C. (1968) An Introduction to Plant Taxonomy, J and A Churchill. London.
10. SambamurthyA..S.S. 2005;Taxonomy of Angiosperms, I.K. International Pvt. Ltd, New Delhi.

B.Sc., Botany

(for the students admitted from 2018-19 onwards)

Semester	Paper Title	Paper code	Hours/ week	Credits
IV	**Core Course – VII MAJOR PRACTICAL IV (Covering the core course – VII -Morphology and Taxonomy of Angiosperms)**	**18 BOP 408**	**2**	**2**

- Dissection and description of inflorescences and flowers with reference to syllabus
- Description of fruits and their economic importance belonging to the families included in the syllabus
- Taxonomic key preparation
- Field study – The students are expected to go for field trip to different types of floristic regions for at least four days under the supervision of the course teachers concerned
- Submission of herbarium sheets (20 nos.) along with field note book
- Herbarium visit

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A.V.C. COLLEGE (AUTONOMOUS), MANNAMPANDAL - 609 305

Semester – IV - EA - I

Hrs - 01

Crd - 01

GENDER STUDIES

Common to all UG courses

Code: 18EA 401

Unit – I – SM

Concepts Of Gender: Sex – Gender – Biological Determinism – Patriarchy - Feminism - Gender Discrimination – Gender Division Of Labour – Gender Stereotyping – Gender Sensitivity – Gender Equity – Equality – Gender Mainstreaming – Empowerment.

Unit – II – GA

Women's Studies Vs Gender Studies: UGC Guidelines: VII To XI Plans- Gender Studies : Beijing Conference And CEDAW – Exclusiveness And Inclusiveness.

Unit – III – SR/SM

Areas Of Gender Discrimination: Family – Sex Ratio- Literacy – Health – Governance – Religion Work Vs Employment – Market – Media – Politics – Law – Domestic Violence – Sexual Harassment – State Policies And Planning.

Unit – IV – SMN

Women Development and Gender Empowerment: Initiatives – International Women's Decade – International Women's Year – National Policy For Empowerment Of Women – Women Empowerment Year 2001- Mainstreaming Global Policies.

Unit - V – SNK

Women's Movements And Safeguarding Mechanism: In India National/State Commission For Women (NCW) – All Women Police Station – Family Court – Domestic Violence Act – Prevention Of Sexual Harassment At Work Place Supreme Court Guidelines – Maternity Benefit Act- PNDT Act – Hindu Succession Act 2005 – Eve Teasing Prevention Act – Self Help Groups – 73rd And 74th Amendment For PRIS.

for G. Shamili

B.Sc., Botany *(for the students admitted from 2018-19 onwards)*				
Semester	**Paper Title**	**Paper code**	**Hours/ week**	**Credits**
V	Core course – IX: ANATOMY, EMBRYOLOGY AND MICROTECHNIQUES	18 BO 509	5	5

OBJECTIVES:

i) To study the internal organization of tissues in plants.
ii) To have a thorough knowledge on the developmental stages in the reproduction of plants.
iii) To learn all techniques pertained to lab specimens.

UNIT - I Anatomy **15 Hrs**

Plant Tissues: Simple and Complex Tissues – Meristems - Types & classification. Theories on differentiation of Meristems. Tissue systems – epidermal, ground and vascular tissue systems. Internal Structure of Monocot and Dicot Stem, root and leaf. Nodal anatomy.

UNIT - II Anatomy **15 Hrs**

Vascular cambium – Types & Function – Secondary growth in stem and root – Wood (Heartwood and sapwood) – Annual Rings - Periderm formation – Phellum, Phellogen, Phelloderm. Anamolous Secondary Thickenings in stem (*Boerhaavia, Nyctanthes, Bougainvilleae* and *Dracaena)* and roots.

UNIT-III Embryology **15 Hrs**

Organisation of essential whorls in a flower - Structure of Microsporangium(Anther) - Microsporogenesis -Development of Male Gametophyte – Types and Structure of Megasporangium – Megasporogenesis – Development of Female Gametophyte – Types of Embryosac (Polygonum)

UNIT - IV Embryology **15 Hrs**

Pollination – Types & Mechanisms - Double Fertilization – Embryogenesis – Structure and development of Dicot and Monocot embryo- Endosperm Types – Polyembryony: types and causes – Appendage and dispersal modes - Significance of Apomixis and Parthenocarpy

UNIT - V Microtechniques **15 Hrs**

Killing and Fixations - Mounting- Squashes, Smears and Maceration – Microtome and its types - Staining techniques - Types of stains - Preparation of Permanent slides— Labelling – Histochemistry (starch)

REFERENCES

1. Bhatnagar and Moitra, (1996). Gymnosperms. New age International Publishers, New Delhi.
2. Johri , RM, Lata S , Tyagi K (2005), A text book of Gymnosperms , Dominate pub and Distributer, New Delhi
3. Biswas, C. and Johri, B.M. (2004). The Gymnosperms. Narosa Publishing House, New Delhi.
4. Chamberlain, C.J. (1934). Gymnosperms: Structure and Evolution. Chicago Reprinted (1950) New York.
5. Pandey B,P., (2015)(Edn.) Plant Anatomy S. Chand Publ. New delhi.
6. Vashista P.C (1984). Plant Anatomy –Pradeep publication , Jalandhar
7. Esau, K.(1960). Plant Anatomy, Wiley Eastern Private Ltd., New Delhi.
8. Esau, K.(1977). Anatomy of seed plants. Wiley Eastern Publication, New Delhi.
9. Fahn, A.(1989). Plant Anatomy. Macmillan Publication (P) Ltd, Singapore
10. Coutler E.G (1969) Plant Anatomy-Part1 Cells and Tissues –Edward Arnold London
11. Bhojwani, S.S. and Bhatnagar, S.P. (2011). The Embryology of Angiosperms, 5th Edition, Vikas Publishing House. Delhi.
12. Pandey , AK (2000). Introduction to Embryology of Angiosperms 1st Edition :CBS; New Delhi
13. Maheswari, P.(1976). An introduction to the Embryology of Angiosperms. TATA McGraw - Hill Publishing Co., Ltd., New Delhi.
14. R. Marimuthu (2015). Microscopy and Microtechnique. MJP Publishers.
15. Steven. E. Ruzin. Plant Microtechniques and Microscopy. Oxford University Press.

B.Sc., Botany *(for the students admitted from 2018-19 onwards)*				
Semester	Paper Title	Paper code	Hours/ week	Credits
V	**Core Course – X: CYTOLOGY, GENETICS, EVOLUTION AND PLANT BREEDING**	**18 BO 510**	5	5

OBJECTIVES:

- *To study the light and sub microscopic structures of Prokayotic and Eukayotic plant cells*
- *To give and insight in to the science of heredity*
- *To study the basic Mendelian genetics*
- *To study on principles, scope and methods involved in Plant breeding*
- *To understand the concept of evolution and learn various theories.*

CYTOLOGY

UNIT – I **15 Hrs**

History, Cell Theory – Structure of prokaryotic and eukaryotic cell. Structure and function of cell wall, Cytoplasm and its properties, plasma membrane, ribosomes, Endoplasmic reticulum, golgi apparatus, mitochondria, chloroplast, lysosomes, peroxisomes and cell inclusions.

UNIT – II **15 Hrs**

Organization of nucleus: nuclear envelope, nucleoplasm and nucleolus, nuclear pore complex. Chromosomal nomenclature - chromatids, centromere, telomere, satellite, secondary constriction. Organization of chromosomes- Nucleic acid and histones- types and classification. Lampbrush chromosomes and polytene chromosomes- Karyotype and idiogram. DNA- Structure and replication; Structure and types of RNA ; Cell division- Mitosis and Meiosis.

GENETICS

UNIT – III **15 Hrs**

History; branches of genetics and application.Mendelism. Laws of Mendel, monohybrid and dihybrid crosses. Incomplete dominance, Interaction of genes, Lethal factor, complementary factor, Epistasis and Multiple factor hypothesis. Linkage and crossing over –Sex Determination. Sex Linked inheritance. (eg) Eye colour in Drosophila, colour blindness in Man.

UNIT – IV **15 Hrs**

Extra chromosomal inheritance-plastid inheritance in Mirabilis, - Male sterility in Maize.
Mutations: Mutagens-physical and chemical; chromosomal and Gene mutations.
Ploidy : Euploidy and aneuploidy.
Concept of the Gene : The Genetic code and its characteristics- cistron, muton and recon.

EVOLUTION AND PLANT BREEDING

UNIT – V **15 Hrs**

Evolution: origin of life, theories of evolution of life forms: Lamarckism, Darwinism, and Neo Darwinism. Variations – definition causes and types, mutation (principles of Hugo De'Vries). Role of mutation in speciation.

Plant Breeding: Principles and objectives: Importance of plant breeding in India. Selection: Mass selection - pure line selection and clonal selection, merits and demerits of selection. Hybridization techniques - Hybrid Vigour. Breeding techniques for paddy, sugarcane and groundnut.

REFERENCE:

1. Shukla R.S., and chandel P.S., (2002), Cytogenetics, Evolution and plant breeding, S.Chand & Company Ltd. Ram Nagar, New Delhi.
2. Rastogi, SC (1992) .Cell biology, Tata McGrew-Hill,New Delhi.
3. Sundararajan ,S (2000). Cytology, Anmol publication (P) ltd, New Delhi.
4. Gupta, PK.(2002).Genetics.Rastogi publishers,Meerut.
5. Chauduri, HK. (1971).Elementary Principles of Plant Breeding, Oxford and IBH Co., New Delhi.
6. Singh, BD (2002).Plant Breeding, Kalyani Publishers, Ludhiana.
7. Verma, P.S and V.K. Agarwal, V.K. (2004). Cell Biology, Genetics Molecular Biology, Evolution and Ecology. S. Chand and Co. New Delhi.

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B.Sc., Botany *(for the students admitted from 2018-19 onwards)*				
Semester	**Paper Title**	**Paper code**	**Hours/ week**	**Credits**
V	**CORE COURSE – XI MICROBIOLOGY AND PLANT PATHOLOGY**	**18 BO 511**	**4**	**4**

OBJECTIVES:

- *To impart basic knowledge on the microorganisms and their distribution.*
- *To teach the applications of microbiology in industry and agriculture.*
- *To make aware of the Plant diseases, it's incidences and preventive measures.*

UNIT - I Fundamentals of Microbiology **15 Hrs**

Scope and history of Microbiology, Characterization and classification of microorganisms, - Pure culture techniques- staining techniques (Algae, Fungi, and Bacteria)-Maintenance of pure cultures.

UNIT - II Agriculture and Environmental Microbiology **15 Hrs**

Role of microorganism in - soil formation and soil fertility - Symbiotic microbes and crop production – uses of microorganism in agriculture - Silage.

Biological nitrogen fixation (Symbiotic and Non symbiotic) – Biopesticides (*Bacillus thuringiensis*, NPV) – Microbiology of air and soil – aquatic microbiology.

UNIT - III Food and industrial microbiology **15 Hrs**

Kinds of food (Perishable and non perishable), Chemistry of food spoilage, Food preservation – Principles and methods, Food borne diseases.

Structure and design of a typical fermentor –Culture systems – batch , continuous and fed batch culture Industrial production of alcohol and antibiotics (Penicillin).

UNIT - IV Elementary plant pathology **15 Hrs**

Plant Diseases and their causes: Development of disease in plants, Inoculum potential , symptoms of plant disease, Classification of plant disease, Pathogenesis, Koch's postulates, defense mechanisms, Control of plant disease (Prophylaxis and immunisation).

UNIT - V Plant Diseases **15 Hrs**

Symptoms, Causal agent, Disease cycle and Control measures of – Tikka disease of groundnut, Red rot of sugarcane, Citrus canker , Blight of Paddy, Yellow vein mosaic disease of lady's finger and Little leaf of Brinjal.

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REFERENCES

1. R.C. Dubey and D.K. Maheshwari (2012). A text book of Microbiology, S. Chand & company Ltd, New Delhi.

2. Pelczar, Chan and Kreig (1993). Microbiology – 5th edition, Tata McGraw-Hill Co Ltd. New Delhi.

3. Ananthanarayanan, R and Panicker, C.K.J. (2002). Text book of Microbiology. VI Edition, Orient Longman, Chennai.

4. Powar, C.B. and Daginawala (1991). General Microbiology Vol I and II – Himalaya Publishing house, Bombay.

5. Prescott, Haley, Klein (1993). Microbiology-WCB Publishers, England, II Edition

6. Pandey, B.P (1982). A textbook of Plant Pathology, Pathogen and Plant Diseases. S.Chand and Co.Ltd., New Delhi.

7. Rangaswamy,G. (1972). Diseases of Crop Plants in India. Prentice Hall of India Oct.Ltd., New Jersey.

8. J. R. Anderson (Ed.). Edward Arnold (1985). Muir's textbook of pathology, 12th edition, London.

9. R.S. Mehrotra (2003). Plant Pathology, Tata McGraw-Hill Education.

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B.Sc., Botany *(for the students admitted from 2018-19 onwards)*				
Semester	Paper Title	Paper code	Hours/ week	Credits
V	**Core course –XII– MAJOR PRACTICAL – V (covering the core course – IX, X and XI)**	**18 BOP 512**	**5**	**5**

- Study of simple and complex tissues by using permanent slides.
- Micro preparations – primary and secondary structure of monocot and dicot stem, root and leaf.
- Anomalous secondary thickening of stem pertaining to the syllabus
- T.S. of anther. Pollinium mounting, Types of ovules, male and female gametophytes, Endosperms, Embryo mounting (*Tridax*)
- Demonstrration of Microtome – preparation of squash and smear.
- Preparation of whole mounts and hand sections (each 5 slides)

- Observation of plant cells- Onion peel and *Hydrilla* leaf.
- Preparation of root tip squash and identification of stages in mitosis.
- Demonstration of eukaryotic cell organelles.
- Training in solving problems in monohybrid, dihybrid, incomplete dominance, interaction of genes and linkage.
- Demonstration of hybridization techniques – emasculation, bagging and labeling.
- Demonstration of vestigial organs, Eye-Nyctitating membrane, Analogous organs – insects and bats, Embryological evidences – fish, chick and man.

- Preparation of common media, sterilization methods, staining of bacteria (Grams) isolation and enumeration of microbes in soil and water.
- Study of motility by hanging drop, pure culture of bacteria – streak and poured plates.
- Microbiology of milk and antibiosis.
- Demonstration of Koch's postulates, examination of pathological specimens, estimation of biochemical compounds (total free amino acids, flavonoids, total phenols, chlorophyll, ascorbic acid and sugar) in normal and infected leaves.

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B.Sc., Botany *(for the students admitted from 2018-19 onwards)*				
Semester	**Paper Title**	**Paper code**	**Hours/ week**	**Credits**
V	MBE – I BIOINSTRUMENTATION, BIOSTATISTICS AND COMPUTER APPLICATIONS	18 BOE 501	5	5

OBJECTIVES:

- *To initiate the students into research activities*
- *To learn to handle various instruments, their principles and procedures.*
- *To understand working principle of various instruments used in biological studies.*
- *To provide details on the application of statistical methods in biology.*

UNIT - I

Principles and applications of Simple, Compound, Phase Contrast, Fluorescence and Electron Microscopes (TEM and SEM); Buffers- Characteristics and preparation; pH meter- principle measurement of pH. Glass and reference electrodes.

UNIT - II

Centrifugation: Principles, types and operations – cooling and ultra centrifuge. Colorimeter: principle and instrumentation: Spectrophotometer: principle, instrumentation and types.

Chromatography – principle and application of paper, TLC, HPLC, ion- exchange and affinity chromatography. Electrophoresis – Principles types and application of gel electrophoresis (SDS-PAGE).

UNIT - III

Biostatistics- Data: Primary and secondary, variable: discrete and continuous. Population and sample. Sampling techniques; classification of data. Presentation of data: histogram, polygon and frequency curve, ogive curve, bar charts, pie diagram.

UNIT - IV

Measures of central values – Mean, Median , Mode, measures of dispersion – range , mean deviation , standard deviation , co-efficient of variation : skewness and kurtosis.; correlation – scatter diagram , rank correlation , Karl Pearson's co-efficient of correlation , regression – definition- regression Lines.

UNIT - V

Introduction of computer – generation of computers , computers applications in various fields of science and management - computer and its peripherals – hardware and software – system and application SW,MS-Word, XL, PPT, Computer network concepts- internet and its application, email, mail merging and search engines.

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REFERENCES

1. Patki L.R, Bhalchandra B.L, Jeevaji I.H.(1987). An introduction to Microtechnique, S.Chand and company (Pvt)ltd, New Delhi.

2. Marimuthu, R. (2008). Microscopy and Microtechnique. MJP Publishers,Chennai.

3. Wilson K, Walker, J. (1994). Principle and techniques of practical biochemistry, 4th ed) Cambridge university press, Cambridge.

4. Palanivelu P (2013) .Analytical Biochemistry and Separation techniques , 20th century Publications, Palkalai nagar ,Madurai.

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5. Khan, I.A., and Khannum, A., (1994).Fundamentals of Biostatistics, Vikas Pub., Hyderabad.

6. Sundar Rao P.S.S and Richard J(2011) Introduction to Biostatistics and research methods , PHI learning private LtD , New delhi.

7. Johansen, DA (1940). Plant Microtechnique, TATA McGraw Hill Book Co., Ins., New Delhi.

8. Peter Gray (1964). Hand book of Basic Microtechnique. McGraw hill publication, New York.

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10. Gurumani, N. (2009), An introduction to Biostatistics (II revised edition), MJP publishers, Chennai.

B.Sc., Botany *(for the students admitted from 2018-19 onwards)*				
Semester	**Paper Title**	**Paper code**	**Hours/ week**	**Credits**
V	**Skill Based Course: II HORTICULTURE AND LANDSCAPE DESIGN**	**18 SBO 502**	**2**	**2**

OBJECTIVES:

- *To study the basic principles and maintenance of horticulture crops.*
- *To understand the landscaping technique and its implications.*
- *To enable self reliant knowledge and self employment.*

UNIT - I **6 Hrs**

Introduction – Scope and Divisions of Horticulture

Gardening - Types of Garden: Informal and formal garden - Indoor garden, Terrace garden, Public garden, Kitchen garden – Gardening implements and accessories. Manures, Irrigation – significance and its types.

UNIT - II **6 Hrs**

Nursery Techniques – Structure, Nursery beds, Propagation methods of horticultural plants: (Cuttage, Layerage, Graftage and budding). Garden operations: Planting and Transplantation, Pinching, Disbudding, Defoliation, Staking, Pruning, Mulching and Topiary. Bonsai techniques.

UNIT - III **6 Hrs**

Orchard Cultivation techniques – Brief study of Propagation of Mango and Grapes – Fruit drop and storage of fruits.

UNIT - IV **6 Hrs**

Cut flowers, Flower arrangements, Commercial floriculture, Cultural practices of Rose, Gerbera, Carnation, Chrysanthemum and Orchids.

UNIT - V **6 Hrs**

Landscape - introduction and principles. Lawns: type of grasses, Lawns - dibbling, Mat fixing, maintenance of lawns. Turfing - play grounds and golf courses – Planning designs for gardens, beautification of urban areas.

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B.Sc., Botany *(for the students admitted from 2018-19 onwards)*				
Semester	**Paper Title**	**Paper code**	**Hours/ week**	**Credits**
V	**Skill Based Course: II HORTICULTURE AND LANDSCAPE DESIGN**	**18 SBO 502**	**2**	**2**

OBJECTIVES:

- *To study the basic principles and maintenance of horticulture crops.*
- *To understand the landscaping technique and its implications.*
- *To enable self reliant knowledge and self employment.*

6 Hrs

UNIT - I

Introduction – Scope and Divisions of Horticulture
Gardening - Types of Garden: Informal and formal garden - Indoor garden, Terrace garden, Public garden, Kitchen garden – Gardening implements and accessories. Manures, Irrigation – significance and its types.

6 Hrs

UNIT - II

Nursery Techniques – Structure, Nursery beds, Propagation methods of horticultural plants: (Cuttage, Layerage, Graftage and budding). Garden operations: Planting and Transplantation, Pinching, Disbudding, Defoliation, Staking, Pruning, Mulching and Topiary. Bonsai techniques.

6 Hrs

UNIT - III

Orchard Cultivation techniques – Brief study of Propagation of Mango and Grapes – Fruit drop and storage of fruits.

6 Hrs

UNIT - IV

Cut flowers, Flower arrangements, Commercial floriculture, Cultural practices of Rose, Gerbera, Carnation, Chrysanthemum and Orchids.

6 Hrs

UNIT - V

Landscape - introduction and principles. Lawns: type of grasses, Lawns - dibbling, Mat fixing, maintenance of lawns. Turfing - play grounds and golf courses – Planning designs for gardens, beautification of urban areas.

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REFERENCE:

1. Chauhan, D.V.S., 1968, Vegetable production in India, Ram Prasad & sons, Agra.
2. Edmund. J.B, Senn. T.L, Andrews. F.S and Halforce. R.G, 1990. Fundamentals of Horticulture, 14th Edn., Tata McGraw Hill Co. Pvt. Ltd., London.
3. Gopalaswami Iyengar. K.S, 1970. Complete Gardening in India, Kalyan Press, Bangalore.
4. Kumar. N, 1990, Introduction to Horticulture, Ros+hini agencies, Nagercoil.
5. Prasad 2005, Principles of Horticulture, International Book Department, Deharadun.

11SSD501

2 credit

Bharathidasan University
Tiruchirappalli- 620 024

Candidates admitted in the Academic year 2011-2012 onwards

FOR ALL UG COURSES
Soft Skills Development

Learning Objective
Today's world is all about relationship, communication and presenting oneself, one's ideas and the company in the most positive and impactful way. This paper intends to enable students to achieve excellence in both personal and professional life.

Unit I
Know Thyself/ Understanding Self
Introduction to Soft skills-Self discovery-Developing positive attitude-Improving perceptions-Forming values

Unit II
Interpersonal Skills/ Understanding Others
Developing interpersonal relationship-Team building-group dynamics-Net working-Improved work relationship

Unit III
Communication Skills / Communication with others
Art of listening-Art of reading-Art of speaking-Art of writing-Art of writing e-mails-e mail etiquette

Unit IV
Corporate Skills / Working with Others
Developing body language-Practising etiquette and mannerism-Time management-Stress management

Unit V
Selling Self / Job Hunting
Writing resume/cv-interview skills-Group discussion- Mock interview-Mock GD – Goal setting - Career planning

Text Book

A book on development of Soft Skills Dr. K. Meena & Dr.V.Ayothi.
Soft Skills. Dr.K.Alex S.Chand & Company Ltd, Ram Nagar, New Delhi- 110 055

Reference Books

(i) **Developing the leader within you John c Maxwell**
(ii) **Good to Great by *Jim Collins***
(iii) **The seven habits of highly effective people Stephen Covey**
(iv) **Emotional Intelligence Daniel Goleman**
(v) **You can win Shive Khera**
(vi) **Principle centred leadership Stephen Covey**

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S. Raju 1/7/14
S. Raju 21/06/14
S. Raju 26/6/15
S. Raju 25/6/14.
24/06/15

B.Sc., Botany *(for the students admitted from 2018-19 onwards)*				
Semester	Paper Title	Paper code	Hours/ week	Credits
VI	**CC XIII – PLANT PHYSIOLOGY AND BIOCHEMISTRY**	**18 BO 613**	**4**	**4**

OBJECTIVES:

- *To study the organization and physiology of plants*
- *To understand the working mechanism in plant metabolic events.*
- *To study the integrated activities of the plants.*

UNIT- I

Plant water relations – Diffusion, imbibitions and osmosis. Plasmolysis and its significance, Absorption of water and minerals, mineral nutrition. Ascent of sap - Translocation of solutes. Munch's mass flow hypothesis. Types of transpiration – Mechanism of stomatal action. Guttation.

UNIT - II

Photosynthesis- Photosynthetic pigments- Stages of Photosynthesis, Light reactions – Cycle and non cyclic photophosphorylation. Calvin cycle, C4 and CAM pathway. Photorespiration.

Respiration – Respiratory substrates – Respiratory Quotient. Mechanism of respiration – Glycolysis, Kreb's cycle , Electron transport system, Oxidative Phosphorylation. Anaerobic respiration.

UNIT- III

Plant growth hormones - Physiological effects of auxins , gibberellins cytokinins and abscissic acid-Photoperiodism, vernalization - Seed dormancy – causes and methods of breaking dormancy, Plant rhythms and biological clock.

UNIT - IV

Carbohydrates- classifications- Monosaccharides (glucose & fructose), Oligosaccharides (Maltose & Sucrose), Polysaccharides (Starch, Glucose and Pectin) – Lipids: Classification and properties. Fatty acids and their types.

UNIT - V

Proteins- Classification, Properties and structure (primary , secondary , tertiary, and quaternary). Enzymes- major groups , properties and IUB classification. Mechanism of action and factors affecting enzyme action. Secondary metabolites and their function in plants.

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REFERENCES

1. Pandey, SN and Sinha, BK (2001). Plant Physiology. Third revised edition, Vikas publishing House Pvt. Ltd, New Delhi.
2. Jain ,VK (2007).Fundamentals of plant physiology , S. Chand & Compamy ltd, New Delhi.
3. Verma,V (2008).Text book of plant Physiology, Ane's student edition ,Newdelhi
4. Devlin, O.P. 1974. Plant Physiology, Affiliated East West Press Pvt. Ltd.
5. Noggle, G.R. & Fritz, G. (1976). Introductory Plant Physiology, Prentice – Hall, India.
6. Taiz and Zeiger, Plant Physiology, V edition, (2010), Sinauer Associates, Inc Pub Sunderland, Massachuesetts, USA.
7. Salisbury, F.B. & Ross, S. (1974). Plant Physiology, Prentice – Hall, India.
8. Rastogi , S.C (2003). Outlines of Biochemistry , CBS Publishers &Distributors , New Delhi.
9. Jain J.L. *et al.*,(2008). Fundamentals of Biochemistry, Chand, New Delhi.
10. Satyanaryana U, Chakrapaani U, (2006). Biochemistry, Books and Allied (P)Ltd.

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UNIT - V

Proteins- Classification, Properties and structure (primary , secondary , tertiary, and quaternary). Enzymes- major groups , properties and IUB classification. Mechanism of action and factors affecting enzyme action. Secondary metabolites and their function in plants.

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1. Pandey, SN and Sinha, BK (2001). Plant Physiology. Third revised edition, Vikas publishing House Pvt. Ltd, New Delhi.
2. Jain ,VK (2007).Fundamentals of plant physiology , S. Chand & Compamy ltd, New Delhi.
3. Verma,V (2008).Text book of plant Physiology, Ane's student edition ,Newdelhi
4. Devlin, O.P. 1974. Plant Physiology, Affiliated East West Press Pvt. Ltd.
5. Noggle, G.R. & Fritz, G. (1976). Introductory Plant Physiology, Prentice – Hall, India.
6. Taiz and Zeiger, Plant Physiology, V edition, (2010), Sinauer Associates, Inc Pub Sunderland, Massachuesetts, USA.
7. Salisbury, F.B. & Ross, S. (1974). Plant Physiology, Prentice – Hall, India.
8. Rastogi , S.C (2003). Outlines of Biochemistry , CBS Publishers &Distributors , New Delhi.
9. Jain J.L. *et al.*,(2008). Fundamentals of Biochemistry, Chand, New Delhi.
10. Satyanaryana U, Chakrapaani U, (2006). Biochemistry, Books and Allied (P)Ltd.

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B.Sc., Botany (for the students admitted from 2018-19 onwards)				
Semester	Paper Title	Paper code	Hours/ week	Credits
VI	Core course – XIV: PRINCIPLES OF BIOTECHNOLOGY	18 BO 614	5 4	4

OBJECTIVES:

- *To provide an opportunity to acquire more knowledge in biotechnology*
- *To enable the students to pursue higher studies and research work in biotechnology*
- *To provide an opportunity to get employment in biotechnology industries and laboratories.*

UNIT – I **15Hrs**

Principles of recombinant DNA Technology. Methods to generate desired foreign genes: isolation of prokaryotic gene by restriction enzymes and of eukaryotic gene by cDNA synthesis. Joining DNA molecules: ligases, linkers and homopolymers.

UNIT – II **15Hrs**

Cloning vectors: natural vectors - E. coli plasmids; in vitro vectors – pBR; cosmids; single-stranded DNA vectors - M13; and shuttle vectors - E. coli; Yeast shuttle vector. Selectable markers. Gene cloning strategies: cDNA library and genomic library.

UNIT – III **15Hrs**

Methods of gene transfer to bacteria and plants: Ca-transfection, microinjection, electroporation, shotgun, lipofection, Crown gall disease and Agrobacterium.

UNIT – IV **15Hrs**

Protoplast fusion technology. Applications of plant tissue culture in agriculture and forestry. Transgenic plants against herbicide, insects, drought and salinity. Genetic Use Restriction Technology. Anti-sense RNA technology and the Flavr Savr tomato.

UNIT – V **15Hrs**

Production technology of plantibodies and monoclonal antibodies by hybridoma technology. Gene therapy. Cloning animals (therapeutic andreproductive). Xenografting. Release of GMOs: Bt brinjal in India. Concerns of genetic engineering. IPRs – meaning, types (IP, Copy Rights & Patents).Arguments for & against patenting genes and life forms.

REFERENCE:

1. Dubey, RC (2004)A text book of Biotechnology - 3rd Edition , S.Chand & Company Ltd, New Delhi.

2. Gupta, PK.(2004).Elements of Biotechnology",I st edition Rastogi publications – Meerut

3. Purohit, SS.(2005), Biotechnology- Fundamentals & Application, 3rd Edition . Mrs. Saraswathi Purohit for student Edition, India.

4. Razdan, MK (2008) Introduction to plant tissue culture" ,2nd edition Oxford & IBH publishing Co. Pvt. Ltd., New Delhi.

5. Ignacimuthu , S., (2003). Plant Biotechnology. Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi.

6. Kalyan Kumar De., (1997). Plant Tissue Culture – New Central Book Agency (P) Ltd., Calcutta.

7. Kumaresan, V, (2009). "Biotechnology", Saras Publications, Nagercoil.

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B.Sc., Botany *(for the students admitted from 2018-19 onwards)*				
Semester	Paper Title	Paper code	Hours/ week	Credits
VI	Core course – XIV: **PRINCIPLES OF BIOTECHNOLOGY**	**18 BO 614**	5 4	4

OBJECTIVES:

- *To provide an opportunity to acquire more knowledge in biotechnology*
- *To enable the students to pursue higher studies and research work in biotechnology*
- *To provide an opportunity to get employment in biotechnology industries and laboratories.*

UNIT – I **15Hrs**

Principles of recombinant DNA Technology. Methods to generate desired foreign genes: isolation of prokaryotic gene by restriction enzymes and of eukaryotic gene by cDNA synthesis. Joining DNA molecules: ligases, linkers and homopolymers.

UNIT – II **15Hrs**

Cloning vectors: natural vectors - E. coli plasmids; in vitro vectors – pBR; cosmids; single-stranded DNA vectors - M13; and shuttle vectors - E. coli; Yeast shuttle vector. Selectable markers. Gene cloning strategies: cDNA library and genomic library.

UNIT – III **15Hrs**

Methods of gene transfer to bacteria and plants: Ca-transfection, microinjection, electroporation, shotgun, lipofection, Crown gall disease and Agrobacterium.

UNIT – IV **15Hrs**

Protoplast fusion technology. Applications of plant tissue culture in agriculture and forestry. Transgenic plants against herbicide, insects, drought and salinity. Genetic Use Restriction Technology. Anti-sense RNA technology and the Flavr Savr tomato.

UNIT – V **15Hrs**

Production technology of plantibodies and monoclonal antibodies by hybridoma technology. Gene therapy. Cloning animals (therapeutic andreproductive). Xenografting. Release of GMOs: Bt brinjal in India. Concerns of genetic engineering. IPRs – meaning, types (IP, Copy Rights & Patents).Arguments for & against patenting genes and life forms.

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REFERENCE:

1. Dubey, RC (2004)A text book of Biotechnology - 3rd Edition , S.Chand & Company Ltd, New Delhi.

2. Gupta, PK.(2004).Elements of Biotechnology",1 st edition Rastogi publications – Meerut

3. Purohit, SS.(2005), Biotechnology- Fundamentals & Application, 3rd Edition . Mrs. Saraswathi Purohit for student Edition, India.

4. Razdan, MK (2008) Introduction to plant tissue culture" ,2nd edition Oxford & IBH publishing Co. Pvt. Ltd., New Delhi.

5. Ignacimuthu , S., (2003). Plant Biotechnology. Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi.

6. Kalyan Kumar De., (1997). Plant Tissue Culture – New Central Book Agency (P) Ltd., Calcutta.

7. Kumaresan, V, (2009). "Biotechnology", Saras Publications, Nagercoil.

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REFERENCE:

1. Dubey, RC (2004)A text book of Biotechnology - 3rd Edition , S.Chand & Company Ltd, New Delhi.

2. Gupta, PK.(2004).Elements of Biotechnology",I st edition Rastogi publications – Meerut

3. Purohit, SS.(2005), Biotechnology- Fundamentals & Application, 3rd Edition . Mrs. Saraswathi Purohit for student Edition, India.

4. Razdan, MK (2008) Introduction to plant tissue culture" ,2nd edition Oxford & IBH publishing Co. Pvt. Ltd., New Delhi.

5. Ignacimuthu , S., (2003). Plant Biotechnology. Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi.

6. Kalyan Kumar De., (1997). Plant Tissue Culture – New Central Book Agency (P) Ltd., Calcutta.

7. Kumaresan, V, (2009). "Biotechnology", Saras Publications, Nagercoil.

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B.Sc., Botany *(for the students admitted from 2018-19 onwards)*				
Semester	Paper Title	Paper code	Hours/ week	Credits
VI	Core course – XV: **PLANT ECOLOGY AND PHYTOGEOGRAPHY**	**18 BO 615**	**4**	**4**

OBJECTIVES:

- *To study the various aspects of ecology*
- *To know about various ecological factors*
- *To know in detail on various types of vegetation*
- *To understand the principles of phytogeography.*

UNIT- I **15 Hrs**

Approaches to the study of Ecology – Autecology – Synecology – Ecological adaptation of Hydrophytes, Mesophytes, Xerophytes, Halophytes, Epiphytes and Lithophytes.

UNIT- II **15 Hrs**

Ecological factors – Climatic factors: Light, Temperature, Precipitation, Atmospheric humidity and wind.

Edaphic factors: Soil components and their effects on vegetation.

Biotic factors: Interaction between plants growing in community and living organism.

Succession: Kinds of succession: Hydrosere and Xerosere.

UNIT- III **15 Hrs**

Population Ecology – Basic concept – Characteristics of population – Population structure.

Community Ecology:

Characteristics of community, Development of vegetation: migration – colonization, Ecesis, Methods of study of vegetation (quadrat & transect). Units of vegetation – formation, association, consociation and society.

UNIT- IV **15 Hrs**

Vegetation types of India – Evergreen, Deciduous, scrub jungle, sand dunes and mangroves. Plants as bio indicators and environmental monitoring. Remote sensing and role of GIS in natural resources management.

UNIT- V **15 Hrs**

Phytogeography – Principles – Phytogeographical zones of India – Floristic and Climatic regions of India. Age and area hypothesis, Continental drift. Endemism – types of endemics and endemism in Indian flora.

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REFERENCES

1. Sharma, P.D (2009). Ecology and Environment, Rastogi Publications.
2. Shukla, R.S. &P.S. Chandel (1991) : Plant Ecology & Soil Science S.Chand& Co., New Delhi.
3. Vasishta, P.C, (1979) Plant Ecology, Vishal Publication.
4. Verma, V, A (1981) Text Book of plant Ecology, Emkay Publication.
5. Sharma, J.P. (2004). Environmental Studies, Laxmi Publications (P) Ltd. New Delhi.
6. Ambasht R.S., (1978). The Book of Plant Ecology, Students friends Co.
7. Odum, E.P. (1971). Fundamentals of Ecology (2 ndEdn.). Saunders & Co.,
8. Philadelphia &Natraj Publishers, Dehradun.
9. Cain, S.A. (1944). Foundations of Plant Geography Harper & Brothers, N.Y.
10. Mani, M.S (1974): Ecology &Biogeography of India Dr. W. Junk Publishers,heHaque.
11. Good, R. (1997): The Geography of flowering Plants (2ndEdn.,) Longmans. Green & Co., Inc., London & Allied Science Publishers, New Delhi-495pp.,

B.Sc., Botany *(for the students admitted from 2018-19 onwards)*				
Semester	Paper Title	Paper code	Hours/ week	Credits
VI	**Core course –XVI– MAJOR PRACTICAL – XVI (covering the core course – XIII, XIV and XV)**	**18 BOP 616**	**6**	**5**

- Experiments to be carried out by students in physiology – Osmotic pressure (plasmolytic method), Osmosis (potato osmoscope), determination of water potential, absorption and transpiration, Ganong's potometer, Willmott's bubbler (effect of monochromatic light), effect of Co2 concentration on photosynthesis, separation of leaf pigments (paper chromatography), Ganong's respiroscope.

- Experiments for demonstration only - in physiology – Thistle funnel experiment, test-tube funnel experiment, Khune's vessel, buffer, colorimeter, pH meter.

- Biochemistry – Qualitative tests for carbohydrates, Paper chromatography, thin layer chromatography and column chromatography.

- Biotechnology – Sterilization techniques, preparation of MS medium, isolation of protoplast (mechanical method), callus induction, encapsulation of embryoids (synthetic seeds), visit to a tissue culture laboratory.

- Ecology – Study of plant community by –species area curve method, quadrat method (qualitative and quantitative), line transect method. – Morpho anatomical studies of xerophytes, mesophytes, hydrophytes, halophytes, parasites and epiphytes. – Study of pond ecosystem, study of soil.

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B.Sc., Botany (*for the students admitted from 2018-19 onwards*)				
Semester	Paper Title	Paper code	Hours/ week	Credits
VI	**Major Based Elective - II: PLANTS AND SOCIETY**	**18 BOE 602**	**4**	**4**

OBJECTIVES:

- *To study the economic aspects of selected crops.*
- *To study the utilization of plants as food for human.*

UNIT- I **9 Hrs**

Scope and Importance of plants and plant products.

Distribution, method of cultivation, improved varieties and nutritive values of the following Cereals: Rice, Wheat, Maize, Rye, Oats and Barley.

UNIT- II **9 Hrs**

Distribution, method of cultivation, improved varieties and nutritive values of the following Millets: Pearl millet, Sorghum, Finger millet, Koda millet and Fox tail millet.

UNIT- III **9 Hrs**

Distribution, method of cultivation, improved varieties and nutritive values of the following Pulses: Red gram, Black gram, Peas, Bengal gram and Soya bean.

Oil crops: Sunflower and Olives.

UNIT -IV **9 Hrs**

Distribution, method of cultivation, improved varieties and economic values of the following Fiber plants: Cotton and Jute.

Timber yielding plants – Teak, Rose wood.

UNIT- V **9 Hrs**

Distribution, method of cultivation, improved varieties, extraction methods and economic values of the following Sugar crops: Sugar cane and Sugar beet.

Distribution, method of cultivation, therapeutic values of the following Medicinal plants: *Stevia rebaudiana* and *Gloriosa superba*.

REFERENCES:

1. Ashok Bendre and Ashok Kumar (1998-99). Economic Botany. Rastogi Publications, Meerut.
2. GovindaPraksh and Sharma, S.K. (1975).Introductory Economic Botany. Jai PrakashNath, Meerut.
3. Gupta, S.K. and Kaushik, M.P. (1973). An Introduction to Economic Botany. K. Nath& Co., Meerut.
4. Hill, A.W. (1952). Economic Botany. Tata McGraw–Hill Publishing Co., New Delhi.
5. Pandey, B.P. (2000). Economic Botany. S. Chand & Company Ltd., New Delhi.
6. Sambamurthy, A.V.V.S. and Subrahmânyan, N.S. (1989). A Text Book of Economic Botany. Wiley Eastern Ltd., Madras.
7. Sen, S. (1992). Economic Botany.New Central Book Agency, Calcutta.
8. Verma, V. (1974). A Text Book of Economic Botany.Emkay Publications, New Delhi.

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B.Sc., Botany *(for the students admitted from 2018-19 onwards)*				
Semester	Paper Title	Paper code	Hours/ week	Credits
VI	**Major Based Elective – III: BIOFERTILIZERS**	**18 BOE 603**	**4**	**4**

OBJECTIVES:

- *To understand the importance of biofertilizers in agriculture*
- *To know various types of microbial inoculants used as biofertilizers*
- *To know the methodology of isolation, identification, cultivation, mass multiplication and method of application of biofertilizers.*

UNIT- I **12 Hrs**

Biofertilizers - Scope and importance of biofertilizers. Types of biofertilizers – cyanobacteria, algal, fungal and bacterial. Impact of biofertilizers in sustainable agriculture.

UNIT – II **12 Hrs**

Isolation, inoculum production, Mass multiplication, Field application and Crop response of *Mycorrhizae*: AM fungi. Mechanism of translocation of nutrients.

UNIT – III **12Hrs**

Distribution, study of Characteristics, isolation, Mass multiplication, Field application and Crop response of cyanobacteria: *Nostoc, Anabaena, Scytonema.*
Study of Characteristics, mass multiplication and, Field application of Azolla.

UNIT – IV **12 Hrs**

Bacterial biofertilizers - Isolation, Mass multiplication, Field application and Crop response of Rhizobium, Azospirillum, Azotobacter and Phosphobacteria (PGPR)

UNIT – V **12 Hrs**

Carrier based inoculants – types of carriers - mode of packaging and storage methods- role of government in quality control and subsidiaries- marketing potential of biofertilizers.

REFERENCE

1. SubbaRao, N.S. (2000). Soil Microbiology. Oxford and IBH Publishing Co. Ltd., New Delhi.
2. SubbaRao, N. S., 1998, Biofertilizers in agriculture and forestry. India Book House Ltd. New Delhi.
3. Somani. L.L. (2007). Hand book of Biofertilizers, Agrotech Publishing Academy, Udaipur.
4. Jaiswal, A.P. and Gupta, N.C. (2013), Biofertilizers technology, Enkay publishing house, New Delhi.
5. Varma, A. and Hock, B. (1995). Mycorrhiza. Springer–Verlag, Berlin.
6. Purohit S.S. (1999) Basic & agricultural biotechnology, Agrobotanica publishers. New Delhi

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B.Sc., Botany (for the students admitted from 2018-19 onwards)				
Semester	Paper Title	Paper code	Hours/ week	Credits
VI	**Skill Based Course – III MUSHROOM TECHNOLOGY**	**18 SBO 603**	**2**	**2**

OBJECTIVES:

- *To understand the cultivation technology of mushrooms.*
- *To understand the concept of mushroom storage and analyze problems in mushroom cultivation.*

UNIT - I **6 Hrs**

Introduction-History-Scope and importance of mushroom cultivation. Mushroom research and development - Present status of mushroom industry in India - National and international agencies.

UNIT - II **6 Hrs**

Morphology - classification: edible and poisonous mushrooms.
Life cycle of Basidiomycetes fungi- Breeding and Genetic improvement of mushroom strains. Medicinal and Nutritional value of mushrooms.

UNIT - III **6 Hrs**

Mushroom cultivation Techniques and conditions for tropical and temperate regions – Mushroom hut. Isolation, spawn production, growth media, spawn running and harvesting of Mushrooms (*Volvariella* spp., *Pleurotus* spp., *Agaricus* spp., *Calocybe* spp., and *Lentinus* spp).

UNIT - IV **6 Hrs**

Diseases / contamination and pests of mushrooms – bacterial blotch, green mold, Brown plaster mold, cab web, - pests – cocid and phorid flies, and their management.

UNIT - V **6 Hrs**

Post Harvest Technology: Processing and Preservation: Storage of edible mushroom – Freezing, drying, freeze drying and canning.
Delicious recipes and value added products of mushrooms - marketing strategies of mushrooms.

REFERENCES:

1. Nita Bahl, (2002). Hand Book on Mushroom Cultivation. 4th Edition, Vijay Primlani for Oxford & IBH Publishing Co., Press, New York, New Delhi.
2. Biswas, S, Datta, M and Nagachan, S.V. (2012). Mushrooms- A manual for cultivation. PHI Learning Private Limited, New Delhi.
3. Krishnamoorthy, (1999). Hand Book of Mushroom Cultivation. TNAU Publications, Coimbatore, TN,India.
4. Dey S.C., (2000), Mushroom growing, Agrobios (India), Jodhpur.
5. Jana, B.L. (2014), Mushroom culture, Agrotech publishing Academy, Udaipur.

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Allied Course – Botany for *Zoology* (Day) & Microbiology (Eve)

and Non Major Elective Course for *Zoology* (Day)

offered by Botany Department

(For the candidates admitted from the academic year 2018-2019 onwards)

Sem	Part	Course	Title	Inst. Hrs./ Week	Cre dit	Exam Hrs	Marks		Total
							Inter	Ext	
I	III	AC 1	Allied Botany Theory – I	4	4	3	25	75	100
I	III	AC 2	Allied Botany Practical I	2	1	3	40	60	100
II	III	AC 3	Allied Botany Theory – II	4	4	3	25	75	100
II	III	AC 4	Allied Botany Practical II	2	1	3	40	60	100
V	III	NMEC 1	Economic Botany	2	2	3	25	75	100
VI	III	NMEC 2	Biofertilizer& Mushroom Technology	2	2	3	25	75	100

B.Sc., Zoology and B.Sc., Microbiology *(for the students admitted from 2018-19 onwards)*				
Semester	Paper Title	Paper code	Hours/ week	Credits
I	**Allied Course – I: BOTANY - I (PLANT DIVERSITY, ANATOMY AND EMBRYOLOGY)**	**18 ABO 101**	7	4

OBJECTIVES:

- *To understand the major groups of plants and their Characteristics.*
- *To study the basic principles of embryology and anatomy.*

UNIT-I: **21Hrs**

General account of Bacteria: ultrastructure, mode of nutrition and economic importance.
Viruses: Physical and chemical nature, Ultrastructure of TMV, Bacteriophage, Replication
Fungi :*Penicillium&Agaricus*

UNIT-II: **21Hrs**

Thallophytes– Structure, reproduction and life cycle of the following
Algae: *Nostoc, Oedogonium, Polysiphonia*
Bryophytes :*Marchantia&Funaria*

UNIT-III:

Study of the Structure, reproduction and life cycle of the following **21Hrs**
Pteridophyta:*Lycopodium*and *Nephrolepis*
Gymnosperms:*Cycas*and *Gnetum*

UNIT-IV: **21Hrs**

Anatomy: Tissues – Simple and Complex
Primary structure: Dicot – Root, stem & leaf
Normal Secondary thickenings: Dicot Stem(*Boerrhavia)*
andMonocot Stem(*Dracaena).*

UNIT-V: **21Hrs**

Embryology: Microsporangium and male gametophyte.
Megasporangium- Types of Ovule and Female gametophyte (*Polygonum*type) Double fertilization, Types of endosperm, Structure of dicot embryo.

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REFERENCES:

1. Pandey, B.P. (2001). College Botany Vol. I: Algae, Fungi, Lichens, Bacteria, Viruses, Plant Pathology, Industrial Microbiology and Bryophyta. S. Chand & Company Ltd., New Delhi.
2. Sharma, PD (2003).The Fungi. Rastogi Publications, Meerut
3. Gangulee&Khar, 1980. College Botany Vol. I &II Tata McGraw Hill, New Delhi.
4. Vashishta , P.C , Sinha and Anilkumar (2010). Pteridophytes, S.Chand&company Ltd, New Delhi
5. Pandey, S.N., Misra, S.P and Trivedi, P.S. 1970. A text book of Botany (Vol II).Vikas PublishingHouse Pvt. Ltd. Delhi.
6. Pandey B,P., (2015)(Edn.) Plant Anatomy S. Chand Publ. New delhi.
7. Vashista P.C (1984). Plant Anatomy –Pradeep publication , Jalandhar
8. Bhojwani, S.S. and Bhatnagar, S.P. (2011). The Embryology of Angiosperms, 5th Edition, Vikas Publishing House. Delhi.
9. Pandey , AK (2000). Introduction to Embryology of Angiosperms 1st Edition :CBS; New Delhi

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B.Sc., Zoology and B.Sc., Microbiology *(for the students admitted from 2018-19 onwards)*				
Semester	Paper Title	Paper code	Hours/ week	Credits
I	**Allied Course – II BOTANY PRACTICAL – I (Covering the syllabus of Allied theory paper – I)**	**18 ABOP 102**	**2**	**1**

- To make suitable micro preparations of algae, fungi, bryophytes, pteridophytes, gymnosperms (mentioned in the syllabus) and to describe and identify the same.

-To make suitable micro preparations of the stem, root and leaf of dicot and monocot and to identify the same giving reasons.

- To make suitable micro preparations and detailed microscopic analysis of normal secondary thickenings: Dicot Stem (*Boerrhavia*) and Monocot Stem (*Dracaena*).

- To demonstrate the developmental stages of micro and megasporangia.

- To study the different types of ovules and endosperms

- To critically comment on the structure of bacteria and viruses (TMV and T4 phage).

- To maintain observation and record note book.

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B.Sc., Zoology and B.Sc., Microbiology *(for the students admitted from 2018-19 onwards)*				
Semester	Paper Title	Paper code	Hours/ week	Credits
II	**Allied Course – III : BOTANY-II (TAXONOMY, PHYSIOLOGY, ECOLOGY, AND BIOTECHNOLOGY)**	**18 ABO 203**	7	4

OBJECTIVES:

- *To study in the basic system of classification and salient features of a few families.*
- *To understand the physiological principles of plants.*
- *To understand the basic mechanism involved in biotechnology.*
- *To study the basic principles of ecology.*

UNIT-I: **21Hrs**

TAXONOMY: Outline of Bentham and Hookers Classification. Study of the following families and economic importance of plants included in the families.
Nymphaceae, Rutaceae, Fabaceae, Cucurbitaceae.

UNIT-II: **21Hrs**

Rubiaceae, Asclepiadaceae, Lamiaceae, Amaranthaceae, Arecaceae and Poaceae.

UNIT-III: **21Hrs**

PHYSIOLOGY: Absorption of water, Absorption of minerals, Photosynthesis - Light and dark reaction.

Respiration: Aerobic-Glycolysis, kreb's Cycle, Electron Transport System, Anaerabic – fermentation. Growth hormones –PhysiologicalEffects and practical applications of Auxin, Gibberellins andcytokinins.

UNIT-IV: **21Hrs**

ECOLOGY: Basic concept of Ecosystem
Factors affecting Vegetation-Climatic, edaphic and biotic factors.
Xerophytes-*Nerium*and *Opuntia*.
Hydrophytes-*Hydrilla* and *Nymphaea.*
Mesophytes-*Helianthus* and*Hibiscus.*

UNIT-V: **21Hrs**

BIOTECHNOLOGY
Tissue culture techniques (Basic principles, Aseptic conditions, MS media, callus induction)
Genetic Engineering - Basic principles, tools, techniques and applications
Transgenic plants-Bt - Cotton

REFERENCE:

1. Pandey, B.P.(1997).Taxonomy of Angiosperms , S.Chand& Co., New Delhi.
2. SambamurthyA..S.S. 2005;Taxonomy of Angiosperms, I.K. International Pvt. Ltd, New Delhi.
3. Jain ,VK (2007).Fundamentals of plant physiology , S. Chand &Company ltd, New Delhi.
4. Verma,V (2008).Text book of plant Physiology, Ane's student edition ,New Delhi
5. Sharma, P.D (2009). Ecology and Environment, Rastogi Publications.
6. Shukla, R.S. &P.S. Chandel (1991) : Plant Ecology & Soil Science S.Chand& Co., New Delhi.
7. Dubey, RC (2004)A text book of Biotechnology - 3rd Edition , S.Chand& Company Ltd, New Delhi.
8. Kumaresan, V, (2009). "Biotechnology", Saras Publications, Nagercoil.

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B.Sc., Zoology and B.Sc., Microbiology *(for the students admitted from 2018-19 onwards)*				
Semester	Paper Title	Paper code	Hours/ week	Credits
II	**Allied –IV BOTANY PRACTICAL – II (Covering the syllabus of Allied theory paper – II)**	**18 ABOP 204**	**2**	**1**

- To describe the plants in technical terms and to identify the family by the observed morphological characters of vegetative and floral parts.

- To dissect the flower and to construct the floral diagram.

- To critically comment the experimental set-ups in plant physiology.

- To demonstrate the ecological groups of plants (morphological and anatomical adaptations)

- To acquire practical knowledge in tissue culture techniques (media preparation, callus induction, etc)

- To critically comment the tools and techniques in genetic engineering.

- To maintain observation and record note book.

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B.Sc., Zoology *(for the students admitted from 2018-19 onwards)*				
Semester	Paper Title	Paper code	Hours/ week	Credits
V	**Non Major Elective Course – I ECONOMIC BOTANY (for III B.Sc., Zoology students)**	**18 NMBO 501**	**2**	**2**

OBJECTIVES:

- *To study the economic aspects of selected crops*
- *To study the utilization of plants as food for human*

UNIT - I **09 Hrs**

Scope of economic botany. Distribution, method of cultivation, improved varieties and nutritive values of the following: Mango, Cashew, Coffee, Pepper, Turmeric, Rubber and Aloe.

UNIT - II **09 Hrs**

Distribution, method of cultivation, improved varieties and nutritive values of the following:
Cereals and millets - Paddy, Maize, Ragi and Jowar.

UNIT - III **09 Hrs**

Distribution, method of cultivation, improved varieties and nutritive values of the following Pulses: Red gram, Black gram, Peas, Bengal gram and Soya bean.

UNIT – IV **09 Hrs**

Distribution, method of cultivation, improved varieties and nutritive values and oil extraction of the following: Ground nut and Gingely oil.
Timber yielding plants: Teak and Rattan.

UNIT – V **09 Hrs**

Distribution, method of cultivation, improved varieties and values of the following:
Fiber plants - cotton.
Medicinal plants - Holy basil and keezhanelli.

REFERENCES:

1. Ashok Bendre and Ashok Kumar (1998-99). Economic Botany. Rastogi Publications, Meerut.
2. Govinda Praksh and Sharma, S.K. (1975). Introductory Economic Botany. Jai Prakash Nath, Meerut.
3. Gupta, S.K. and Kaushik, M.P. (1973). An Introduction to Economic Botany. K. Nath & Co., Meerut.
4. Hill, A.W. (1952). Economic Botany. Tata McGraw–Hill Publishing Co., New Delhi.
5. Pandey, B.P. (2000). Economic Botany. S. Chand & Company Ltd., New Delhi.
6. Sambamurthy, A.V.V.S. and Subrahmanyan, N.S. (1989). A Text Book of Economic Botany. Wiley Eastern Ltd., Madras.
7. Sen, S. (1992). Economic Botany. New Central Book Agency, Calcutta.
8. Verma, V. (1974). A Text Book of Economic Botany. Emkay Publications, New Delhi.
9. Simpson, B.B., Ogozaly, M.C., (2001) Economic Botany (3rd Edition) Newyork: McGraw- Hill.
10. Marriyaom H. Reshid, (2017).The Flavour of Spices – Journeys, Recipes and Stores, Hochette India.

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B.Sc., Botany (*for the students admitted from 2018-19 onwards*)				
Semester	Paper Title	Paper code	Hours/ week	Credits
VI	**NMEC – II - BIOFERTILIZER AND MUSHROOM TECHNOLOGY (FOR III B.SC., ZOOLOGY STUDENTS)**	**18 NMBO 602**	**2**	**2**

OBJECTIVES:

- *To know the basic aspects of biofertilizers*
- *To know about the production and mass multiplication of various microbes used as fertilizers*
- *To understand the cultivation technologies of mushrooms*

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UNIT- I **6 Hrs**

Biofertilizers - Scope and significance of biofertilizers. Types of biofertilizers – Cyanobacteria, algal, fungal and bacterial.

Isolation, Mass multiplication and Field application of cyanobacteria: *Nostoc.*

Mass multiplication and field application of Azolla.

UNIT- II **6 Hrs**

Bacterial biofertilizers - Isolation, Mass multiplication and Field application of Rhizobium, and Phosphobacteria.

Mechanism of Biological Nitrogen fixation (Symbiotic)

UNIT-III **6 Hrs**

Isolation, Inoculum production, Mass multiplication and Field application of *Mycorrhizae*: AM fungi. Mechanism of translocation of nutrients.

Marketing potential of biofertilizers.

UNIT- IV **6 Hrs**

Scope and importance of Mushroom cultivation.

Edible and poisonous mushroom - Nutritional and medicinal value of edible mushrooms.

Morphology and life cycle of edible mushrooms - *Agaricus* and *Pleurotus.*

UNIT-V **6 Hrs**

Mushroom cultivation Techniques and conditions for – Mushroom hut. Isolation, spawn production, growth media, spawn running and harvesting of Oyster mushrooms. Preservation and storage.

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REFERENCE:

1. Subba Rao. N.S (2000) . Soil microbiology, oxford and IBH Publishing Co., Ltd., New Delhi.
2. Subba Rao. N.S (1998). Biofertilizer in agriculture and forestry. India book house Ltd., New Delhi
3. Somani, L.L (2007). Hand book of biofertilizers, Agrotech publishing Academy, Udaipur.
4. Nita Bahal (2002) Hand on mushroom cultivation. 415 Edition, Vijay primlani for oxford & IBH Publishing Co., press new yark, New Delhi.
5. Krishnamoorty, (1999), Hand Book of mushroom cultivation TNAU Publications, Coimbatore, TN, India.
6. Dey S.C, (2000), Mushroom growing Agrobios (India) Jodhpur.
7. Jana, B.L (2014), Mushroom culture, Agrotech publishing Academy, Udaipur.

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A.V.C.COLLEGE (AUTONOMOUS) MANNAMPANDAL
MAYILADUTHURAI
QUESTION PAPER PATTERN
UG/ PG 2015 ONWARDS

Course Code:

A.V.C.COLLEGE (AUTONOMOUS) MANNAMPANDAL, MAYILADUTHURAI
[Degree] Examinations, [Month and Year]
[Major] –[Semester no.]
[Title of the paper]

Time: Three Hours

Maximum: 75 marks

SECTION A - (10X2=20 MARKS)
Answer ALL questions

1. } From Unit – I
2. }
3. } From Unit – II
4. }
5. } From Unit – III
6. }
7. } From Unit – IV
8. }
9. } From Unit – V
10. }

SECTION B - (5X5=25 MARKS)
Answer ALL questions, choosing either (a) or (b)

11. (a) OR (b) → From Unit - I
12. (a) OR (b) → From Unit - II
13. (a) OR (b) → From Unit - III
14. (a) OR (b) → From Unit - IV
15. (a) OR (b) → From Unit - V

SECTION C - (3X10=30 MARKS)
Answer any THREE questions

16. → From Unit - I
17. → From Unit - II
18. → From Unit- III
19. → From Unit - IV
20. → From Unit - V

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A.V.C.COLLEGE(AUTONOMOUS) MANNAMPANDAL
MAYILADUTHURAI

NON MAJOR ELECTIVE
SBC, SSD, EA, VBC & ES.
QUESTION PATTERN
(UP TO 2012 ONWARDS)

TIME: 3HRS. MAX: 75 MKS.

Answer **Five** out of Eight essay type questions which cover all the five units with not more than **Two** questions from **each unit**.

B.Sc., BOTANY MAJOR AND ALLIED BOTANY -THEORY

QUESTIONPAPER MODEL (for Core Course, Major Based Elective & Allied Course)

B.Sc., Degree Examination, APRIL / NOVEMBER

Time: 3 hrs. Maximum: 75 Marks

Part – A (10 x 2 = 20 Marks)
Answer ALL the questions.
All questions carry equal marks. Draw diagrams wherevernecessary.
Each answer should not exceed 50 words
(Twoquestions from each unit)

Q.No. 1&2 From UNIT-I

Q.No. 3& 4- From UNIT-II

Q.No. 5&6 From UNIT-III

Q.No. 7&8 From UNIT-IV

Q.No. 9&10From UNIT-V

Part – B (5x5 = 25 marks)
Answer ALL the questions
All Question carry equal marks
(One question from each unit with internal choice)
Each answer should not exceed 200 words.

Q.No. 11.a (or) b From UNIT-I

Q.No. 12.a (or) b From UNIT-II

Q.No. 13.a (or) b From UNIT-III

Q.No. 14.a (or) b From UNIT-IV

Q.No. 15.a (or) b From UNIT-V

Part – C (3x10 = 30 marks)
Answer any THREE questions
One question from each unit
All Question carry equal marks. Each answer should not exceed 500 words.

Q.No. 16.From UNIT-I

Q.No. 17. From UNIT-II

Q.No. 18 From UNIT-III

Q.No. 19.From UNIT-IV

Q.No. 20. From UNIT-V

B.Sc., BOTANY -THEORY

QUESTIONPAPER MODEL

(for Skill Based Courses & Non-Major Elective Courses) & SSD, EA, VBC, ES

B.Sc., Degree Examination, APRIL / NOVEMBER

Time: 3 hrs. Maximum: 75 Marks

Answer anyFIVE questions. (5 X 15 = 75)
All questions carry equal marks.
Draw diagrams wherever necessary.

(One question compulsorily from each unit & not more than two questions from a unit)

1.

2.

3.

4.

5.

6.

7.

8.

A.V.C.COLLEGE (AUTONOMOUS),MANNAMPANDAL,MAYILADUTHURAI.

M.Sc., BOTANY

Programme structure under CBCS

(For the candidates admitted from the academic year 2018-2019 onwards)

Semester	Course	Title	Int. Hrs./ Week	Credit	Exam. Hours	Marks		Total
						Inter	Ext	
I	CC I	Plant Diversity – I (Algae, Fungi, Lichens & Bryophytes)	07	05	03	25	75	100
	CC II	Plant Diversity – II (Pteridophytes, Gymnosperm and Paleobotany)	07	05	03	25	75	100
	CC III	Anatomy Morphogenesis and Experimental Embryology	06	05	03	25	75	100
	CC IV	Practical-I (Cov. CCI to CCIII)	06	03	04	40	60	100
	EC-1	Elective- Horticulture and Plant Breeding	04	04	03	25	75	100
II	CC V	Taxonomy & Economic Botany	07	05	03	25	75	100
	CC VI	Cytogenetics, Evolution & Molecular Biology	07	05	03	25	75	100
	CC VII	Microbiology & Phytopathology	06	05	03	25	75	100
	CC VIII	Practical-II (Cov.CC V to VII)	06	03	04	40	60	100
	EDC-1	Offered by other departments	04	02	03	25	75	100
III	CC IX	Physiology, Biochemistry & Biophysics	06	05	03	25	75	100
	CC X	Biotechnology & Genetic Engineering	05	05	03	25	75	100
	CC XI	Principles of Ecology & Forest Science	05	05	03	25	75	100
	CC XII	Practical-III(Cov.CC IX to XI)	06	03	04	40	60	100
	EC-II	Elective – Marine Botany	04	04	03	25	75	100
	EDC-II	Offered by other departments	04	02	03	25	75	100
IV	CC XIII	Ethanobotany & Herbal Technology	06	05	03	25	75	100
	CC XIV	Research Methodology	06	05	03	25	75	100
	CC XV	Practical-IV (Cov.CCXIII&XIV)	06	04	04	40	60	100
	EC-III	Bioinformatics and Bionanotechnology	06	04	03	25	75	100
		Project Work & Viva-Voce	06	06	-	-	-	100

EDC: Offered by department of Botany

1. **Horticulture;**
2. **Herbal medicine.**

SEMESTER – I **Hrs. / WEEK - 7**
CODE – 18 PBO 101 **CREDIT –5**

CORE COURSE – I: PLANT DIVERSITY – I (ALGAE, FUNGI, LICHENS AND BRYOPHYTES)

(From the academic year 2018 – 2019 onwards)

OBJECTIVES:

- To understand the major groups of plants and their Characteristics.
- To trace their interrelationships and to study their economic importance and evolutionary trends.

UNIT – I **ALGAE** **21 Hrs.,**

General characteristic features of Algae.
Classification of Algae (Fritsch).
Salient features of major classes: Chlorophyceae, Xanthophyceae, Bacillariophyceae, Phaeophyceae, Rhodophyceae and Myxophyceae.
Ultrastructure of Prokaryotic and Eukaryotic algal cell.
Algal Pigments.

UNIT – II **ALGAE:** **21 Hrs.,**

Range of thallus variation and reproduction in Algae.
Origin and evolution of sex in algae.
Life Cycle patterns in Algae.
Economic Importance of Algae.
Fossil Algae.

UNIT – III **FUNGI** **21 Hrs.,**

General characteristic features of Fungi.
Classification of Fungi (Alexopoulous).
Salient features of major classes: Chytridiomycetes, Zygomycetes, Ascomycetes, Basidioimycetes, Deuteromycetes.
Nutrition, mycelial structure and fruit bodies in fungi.
Homothallism, Heterothallism and parasexuality in fungi.

UNIT – IV **FUNGI & LICHENS** **21 Hrs.,**

Reproduction in Fungi.
Economic Importance of Fungi
Fossil fungi.
Lichens: General characteristic features and composition of Lichens.
Thallus organization of Lichens.
Economic Importance of Lichens.

UNIT – V **BRYOPHYTES** **21 Hrs.,**

General characteristic features of Bryophytes.
Classification of Bryophytes (Rothmaler).
Salient features of major classes: Hepaticopsida, Anthoceratopsida and Bryopsida.
Origin and evolutionin Bryophytes.
Gametophytic and Sporophytic Structures in Bryophytes.
Reproduction and Alternation of generations in Bryophytes.
Economic importance of Bryophytes

REFERENCES:

Pandey B. P. (2011), College Botany (Algae, Fungi, Lichens, Bacteria, Viruses, Plant Pathology, Bryophyta). S. Chand &company, New Delhi.

Fritsch F.E. (1935 The Structure & Reproduction ofAlgae 1945): Cambridge University Press Cambridge, U.K. Vol. I, Vol. II.

Smith, G.M (1955) :Cryptogamic Botany(Vol. I Algae, Fungi, & Lichens) McGraw-Hill Book Co., New York .

Ian Morris (1967): An Introduction to the Algae, Hutchinson, London.

Bold, H. C. and Wyne, M. J. (1978). Introduction of Algae Structure and Reproduction. Prentice Hall, New Jersey.

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Vashishta, B.R. et al. (2008). Botany for Degree Students – Algae. S. Chand and Co. Ltd., New Delhi.

Pelczar, M.J. (2001) Microbiology, 5th edition, Tata Mc Graw-Hill Co, New Delhi.

Presscott, L. Harley, J. and Klein, D. (2005) Microbiology, 6th edition, Tata McGraw- Hill Co. New Delhi.

Alexopoulos,C.J.., Mims, C.W. & Blackwell, M. (1996): Introductory Mycology John Wiley& Sons., Inc., N.Y., Chicester, Berisbane, Toronto, Singapore.

Webster, J (1999) : Introduction to Fungi(2nd edition) Cambridge University Press.

Smith, G.M. (1955): Cryptogamic Botany Vol. II. (2nd Edition) (Bryophytes & Pteridophytes) Tata McGraw Hill Publishing Co., New Delhi.

Sharma, OP (2013). Bryophytes , McGraw Hill education (India) Pvt.Ltd,New Delhi

Parihar, NS (1991). An introduction to Embryophyta. Vol. I. Bryophyta. Central Book Depot, Allahabad.

Vashishta, PC (1999). Bryophyta, S.Chand & Company, New Delhi.

Vashishta, Sinha AK (2011). Bryophytes, S.Chand &Company ltd., New Delhi

Sharma, P.D. (1987). The Fungi. Rastogi and Co., Meerut.

Vashishta, B.R. and Sinha, A.K. (2007). Botany for Degree Students – Fungi . S. Chand and Co. Ltd., New Delhi.

A.V.C. College (Autonomous), Mannampandal, Mayiladuthurai.

Even Semester - Model Question Paper

Class: I – M.Sc., Subject: Botany

Title of the Paper: Plant Diversity – I (Algae, Fungi, Lichens and Bryophytes)

Date : Sub. Code: 18 PBO 101

Time: 3 Hrs. Max. Marks: 75

SECTION – A(10 X 02 = 20 Marks)

Answer *ALL* the Questions

01. Define the term thallus.

02. Comment on algal pigments.

03. Define the term anaisogamy.

04. What is meant by haplo-diplontic life cyle?

05. Define mycelium.

06. Comment on conidiophores.

07. Define the term symbiosis.

08. Mention any two algal symbionts in lichens.

09. Comment on hornworts.

10. Define mosses.

SECTION – B(05 X 05 = 25 Marks)

Answer *ALL* the Questions

11. **(a)** Write a brief note on general characters of algae.

(Or)

(b) Explain the salient features of Xanthophyceae.

12. **(a)** Briefly describe the thallus variations in algae.

(Or)

(b) Comment on fossil algae.

13. **(a)** Write a brief note on parasexuality in fungi.

(Or)

(b) Describe the salient features of Basidiomycetes.

14. **(a)** Comment on fossil fungi.

(Or)

(b) Briefly discuss about thallus organization of lichens.

15. **(a)** Write a short note on evolution of bryophytes.

(Or)

(b) Enumerate the economic importance of bryophytes.

SECTION – C (03 X 10 = 30 Marks)

Answer any THREE Questions

16. Discuss about the classification of algae proposed by Fritsch.

17. Write an elaborate note on life cycle pattern in algae.

18. Describe the classification of fungi proposed by Alexopoulous.

19. Write an essay on economic importance of lichens.

20. Give an account of the classification of bryophytes proposed by Rothmaler.

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SEMESTER – I **Hrs. / WEEK - 7**
CODE – 18 PBO 102 **CREDIT –5**

CORE COURSE – II: PLANT DIVERSITY – II (PTERIDOPHYTES, GYMNOSPERMS AND PALEOBOTANY)

(From the academic year 2018 – 2019 onwards)

OBJECTIVES:

- To understand the major groups of plants and their Characteristics.
- To trace their interrelationships and to study their economic importance and evolutionary
- trends.

UNIT – I **PTERIDOPHYTES** **21 Hrs.,**

General characteristic features of Pteridophytes
Classification of Pteridophytes (K.R.Sporne).
Salient features of major classes: Psilopsida, Psilotopsida, Lycopsida, Sphenopsida, Pteridopsida.
Phylogeny and Evolutionary trends in Ferns.

UNIT – II **PTERIDOPHYTES** **21 Hrs.,**

Stelar evolution in Pteridophytes.
Soral evolution in Pteridophytes.
Gametophytes in Eusporangiate and Leptosporangiate forms.
Life cycles patterns in Pteridophytes.
Economic Importance of Pteridophytes.

UNIT – III **GYMNOSPERMS** **21 Hrs.,**

General characteristic features of Gymnosperms.
Pteridophytic and Angiospermic affinities in Gymnosperms.
Classification of Gymnosperms (K.R.Sporne).
Salient features of major classes: Cycadopsida, Coniferopsida, Gnetopsida.

UNIT – IV **GYMNOSPERMS** **21 Hrs.,**

Geological History of Gymnosperms.
Living Fossil – Cycads (General characteristic features).
Male and Female cones in Gymnosperms.
Economic Importance of Gymnosperms.

UNIT – V **PALEOBOTANY** **21 Hrs.,**

Concepts of Paleobotany.
General Account on Geological Periods.
Contribution of Birbal Sahni.
Techniques of fossil studies and Age determinations of fossils.
Role of fossil in oil exploration and coal excavation.

REFERENCES:

Pandey B. P. (2011), College Botany (Pteridophyta, Gymnosperma, Palaeobotany and Angiosperm). S. Chand &company, New Delhi.

Eames, A.J. (1936) : Morphology of Vascular Plants (Lower Groups) McGraw Hill, N.Y.

Parihar, N.S. (1991) : An Introduction to Embryophyta Vol.II Pteridophyta Central Book Depot., Allahabad.

Smith, G.M. (1955) : Cryptogamic Botany Vol.II (2nd Edn.,) (Bryophytes & Pteridophytes) Tata McGraw Hill Publishing Co., New Delhi.

Sporne, K.R. (1970) : The Morphology of Pteridophytes (The Structure of Ferns and Allied Plants) Hutchinson University Library, London

Coulter, J.M.& C.J. Chamberlain (1964) : Morphology of Gymnosperms Central Book Depot, Allahabad.

Sporne, K.R. (1971): The Morphology of Gymnosperms (The structure and Evolution of Primitive seed Plants) Hutchinson University Library, London.

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Bower, F.O. (1939). The Ferns Vols. I –III. Today and Tomorrow's Printers, New Delhi.

Sharma, O.P. (1990). Textbook of Pteridophyta. Macmillan India Ltd., India.

A.V.C. College (Autonomous), Mannampandal, Mayiladuthurai.

Even Semester - Model Question Paper

Class: I – M.Sc., Subject: Botany

Title of the Paper: Plant Diversity – II (Pteridophytes, Gymnosperms and Paleobotany)

Date : Sub. Code: 18 PBO 102

Time: 3 Hrs. Max. Marks: 75

SECTION – A(10 X 02 = 20 Marks)

Answer *ALL* the Questions

01. Define sporophyll.

02. Define the term homosporous.

03. What is meant by sorus?

04. Define the term eusporangiate.

05. Write any two angiospermic resemblences in gymnosperms.

06. Define the term sago.

07. What is called living fossil.

08. Define megasporophyll.

09. Define the term excavation.

10. Define Paleozoic era.

SECTION – B(05 X 05 = 25 Marks)

Answer *ALL* the Questions

11. **(a)** List out the general characteristic features of Pteridophytes.

(Or)

(b) Write the salient features of class Psilopsida.

12. **(a)** Give a short note on stellar evolution in Pteridophytes.

(Or)

(b) Describe the life cycle patterns in Pteridophytes.

13. **(a)** Briefly explain the salient features of class Cycadopsida.

(Or)

(b) Write the general characteristic features of gymnosperms.

14. **(a)** Write down the general characters of cycads.

(Or)

(b) Discuss the geological history of gymnosperms.

15. **(a)** Write the contribution of Birbal Sahni in paleobotany.

(Or)

(b) Explain the role of fossil in oil exploration.

SECTION – C (03 X 10 = 30 Marks)

Answer any THREE Questions

16. Give a detailed account on classification of Pteridophytes by K.R. Sporne.

17. Write an essay on economic importance of Pteridophytes.

18. Write the classification of gymnosperms proposed by K.R. Sporne.

19. Give an account of male and female cone of gymnosperms.

20. Discuss about techniques of fossil studies.

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SEMESTER – I **Hrs. / WEEK - 6**

CODE – 18 PBO 103 **CREDIT –5**

CORE COURSE – III: ANATOMY, MORPHOGENESIS AND EXPERIMENTAL EMBRYOLOGY

(From the academic year 2018 – 2019 onwards)

OBJECTIVES:

- To enable the students to have a comprehensive idea of a tissues and tissues system
- To enable the students to learn the significance of anatomy, morphogenesis and experimental and applied embryology

UNIT – I **ANATOMY** **18 Hrs.,**

Introduction to anatomy.
Vascular and cork cambium- structure, development and function.
Ontogeny and phylogeny of xylem and phloem.
Components of secondary xylem and phloem.
Leaf initiation and ontogeny.

UNIT – II **ANATOMY** **18 Hrs.,**

Nodal anatomy- types.
Root – Stem transition.
Floral anatomy.
Senescence and abscission-Healing of wounds.
Anomalous secondary growth: *Boerhaavia, Nyctanthus, Bougainvillea, Achyranthus.*

UNIT – III **MORPHOGENESIS** **18 Hrs.,**

Differentiation of xylem and phloem *in vitro* and *in vivo*.
Polarity, asymmetrical cell division.
Role of Cytoplasm and nucleus in plant morphogenesis.
Role of Hormones in plant morphogenesis.

UNIT – IV **EXPERIMENTAL EMBRYOLOGY** **18 Hrs.,**

Embryogenesis, Physiological and Genetic aspects of Embryogenesis.
Unusual features in embryo development.
Nutrition of embryo – in vitro and in vivo
Polyembryony – Causes and experimental induction.
Causes of Apomixis.
Agamospermy.

UNIT – V **EXPERIMENTAL EMBRYOLOGY** **18 Hrs.,**

Apospory and Seed development.
Pollen culture,Haploid Production and its significance.
Embryo Culture.
Ovule and Seed Culture.
Parthenocarpy types and significances.

REFERENCES:

Easu, K. (1953). Plant Anatomy. John Wiley & Sons Inc., New York.

Fahn, A. (1989). Plant Anatomy. Maxwell Pvt. Ltd., Singapore.

Metcalfe and Chalk (1950). Anatomy of the Dicotyledons and Monocotyledons. Vols. I & II. Clarendon Press, Oxford, UK.

Pandey, B.P. (1989). Plant Anatomy. S. Chand & Co. Ltd., New Delhi.

Singh, V., Pande, P.C. and Jain, D.K. (1987). Anatomy of Seed Plants. Rastogi Publications, Meerut.

Burgess, J. (1985). An Introduction to Plant Cell Development. Cambridge University Press, London.

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Bhojwani, S.S. and Bhatnagar, S.P. (1981). Embryology of Angiosperms.Vikas Publishing House Pvt. Ltd., New Delhi.

Dwivedi, J.N. (1998). Embryology of Angiosperms. Rastogi and Co.,Meerut.

Maheswari, P. (1963). An Introduction to Embryology of Angiosperms. International Society of Plant Morphologies, University of Delhi.

A.V.C. College (Autonomous), Mannampandal, Mayiladuthurai.

Even Semester - Model Question Paper

Class: I – M.Sc., Subject: Botany

Title of the Paper: Anatomy, Morphogenesis and Experimental Embryology

Date : Sub. Code: 18 PBO 103

Time: 3 Hrs. Max. Marks: 75

SECTION – A(10 X 02 = 20 Marks)

Answer *ALL* the Questions

01. What is fascicular cambium?
02. Define the term early wood.
03. Define node.
04. What is senescence?
05. Define the term polarity.
06. What is asymmetrical cell division?
07. Define the term agamospermy.
08. Define embryogeny.
09. Define the term androgenesis.
10. What is *invitro* culture?

SECTION – B(05 X 05 = 25 Marks)

Answer *ALL* the Questions

11. (a) Write critical notes on vascular cambium.

(Or)

(b) Comment upon the structure and development of cork cambium.

12. (a) Briefly describe nodes and its types.

(Or)

(b) Write explanatory notes on secondary growth in *Achyranthus.*

13. (a) Briefly discuss about the role of nucleus in plant morphogenesis.

(Or)

(b) Comment upon *invitro* differentiation of xylem and phloem.

14. (a) Comment on causes of polyembryony.

(Or)

(b) Discuss briefly about the genetic aspects of embryogenesis.

15. (a) List out the significance of haploid production.

(Or)

(b) Write short note on embryo culture.

SECTION – C (03 X 10 = 30 Marks)

Answer any THREE Questions

16. Give a detailed account of leaf initiation.
17. Write an elaborate account of root – stem transition.
18. Discuss the role of hormones in plant morphogenesis.
19. Give a elaborate account of apospory and seed development.
20. Write an essay on parthenocarpy and its types.

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SEMESTER – I **Hrs. / WEEK - 6**
CODE – 18 PBOP 104 **CREDIT – 3**

PRACTICAL – I:

PLANT DIVERSITY- I (ALGAE, FUNGI, LICHENS AND BRYOPHYTES), PLANT DIVERSITY- II (PTERIDOPHYTES, GYMNOSPERMS AND PALEOBOTANY), ANATOMY, MORPHOGENESIS AND EXPERIMENTAL EMBRYOLOGY

PLANT DIVERSITY – I

Algae: *Spirulina, Volvox, Nitella, Ulva, Caulerpa, Sargassam, Padina, Gracilaria*

Fungi: *Taphrina, Xylaria, Aspergillus, Penicillium, Polyporus, Mucor, Alubugo* infected leaf, *Cercospora* infected leaf.

Lichens: *Usnea.*

Bryophytes: *Riccia* Thallus, *Turgionia* Thallus, *Marchantia* Thallus, *Polytrichum* Habit, *Polytrichum* Male Sex Organ, *Polytrichum* Capsule, *Funaria* Habit, *Funaria* Sex Organ.

PLANT DIVERSITY – II

Pteridophytes: *Lycopodium* Habit, Stem T.S., Cone L.S., *Selaginella* Habit, Stem T.S., Cone L.S., *Adiantum* Habit, Leaf let V.S., *Equisetum* Habit, Stem T.S, Cone L.S., *Psilotum* Sporophyte, Synangium L.S.,

Gymnosperms & Paleo Botany : *Pinus* Stem T.S., *Araucaria* Stem T.S., *Gnetum* Stem T.S., Male & Female cone, *Williamsonia* Habit, *Lyginopteris, Cordaitales, Lepidodendran.*

ANATOMY: Study of Anomalous Secondary Growth of *Bogainvilliea, Boearhaavia, Nyctanthus, Achyranthus Stem T.S.,* - Study of Nodal anatomy (Unilocunar, Bilocunar and Trilocunar)

EXPERIMENTAL EMBRYOLOGY

Pollen Morphology, T.S. of Mature Anther, Dicot Embryo Mounting and Type of ovules

SEMESTER – I
CODE – 18 PBOE 101

Hrs. / WEEK - 4
CREDIT –4

ELECTIVE COURSE – I: HORTICULTURE & PLANT BREEDING

(From the academic year 2018 – 2019 onwards)

OBJECTIVES:

- To understand the main principles and importance of horticulture.
- To develop skill in horticulture techniques and Plant Breeding techniques.
- To develop potential for self employment.

UNIT – I **HORTICULTURE** **12 Hrs.,**

Importance and scope of horticulture.
Divisions of horticulture.
Irrigation and Manuring Practices.
Plant propagation method – Cutting, layering, grafting and budding.

UNIT – II **HORTICULTURE** **12 Hrs.,**

Principles and methods of designing outdoor garden – hedges, edges, fences, trees, climbers, rockeries, arches, terrace garden.
Lawn making and maintenance.
Water garden.

UNIT – III **HORTICULTURE** **12 Hrs.,**

Indoor gardening – Foliage plants, flowering plants, hanging basket, Bonsai plants.
Training and pruning.
Floriculture – Cultivation of commercial flower crops – Rose, Jasmine and Chrysanthemum.
Flower decoration – Dry and wet decoration.

UNIT – IV **HORTICULTURE** **12 Hrs.,**

Layout for a model kitchen garden.
Cultivation of important vegetables: Potato, Onion.
Cultivation of important fruit crops: Mango, Guava.
Cultivation of tree species: Eucalyptus and Teak.

UNIT – V **PLANT BREEDING** **12 Hrs.,**

Aim and Objective of Plant breeding.
Methods of Plant breeding – Procedure, Influencing Factors, Merits and Demerits of Mass selection, Pureline selection and Clonal selection.
Breeding method in self pollinated crop – Pedigree methods; Cross pollinated crop – recurrent selection.

REFERENCES:

Arora, J.S. (1992). Introductory Ornamental Horticulture. Kalyani Publishers, New Delhi.

Edmond, J.B. et al. (1977). Fundamentals of Horticulture. Tata–McGraw Hill Publishers Co. Ltd., New Delhi.

George Acquaah. (2002). Horticulture Principles and Practices (2nd ed.). Pearson Education, New Delhi.

Kumar, N. (1987). Introduction to Horticulture. Rajalakshmi Publishers, Nagercoil.

Manibushan Rao, K. (1991). Textbook of Horticulture. Macmillan Publishing Co., New York.

Rao, K.M. (2000). Textbook of Horticulture. Macmillan India Ltd., New Delhi.

Edmond, J.B. Fundamentals of Horticulture. Tata McGRaw Hill Publishers Co. Ltd., New Delhi.

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Sharma, J.R. (1994). Principles and practices of Plant Breeding. Tata McGraw-Hill Publishers Company Ltd., New Delhi.

Singh, B.D. (1996). Plant Breeding: Principles and methods. Kalyani Publications, Chennai.

Ghahal, G.S. and Gosal, S.S. (2002). Principles and procedures of Plant Breeding. Narosa Publishing House, New Delhi.

A.V.C. College (Autonomous), Mannampandal, Mayiladuthurai.

Even Semester - Model Question Paper

Class: I – M.Sc., Subject: Botany

Title of the Paper: Horticulture and Plant Breeding

Date : Sub. Code: 18 PBOE 101

Time: 3 Hrs. Max. Marks: 75

SECTION – A(10 X 02 = 20 Marks)

Answer *ALL* the Questions

01. Define pomology.

02. Define the term irrigation.

03. What are rockeries?

04. Define water garden.

05. What are foliage plants?

06. Define dry flower decoration.

07. What is kitchen garden?

08. Mention the cultivable season of potato.

09. Define mass selection.

10. What is self pollination?

SECTION – B(05 X 05 = 25 Marks)

Answer *ALL* the Questions

11. **(a)** Write short notes on manuring.

(Or)

(b) Comment on various methods of budding.

12. **(a)** Give an account of terrace garden.

(Or)

(b) Comment on arches.

13. **(a)** Give an account of hanging basket.

(Or)

(b) Comment on wet flower decoration.

14. **(a)** Give an account of cultivation practices of onion.

(Or)

(b) Comment on teak cultivation methods.

15. **(a)** Give an account of the procedure involved in clonal selection.

(Or)

(b) Write short notes on cross pollination.

SECTION – C (03 X 10 = 30 Marks)

Answer any THREE Questions

16. Write an essay on scope and importance of horticulture.

17. Give a elaborate account of lawn making.

18. Write an essay on cultivation techniques of rose.

19. Give a elaborate account of cultivation of mango.

20. Write an essay on pure-line selection.

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SEMESTER – II **Hrs. / WEEK - 7**
CODE – 18 PBO 205 **CREDIT –5**

CORE COURSE – V: TAXONOMY AND ECONOMIC BOTANY

(From the academic year 2018 – 2019 onwards)

OBJECTIVES:

- To study the basic systems of classification and salient features of few families
- To learn herbarium techniques.
- To study the floral characters with an aim to identify the taxa authentically.
- To prepare taxonomic keys with the help of morphological and floral characters.
- To study the various types of floral distribution in Tamilnadu.
- To study the economic aspects of selected crops
- To study the utilization of plants as food for human.

UNIT – I **TAXONOMY** **21 Hrs.,**

Plant Taxonomy: Objectives – Comprehensive view of various approaches to plant classification-artificial (Linnaeus) natural, (B&H), Phylogenetic (Hutchinson and Takhtajan).
Taxonomic hierarchy and Plant nomenclature basis, rules and typification.
Preparation of key.
Herbarium preparation and maintenance.
Taxonomic literature-Flora and Monograph

UNIT – II **TAXONOMY** **21 Hrs.,**

Taxonomic evidences – Morphology, Comparative plant anatomy, Cytotaxonomy, Embryology,Palynology.
Chemotaxonomy.
Numerical taxonomy.
Serotaxonomy.
Molecular taxonomy: Application of RAPD, RFLP & DNA Bar-coding.

UNIT – III **TAXONOMY** **21 Hrs.,**

Detailed study: Salient features, description, distribution and economic importance of the following families.
Ranunculaceae, Magnoliaceae, Cruciferae, Portulacacae,
Sterculiaceae, Vitaceae (E&P), Sapindaceae, Combretaceae,
Myrtaceae, Onagraceae, Cucurbitaceae, Apiaceae.

UNIT – IV **TAXONOMY** **21 Hrs.,**

Oleaceae, Boraginaceae, Solanaceae, Bignoniaceae, Nyctaginaceae,
Aizoaceae (F&P) Podostemonaceae, Loranthaceae, Casuarinaceae,
Amarillidaceae, Commellinaceae, Arecaceae Cyperaceae and Poaceae.

UNIT – V **ECONOMIC BOTANY** **21 Hrs.,**

Economic Botany: Industrial Timbers, Fibers, Cellulose,
Starch & paper, latex and Rubber, Essential oils,
gums, resins, tannins, alkaloids, Drugs and narcotics.

REFERENCES:

Singh, G. (1999). Plant Systematics – Theory and Practice. Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.

Naik, V.K. (1984). Taxonomy of Angiosperms. Tata McGraw-Hill publishing Co. Ltd., New Delhi.

Pandey, B.P. (2003). Text Book of Angiosperms. S. Chand & Co. Ltd., New Delhi.

Lawrence, G.H.M. (1973). Taxonomy of Vascular Plants. Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.

Jain, S.K. and Rao, R.R. (1977). A handbook of Field and Herbarium methods. Today and Tomorrow Printers and Publishers, New Delhi.

Chopra, G.L. (1974). Angiosperms. Jowhar Offset Press, Delhi, India.

Prakash, G.. and Sharma. Introductory Economic Botany

Pandey, B.P. Economic Botany. S. Chand & Co. Ltd., New Delhi.

Pandey B. P. (2011), College Botany Vol. II (Pteridophyta, Gymnosperma, Palaeobotany and Angiosperm). S. Chand &company, New Delhi.

Pandey B. P. (2011), College Botany Vol. III (Anatomy, Reproduction in flowering plant, Biochemistry, Plant Physiology, Biotechnology, Ecology, Economic Botany, Cell Biology and Genetics). S. Chand &company, New Delhi.

A.V.C. College (Autonomous), Mannampandal, Mayiladuthurai.

Even Semester - Model Question Paper

Class: I – M.Sc., Subject: Botany

Title of the Paper: Taxonomy and Economic Botany

Date : Sub. Code: 18 PBO 205

Time: 3 Hrs. Max. Marks: 75

SECTION – A(10 X 02 = 20 Marks)

Answer *ALL* the Questions

01. What is herbarium?

02. Define the term typification.

03. Define chemotaxonomy.

04. What is palynology?

05. Define the term inferior ovary.

06. What is meant by cymose inflorescence?

07. Define the term gamopetalous.

08. What is hypogynous flower?

09. Define the term Gum.

10. What are resins?

SECTION – B(05 X 05 = 25 Marks)

Answer *ALL* the Questions

11. **(a)** Briefly explain the method of key preparation.

(Or)

(b) List out the merits and demerits of Bentham & Hookers' system of classification.

12. **(a)** Comment upon numerical taxonomy.

(Or)

(b) Write explanatory notes on taxonomic evidences in relation to embryology.

13. **(a)** Briefly describe the floral characteristic of Myrtaceae.

(Or)

(b) List out the salient features of Apiaceae.

14. **(a)** Describe the floral characteristics of Boraginaceae.

(Or)

(b) Bring out the economic important of the family Solanaceae.

15. **(a)** Write critical notes on rubber.

(Or)

(b) Give a brief notes on Cellulose.

SECTION – C (03 X 10 = 30 Marks)

Answer any THREE Questions

16. Write an essay on herbarium preparation and add note on its maintenance.

17. Describe the application of various molecular techniques in plant taxonomy.

18. Explain the floral characteristics of the family Cucurbitaceae. And add note on its economic importance.

19. Write the salient features of the family Commellinaceae.

20. Give a detailed account of drugs and narcotics.

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SEMESTER – II
CODE – 18 PBO 206

Hrs. / WEEK - 7
CREDIT –5

CORE COURSE – VI: CYTOGENETICS, EVOLUTION AND MOLECULAR BIOLOGY

(From the academic year 2018 – 2019 onwards)

OBJECTIVES:

- To understand the organization and functioning of genetic material
- To comprehend the intricacy of regulation of genes
- To understand the mechanism of gene expression

UNIT – I **CYTOGENETICS** **21 Hrs.,**

Genic interaction.
Linkage and crossing over.
Chromosomal aberrations.
Chromosome mapping.
Sex determination in plants.
Biochemical genetics with reference to Neurospora.

UNIT – II **CYTOGENETICS** **21 Hrs.,**

Cytoplasmic inheritance in plants.
Extra nuclear inheritance – chloroplast & mitochondria.
Mutation: Types – Spontaneous and Induced – Causes and detection.
Mutant types: Lethal, Conditional, Biochemical, Loss of function, Gain of function, Germinal versus Somatic mutants, insertional mutagenesis.

UNIT – III **CYTOGENETICS & EVOLUTION** **21 Hrs.,**

Population genetics – Populations -Gene frequency; Hardy-Weinberg Law.
Concepts and rate of change in gene frequency through natural selection, migration and random genetic drift.
Adaptive radiation; Isolating mechanisms; Speciation; Allopatricity and Sympatricity.
Convergent evolution; Sexual selection; Co-evolution.

UNIT – IV **MOLECULAR BIOLOGY** **21 Hrs.,**

Nucleic acids-Chemical and Physical structure of DNA and RNA.
DNA replication in prokaryotes and Eukaryotes.
DNA damage and repair mechanism.
Transposans.
Genetic code.

Molecular Genetics & Evolution

UNIT – V **MOLECULAR BIOLOGY** **21 Hrs.,**

Protein synthesis – Transcription and Translation.
Operon model – lacoperon: Positive and Negative control.
Blotting Techniques: Southern, Western and Northern.
Marker Techniques:RAPD and RFLP.

REFERENCES:

Strickberger (2005). Genetics (III Edn). Prentice Hall of India Pvt. Ltd., New Jersey.

De. Robertis and De Robertis, 1998, Cell and Moleceular Biology, K.M. Verghese and Company.

Sinnott, E.W., L.C. Dunn & J. Dobshansky.(1958) : Principles of Genetics(5th Edition) McGraw Hill Publishing Co., N.Y. Toronto, London-459pp.,

Meyyan, R.P., (2000) : Genetics & Evolution. Saras Publication, Nagercoil, India-380pp.,

Gupta, P.K. (2000) : Genetics. Rastogi Publishers, Meerut, India.

Grierson, D. and Convey S.N. 1989, Plant Molecular Biology, Blackie Publishers, New York

Lea, P.J. and Leegood R.C. 1999, Plant Biochemistry and Molecular Biology, John wiley and sons, London.

Ajay Paul (2007). Text book of Cell and Molecular biology. Books and Allied (P) Ltd., Kolkata

Gerald Karp (2008). Cell and Molecular biology: Concepts and experiments (V Edn). John Wiley & Sons, India.

A.V.C. College (Autonomous), Mannampandal, Mayiladuthurai.

Even Semester - Model Question Paper

Class: I – M.Sc., Subject: Botany

Title of the Paper: Cytogenetics, Evolution and Molecular Biology

Date : Sub. Code: 18 PBO 206

Time: 3 Hrs. Max. Marks: 75

SECTION – A(10 X 02 = 20 Marks)

Answer *ALL* the Questions

01. Define the term crossingover.

02. What is linkage?

03. What is called spontaneous mutation?

04. Write any two chemical mutagens.

05. Define allopatry.

06. Define genetic drift.

07. Define transposans.

08. What is genetic code?

09. What are biomarkers?

10. Define transcription.

SECTION – B(05 X 05 = 25 Marks)

Answer *ALL* the Questions

11. **(a)** List out the significance of crossingover.

(Or)

(b) Briefly explain chromosomal aberrations.

12. **(a)** Give a short note on induced mutation.

(Or)

(b) Write critical note on extra-nuclear inheritance with reference to chloroplast.

13. **(a)** Comment upon speciation.

(Or)

(b) Give a short note on co-evolution.

14. **(a)** Explain briefly the physical and chemical nature of DNA.

(Or)

(b) Describe the DNA replication in Eukaryotes.

15. **(a)** Give a short note on lacoperon.

(Or)

(b) Explain briefly about southern blotting techniques.

SECTION – C (03 X 10 = 30 Marks)

Answer any THREE Questions

16. Write an essay on sex determination in plants.

17. Discuss about cytoplasmic inheritance in plants.

18. Write a detailed account of gene frequency.

19. Give a detailed account of DNA damage and repair mechanism.

20. Explain the steps involved in translation.

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SEMESTER – II **Hrs. / WEEK - 6**
CODE – 18 PBO 207 **CREDIT - 5**

CORE COURSE – VII : MICROBIOLOGY AND PHYTOPATHOLOGY

(From the academic year 2018 – 2019 onwards)

OBJECTIVES:

- To study the different types of microorganisms and their activities
- To understand and exploit their potentialities in agriculture, industry and other environmental aspects
- To study the mechanism of infection and colonization of plant diseases
- To study disease cycle and control measures of various plant diseases.

UNIT – I **MICROBIOLOGY** **18 Hrs.,**

General classification of microorganisms (Whittacker).
Sterilization Methods.
Pure culture techniques andmaintenance.
General characters of Viruses, Mycoplasma and protozoa.
Structure growth and reproduction of bacteria.
Culture media – types and culture techniques.
Staining techniques for bacteria.

UNIT – II **MICROBIOLOGY** **18 Hrs.,**

General Characters, Mass Production and Application of Biofertilizers: Azolla, Azotobacter, Azospirillum, Rhizobium,Phospho bacteria, Blue Green Algae and Mycorrhiza.
Biopesticides (Bacterial, Fungal and Viral).
Mushroom cultivation – Oyster Mushroom

UNIT – III **MICROBIOLOGY** **18 Hrs.,**

Role of Microbes in cycling of Nitrogen, Carbon and Phosphorous.
Role of Microbes in decomposition and Sewage treatment.
Role of Microbes in industry – Production of enzymes(Amylase), antibiotics(Penicillin), alcohol(Ethanol) and Organic acid(Citric acid).
Microbes as food - Probiotics.

UNIT – IV **PHYTOPATHOLOGY** **18 Hrs.,**

Koch's postulates and Inoculum potential.
Parasitic and Non-Parasitic causes of diseases – Disease symptoms.
Entry and Invasion of the host plant and damage to host Tissues.
Toxins in pathogenesis.
Defense Mechanism in Plants – Mechanical and Chemical.

UNIT – V **PHYTOPATHOLOGY** **18 Hrs.,**

Epidemiology – The causes of epidemics, environment and pathogenic factors.
Importance of plant protection and protective methods
Integrated Pest Management(Physical, Chemical and Biological)
Detail studies of Diseases in paddy (Blast disease, Bacterial leaf blight, Tungro disease), sugarcane (Red rot, Sugarcane Mosaic), cotton (Wilt of cotton, Angular leaf spot), banana (Panama disease and Bunchy Top)&groundnut (Tikka disease).

REFERENCES:

Pelczar, M.J. (2001) Microbiology, 5th edition, Tata Mc Graw-Hill Co, New Delhi.

Presscott, L. Harley, J. and Klein, D. (2005) Microbiology, 6th edition, Tata McGraw- Hill Co. New Delhi.

Dubey, R.C. and Maheshwari, D.K. (2007). A Textbook of Microbiology. S. Chand & Co. Ltd., New Delhi.

Power and Daginwala (1994). General Microbiology. Himalayan Publishing House Bombay.

Pandey, B.P. (1982). A Textbook of Plant pathology, Pathogen and Plant Diseases. S. Chand and Co. Ltd., New Delhi.

Rangaswamy, G. (1972). Diseases of Crop Plants in India. Prentice Hall of India Pvt. Ltd., New Jersey.

Mehrota, R.S. (1994). Plant Pathology. Tata McGraw Hill Publishing Co. Ltd., New Delhi.

Subba Rao, N.S. 2000 Soil Microbiology. Oxford and IBH Publishing Co. Ltd.

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Even Semester - Model Question Paper

Class: I – M.Sc., Subject: Botany

Title of the Paper: Microbiology and Phytopathology

Sub. Code: 18 PBO 207

Date :

Time: 3 Hrs. Max. Marks: 75

SECTION – A(10 X 02 = 20 Marks)

Answer *ALL* the Questions

01. Define virion.
02. What is called transduction?
03. Define ectomycorrhiza.
04. What is spawn?
05. Define diazotrophs.
06. What are antibiotics?
07. Define inoculum.
08. Define pathogenesis.
09. Define the term spordiac disease.
10. Write the causative organisms of Tikka disease of ground nut.

SECTION – B(05 X 05 = 25 Marks)

Answer *ALL* the Questions

11. (a) Write the general characters of virus.

(Or)

(b) Give a short note on conjugation in bacteria.

12. (a) Write explanatory notes on biopesticides.

(Or)

(b) Give a short note on mass production of *Azolla*.

13. (a) Write the role of microbes in cycling of nitrogen.

(Or)

(b) Discuss about the production of ethanol.

14. (a) Give a short note on parasitic causes of diseases.

(Or)

(b) Write about the koch's postulates.

15. (a) Give a brief account of Bunchy top of banana.

(Or)

(b) Describes the symptoms and control measures of wilt of cotton.

SECTION – C (03 X 10 = 30 Marks)

Answer any THREE Questions

16. Give a detailed account of sterilization techniques.
17. Discuss about mushroom cultivation techniques.
18. Explain in detail about the role of microbes in sewage treatment.
19. Write an essay on defense mechanism in plants.
20. Discuss about Integrated Pest Management.

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SEMESTER – II **Hrs. / WEEK - 6**
CODE – 18 PBOP 208 **CREDIT – 3**

PRACTICAL – II:

TAXONOMY AND ECONOMIC BOTANY; CYTOGENETICS, EVOLUTION, MOLECULAR BIOLOGY, MICROBIOLOGY AND PHYTOPATHOLOGY

TAXONOMY AND ECONOMIC BOTANY

- Dissection and description of inflorescences, flowers and fruits with reference to syllabus
- Dissection, identification, observation and sketching the floral parts of the plants belonging to the families included in the syllabus
- Exercises in Key - making
- Field study – The students are expected to go for field trip to different types of floristic regions for at least four days under the supervision of the course teachers concerned and submission of minimum 25 herbarium sheets along with field note book
- Visit to a herbarium.
- Study of Binomial identification using flora

CYTOGENETICS

- Training in solving problems in monohybrid, dihybrid, Genetic frequency and Chromosome map

EVOLUTION

- Speciation – Spotters

MOLECULAR BIOLOGY

- Biomarker techniques.
- Blotting Techniques.

MICROBIOLOGY

- Sterilization methods and media preparations
- Isolation and study of *Coprophillous* fungs
- Estimation of acidity in milk and curd
- Microbial analysis of Milk
- Isolation of Microorganism from the soil
- Staining of Bacteria, Hanging drop technique and Haemocytometer

PHYTOPATHOLOGY

- Demonstration of Koch's postulates
- Estimation of Total free amino acids, Flavonoids, Total Phenols, Total Chlorophyll and Sugar of infected and normal leaves.

SEMESTER – II **Hrs. / WEEK - 4**

CODE – 18 EDBO 201 **CREDIT 4 2**

EXTRA DECIPILINARY COURSE - I: HORTICULTURE

(From the academic year 2018 – 2019 onwards)

OBJECTIVES:

- To understand the main principles and importance of horticulture.
- To develop skill in horticulture techniques.
- To develop potential for self employment.

UNIT – I **12 Hrs.,**

Scope and importance of horticulture.
Divisions of horticulture.
Outdoor Garden components – lawn, shrub, climbers, trees, creepers, flower beds & borders, hedges and edges, paths, rockery, water garden and topiary.
Lawn making.

UNIT – II **12 Hrs.,**

Indoor garden – potted plants, cut flowers, hanging baskets, bonsai, and hydroponics.
Layout of kitchen garden.
Gardening – Types – Planning.
Creating a design – Establishment.
Plant propagation methods – cutting, layering, grafting and budding.

UNIT – III **12 Hrs.,**

Irrigation – Types of irrigation
Manuring – Organic and chemical fertilizers – time and method of application.
Role of growth hormones in horticulture.
Training and Pruning – Principles and methods.

UNIT – IV **12 Hrs.,**

Cultivation of vegetables- Brinjal and Tomato.
Fruits – Banana and Mango.
Flower – Jasmine and Chrysanthemum.
Medicinal Plants – *Curcuma* and *Centella*.
Green houses – types.

UNIT – V **12 Hrs.,**

Preservation of fruits and vegetables.
Preparation of Jam, Squash, Syrup and Pickles.
Flower Decoration – Types of flower arrangement, Components of flower arrangement, Ikebana, Dry decoration, Cut flowers and Bouquets.
Terrace Gardens and soil less cultures.

REFERENCES:

Arora, J.S. (1992). Introductory Ornamental Horticulture. Kalyani Publishers, New Delhi.

Edmond, J.B. et al. (1977). Fundamentals of Horticulture. Tata–McGraw Hill Publishers Co. Ltd., New Delhi.

George Acquaah. (2002). Horticulture Principles and Practices (2nd ed.). Pearson Education, New Delhi.

Kumar, N. (1987). Introduction to Horticulture. Rajalakshmi Publishers, Nagercoil.

Manibushan Rao, K. (1991). Textbook of Horticulture. Macmillan Publishing Co., New York.

Rao, K.M. (2000). Textbook of Horticulture. Macmillan India Ltd., New Delhi.

Edmond, J.B. Fundamentals of Horticulture. Tata McGRaw Hill Publishers Co. Ltd., New Delhi.

Prasad, S. and U. Kumar, Fundamentals of Horticulture. Agro Botanica Publication and Distributior, Bikaner, India.

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Even Semester - Model Question Paper

Class: I – M.Sc., Subject: Botany

Title of the Paper: EDC – Horticulture

Date : Sub. Code: 18 EDBO 201

Time: 3 Hrs. Max. Marks: 75

SECTION – A(10 X 02 = 20 Marks)

Answer *ALL* the Questions

01. Define edges.

02. What is topiary?

03. What is cut flower?

04. What is layering?

05. Mention the types of irrigation.

06. What is meant by organic fertilizer.

07. Write any two varieties of mango.

08. Green Houses.

09. What is squash?

10. What are bouquets?

SECTION – B(05 X 05 = 25 Marks)

Answer *ALL* the Questions

11. **(a)** Write short note on scope of horticulture.

(Or)

(b) Give a short account of Lawn.

12. **(a)** Comment on bonsai.

(Or)

(b) Briefly explain the budding techniques.

13. **(a)** Give a short account of role of growth hormones in horticulture.

(Or)

(b) Write short note on pruning.

14. **(a)** Explain the cultivation practices of tomato.

(Or)

(b) Write short note on turmeric.

15. **(a)** Comment on preparation of Jam.

(Or)

(b) Give a short account of soil less culture.

SECTION – C (03 X 10 = 30 Marks)

Answer any THREE Questions

16. Write an essay on division of horticulture.

17. Describe the various methods of layering.

18. Write an essay on types of irrigation.

19. Write an essay on green houses and its types.

20. Give an elaborate account of preservation of fruits.

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SEMESTER – III **Hrs. / WEEK – 6**
CODE – 18 PBO 309 **CREDIT - 5**

CORE COURSE – IX: PHYSIOLOGY, BIOCHEMISTRY AND BIOPHYSICS

(From the academic year 2018 – 2019 onwards)

OBJECTIVES:

- To understand the working mechanism in plant-metabolic pathways.
- To facilitate the integrated activities of the plants.
- To elucidate the interrelationships of the cellular components.
- To study the biophysical principles of plants.

UNIT – I **18 hrs.**

PLANT PHYSIOLOGY

Physico – chemical properties of water. Diffusion, Imbibition, Osmosis, water potential – Mechanisms for ascent of sap – Surface phenomena – transport of ions across the membrane – active and passive theories – Mineral salt absorption theories – Types of transpiration – mechanism of stomatal movement and theories of transpiration.

UNIT - II **18 hrs.**

PLANT PHYSIOLOGY

Photosynthesis: Plant pigment, photosynthetic apparatus – photo phosphorylation – photosystem I & II, methods of carbon fixation: C3, C4 & CAM Pathways and its distinguish features – factors affecting photosynthesis - photorespiration.

Respiration: Respiratory substrate – glycolysis, Kreb's cycle, electron transport and oxidative phosphorylation – Pentose Phosphate Pathway.

UNIT – III **18 hrs.**

PLANT PHYSIOLOGY

Biological Nitrogen fixation – symbiotic and asymbiotic: molecular mechanism of nitrogen fixation.

Growth regulators and their physiological effects – Auxin, Gibberellins, Cytokinin, Abscisic acid and Ethylene – Photoperiodism and vernalization – Physiological basis of Salt and drought tolerance.

UNIT –IV **18 hrs.**

BIOCHEMISTRY

Structure, classification and properties of carbohydrates, protein and lipid – General account of amino acids - Biosynthesis of fatty acids and Glycerol – Oxidation of fatty acids.

Enzyme (Apo enzyme, co enzyme and cofactors) structure, classification and mechanism of enzyme action – Activators, inhibitors – factors determining enzyme action

UNIT – V **18 hrs.**

BIOPHYSICS

Law of thermodynamics, concept of free energy, enthalpy and entropy – Beer's and Lambert's Law – Radioactivity and Tracer techniques and their uses – Measurement of radioactivity using GM counter and scintillation counter.

REFERENCES:

Glen Ray Noggle, George John Fritz, 2006. Introductory Plant Physiology, 2nd Edition, Prentice – Hall Publishers, University of Michigan

Subash Chandra Datta, 1998. Plant Physiology, New Age International Pvt. Ltd. New Delhi.

Bernard S. Meyar and Donald B. Anderson, 1952. Plant Physiology, D Van Newtrand Company, New Delhi.

Price, G.A. 1974. Molecular Approaches to Play Physiology, Tata McGraw-Hill Publishing Company Ltd. New Delhi.

Jain, V.K. 2009. Fundamentals of Plant Physiology, S. Chand & Company Ltd., New Delhi.

Verma S.K. 1999. Text Book of Plant Physiology and Biochemistry, S. Chand & Company Ltd., New Delhi.

Gill, P.S. 2000. Plant Physiology, S. Chand & Company Ltd., New Delhi.

Sinha, R.K. 2007. Modern Plant Physiology, Narosa Publishing House, New Delhi.

Rastogi, S.C.2002. Biochemistry, Tata McGraw-Hill Publishing Company Ltd. New Delhi.

Jain, J.L, Sanjay Jain, Nithin Jain, 1982. Fundamentals of Biochemistry, S. Chand & Company Ltd., New Delhi.

Keith Wiison and John Walker, 2010. Principles and Techniques of Biochemistry and Molecular biology, Cambridge University Press, New Delhi.

Sathyanarayana, U and Chakrapani, V. 2010. Biochemistry, Books and Allied Pvt. Ltd., Kolkata.

Narayanan, P. 2008, Essential of Biophysics, New Age International Publishers, New Delhi.

Mohan P. Arora, 2004. Biophysics, Himalaya Publishing House, New Delhi.

Saran. K, Bio Physics, Rajat Publications, New Delhi.

Daniel, M, 1999. Basic Biophysics to Biologists, Agro Botanica, New Delhi.

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Odd Semester - Model Question Paper

Class: II – M.Sc., Subject: Botany

Title of the Paper: Physiology, Biochemistry and Biophysics

Date : Sub. Code: 18 PBO 309

Time: 3 Hrs. Max. Marks: 75

SECTION – A (10 X 02 = 20 Marks)

Answer *ALL* the Questions

01. Define water potential.

02. What is diffusion?

03. Define photorespiration.

04. Differentiate between photosystem I and II.

05. What is respiratory substrate?

06. What are long day plants?

07. Mention any two properties of protein.

08. Differentiate between Apo-enzyme and co-enzyme.

09. What is enthalpy?

10. Define entropy.

SECTION – B(05 X 05 = 25 Marks)

Answer *ALL* the Questions

11. **(a)** Give a short note on mechanism of ascent of sap.

(Or)

(b) Explain the types of transpiration.

12. **(a)** Give a short note on C_4 pathway.

(Or)

(b) List out the factors affecting photosynthesis.

13. **(a)** Write short note on vernalization.

(Or)

(b) Briefly explain about physiological role of cytokinin.

14. **(a)** What are the factors influencing enzyme actions.

(Or)

(b) List out the properties of lipids.

15. **(a)** Explain the law of thermodynamics.

(Or)

(b) Describe about Beer's and Lamberts law.

SECTION – C (03 X 10 = 30 Marks)

Answer any THREE Questions

16. Discuss about the mechanism of stomatal movement.

17. Give a detail account of Calvin cycle.

18. Write an essay on molecular mechanism of nitrogen fixation.

19. Write a detail account of classification of carbohydrates.

20. Give an account on G.M. counter.

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SEMESTER – III **Hrs. / WEEK - 5**
CODE – 18 PBO 310 **CREDIT - 5**

CORE COURSE – X : BIOTECHNOLOGY & GENETIC ENGINEERING

(From the academic year 2018 – 2019 onwards)

OBJECTIVES:

- To know the art of recombinant DNA technology
- To understand the basic principles of micropropagation.
- To understand the industrial applications of microbes.

UNIT-I **15 Hrs.**

TOOLS OF GENETIC ENGINEERING

Biotechnology: Potentialities and limitations, Tools of genetic engineering – Vectors; Cosmid(PLFR5), Viruses (M13 Phage) and Plasmid (PBR 322) – Enzymes; restriction endonucleases, DNA ligase, S1 Nuclease, alkaline Phosphatase, reverse transcriptase – Genomic and cDNA libraries; construction and uses.

UNIT-II **15 Hrs.**

GENETIC ENGINEERING TECHNIQUES

Gene transfer Methods: Natural Methods: Agrobacterium mediated gene transfer – Artificial methods: chemically mediated DNA uptake, electroporation, micro-injection, particle gun bombardment lipofection, ultrasonication and retroviral infection (Virus vector method).

UNIT III **15 Hrs.**

PLANT TISSUE CULTURE

Culture techniques: media types and preparation of White, M.S. – B5 medium, choice of explants, callus induction and Somatic embryogenesis and Synthetic seed technology, Micropropagation, protoplasts fusion technology, somatic hybrid and cybrid – Anther culture – Suspension cell culture and Secondary metabolites production – Cryopreservation of germplasm.

UNIT-IV **15 Hrs.**

INDUSTRIAL BIOTECHNOLOGY

Fermentation technology – Types of fermentors – Industrial production of Ethanol, Penicillin, Riboflavin, Citric acid and amylase – Immobilization Techniques – Production of Monoclonal antibodies and Hybridoma technology.

UNIT-V **15 Hrs.**

BIOSAFETY AND INTELLECTUAL PROPERTY RIGHTS

Biosafety-methods and implication of Genetically modified organisms – Intellectual Property Rights (IPR) Patents, trademarks, trade secrets and copy rights, GATT, TRIPR, and WTO; Patenting of biological materials (process and product); Patenting of transgenic plants, Bioethics of GMOs.

REFERENCES:

Chawla H.S. 2010. Introduction to plant biotechnology, Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.

De K.K. 1987. Plant Tissue Culture, New Central Book Agency, Calcutta.

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Jain S.K. 2003. Text Book of Biotechnology, CBS Publishers & Distributors, New Delhi.

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Martell & Smith, 1983. Plant Biotechnology, Cambridge University, U.K.

Mishra, R.C. 2006. Plant Biotechnology, ABO Publishers, New Delhi.

Nandan Hazard, 2005. Industrial Biotechnology, Dominant Publishers and Distributors, New Delhi.

Nirmala, C.B., G. Rajalakshmi, Chandra, Karthick, 2009. Plant Biotechnology, MJP Publishers, New Delhi.

Old, R.W and Primerose, S.B. 1996. Gene Manipulation, Blackwell Scientific Publications, London.

Yadav, P.R and Rajiv Tyagi, 2005. Industrial Biotechnology, Discovery Publishing House, New Delhi.

A.V.C. College (Autonomous), Mannampandal, Mayiladuthurai.

Odd Semester - Model Question Paper

Class: II – M.Sc., Subject: Botany

Title of the Paper: Biotechnology and Genetic Engineering

Date : Sub. Code: 18 PBO 310

Time: 3 Hrs. Max. Marks: 75

SECTION – A (10 X 02 = 20 Marks)

Answer *ALL* the Questions

01. Define Plasmid.

02. Mention the functions of DNA ligase.

03. What is electroporation?

04. Define lipofection.

05. What are explants?

06. Define the term protoplast.

07. Mention any two industrially important microbes.

08. Define fermentation.

09. Expand TRIPR.

10. Define copy right.

SECTION – B(05 X 05 = 25 Marks)

Answer *ALL* the Questions

11. **(a)** Briefly discuss the characteristics features of restriction endonucleases.

(Or)

(b) Comment on alkaline phosphatase.

12. **(a)** How will you transfer a gene into pollengrains? Explain.

(Or)

(b) Write short notes on ultrasonication.

13. **(a)** Write short notes on synthetic seeds.

(Or)

(b) Comment on embryo culture and its application.

14. **(a)** Give a short note on immobilization technique.

(Or)

(b) Write the industrial production of citric acid.

15. **(a)** Comment on GATT.

(Or)

(b) Write the objectives of WTO.

SECTION – C (03 X 10 = 30 Marks)

Answer any THREE Questions

16. Discuss the steps involved in construction of cDNA library.

17. Write an essay on natural gene transfer in plants.

18. Write an essay on secondary metabolite production.

19. Describe the hybridoma technology.

20. Give a detail account of patenting of biological materials.

*****

SEMESTER – III **Hrs. / WEEK - 5**
CODE – 18 PBO 311 **CREDIT - 5**

CORE COURSE – XI: PRINCIPLES OF ECOLOGY AND FOREST SCIENCE

(From the academic year 2018 – 2019 onwards)

OBJECTIVES:

- To prepare students for employment in forest services.
- To know the uses and importance of forest products.

UNIT-I **15 hrs.**

ECOLOGY

Principles of Ecology – Biotic and abiotic environment – ecosystem structure and function – energy flow and mineral cycling (C, N and P) – Primary producer and decomposer – structure and function of some Indian ecosystems – terrestrial (forest and grassland) and aquatic (fresh water and marine)

UNIT-II **15 hrs**

ECOLOGY

Concept of habitat and ecological niche – Characteristics of population ecology – population regulation – Community ecology: Structure and Nature of communities – levels of diversity and its measurement; edges and ecotones – Ecological succession: types and mechanisms - concept of climax

UNIT-III **15 hrs**

ECOLOGY

Principles of conservations – *in-situ* conservation: Protected areas – biosphere reserves and national parks and *ex-situ* conservation: Germplasm collection – Botanic Gardens – Seed, pollen and gene banks.

UNIT-IV **15 hrs**

FOREST SCIENCE

Scope and importance of forest, forest types – tropical, sub tropical, temperate, evergreen, semi evergreen, deciduous and social - Man made forest: Social and community forestry, Agro forestry - Deforestation - Afforestation - Forest protection - Wild life and Biosphere reserves in India.

UNIT-V **15 hrs**

FOREST SCIENCE – SILVICULTURE

Concept and scope of study, forest in general form, composition, classification of Indian forest (Champion and Seth,) and their conservation – Silvicultural systems – Clear felling, uniform, shelter – selection. – Cultivation practices of economically important trees – *Pinus roxburghii, Acacia nilotica, Tectona grandis, Terminalia arjuna.*

REFERENCES:

Puri, G.S. Mehr Homji. V.M, R.K. Gupta & S. Puri, Forest Ecology, Oxford and IBH Publications Company, New Delhi.

Singh, M.P. Forest environment and Biodiversity, Daya Publications house, New Delhi.

Negi. S.S. Indian forests, Forestry and Wildlife, Indus Publishing Company, New Delhi.

Burion, V. Barnes, Donald. B, R. Bentan, B. Spure. Forest Ecology, 4th Edition, Wiley Publications.

Shukla. R.S. and Chandel P.S. 2006. A text book of Plant Ecology, S. Chand & Company Ltd., New Delhi.

Etherington.R. 1976. Environment and Plant Ecology, Wiley Eastern Ltd., New Delhi.

Sing. P. 2015. Forestry and Agroforestry, Agrotech Press. Jaipur, India.

Gopikumar, K., Gobikumar, S. Anoop. E.V. 2003. Foret Nursery & Tree Husbandry, Industrial Book Distributors, Uttranchal, India.

A.V.C. College (Autonomous), Mannampandal, Mayiladuthurai.

Odd Semester - Model Question Paper

Class: II – M.Sc., Subject: Botany

Title of the Paper: Principles of Ecology and Forest Science

Date : Sub. Code: 18 PBO 311

Time: 3 Hrs. Max. Marks: 75

SECTION – A (10 X 02 = 20 Marks)

Answer *ALL* the Questions

01. Define energy flow.

02. What are primary producer?

03. Define ecology niche.

04. Define population ecology.

05. Define ecotones.

06. What is gene bank?

07. Define evergreen forest.

08. Define Afforestation.

09. What is clear felling?

10. Define silviculture.

SECTION – B(05 X 05 = 25 Marks)

Answer *ALL* the Questions

11. **(a)** Give an account of principle of ecology.

(Or)

(b) Comment on aquatic ecosystem.

12. **(a)** Comment on concept of climax.

(Or)

(b) Write short note on community ecology.

13. **(a)** Comment on biosphere reserves.

(Or)

(b) Comment on *in-situ* conservation methods.

14. **(a)** Comment on scope and importance of forest.

(Or)

(b) Give a brief account of social forest.

15. **(a)** Write briefly about general form of forest.

(Or)

(b) Comment on shelter selection.

SECTION – C (03 X 10 = 30 Marks)

Answer any THREE Questions

16. Write an essay on structure and function of Indian ecosystem.

17. Give an elaborate account of ecological succession.

18. Write an essay on seed, pollen and gene banks.

19. Give an elaborate account of biosphere reserves in India.

20. Write an essay on cultivation practices of *Tectona grandis*.

*****

SEMESTER – III **Hrs. / WEEK - 6**

CODE – 18 PBOP 312 **CREDIT – 3**

PRACTICAL – III:

PHYSIOLOGY, BIOCHEMISTRY AND BIOPHYSICS; BIOTECHNOLOGY & GENETIC ENGINEERING; PRINCIPLES OF ECOLOGY AND FOREST SCIENCE

PHYSIOLOGY, BIOCHEMISTRY AND BIOPHYSICS

- Determination of Osmotic Pressure (De Vries Method), Water potential (Dye method), water content of leaf
- Estimation of Total aminoacids, amylase activity
- Effect of temperature on membrane permiability

BIOTECHNOLOGY & GENETIC ENGINEERING

- Isolation of Protoplast (mechanical method), VAM fungi (root sample)
- Estimation of casein from milk
- Extraction and estimation of leghaemoglobin from root nodules
- Preparation of M.S medium
- Embryo and callus culture

ECOLOGY, FOREST SCIENCE AND SYLVICULTURE

- Study of Vegetation analysis
- Seed Process
- Nursery techniques

SEMESTER – III **Hrs. / WEEK - 4**

CODE – 18 PBOE 302 **CREDIT - 4**

ELECTIVE COURSE II: MARINE BOTANY

(From the academic year 2018 – 2019 onwards)

OBJECTIVES:

- To learn the marine biodiversity
- To learn marine ecology and economic importance of seaweeds

UNIT I **12 Hrs.,**

Marine environment- Sea, coastal and estuarine. Dynamics of sea water – tides, waves and Current - Physical and chemical properties of sea water – temperature, O_2, CO_2, pH, salinity, nutrients, calcium carbonate precipitation - Marine pollution – types, sources and impacts - Toxic heavy metals, oil, sewage, pesticides, radioactive pollution.

UNIT II **12 Hrs.,**

General characters of Phytoplankton and zooplankton - Salient features of Diatom, Dinoflagellates, marine cyanobacteria, Importance of phytoplankton - Algal blooming - types, causes and impact - Seaweed- types and characteristic features.

UNIT III **12 Hrs.,**

Ecology and importance of Sea grass, Sand dunes and Salt marshes - Mangroves salient features and ecological importance - Mangrove adaptations – morphological, anatomical and physiological - Viviparous type of germination.

UNIT IV **12 Hrs.,**

Zonation structure of mangroves - Salt regulation in hydrophytes – Ultra structure of salt glands and salt secretion - Marine protective areas in India: Reserve forests and national parks - Threats to marine biodiversity and environment - Factors influencing marine biodiversity.

UNIT - V **12 Hrs.,**

Marine algal research centers in India - Mass production of *Spirulina, Chlorella* - *Gracilaria Cultivation* - Seaweed polysaccharides - Agar-agar, carrageenan and alginic acid - Preparation of Seaweed liquid fertilizers - Economic importance of seaweeds.

Reference

1. Chapman, V.J. (1976). Coastal vegetation. II ed., Pergamon Press, New York.
2. Desikachary, T.V. (1975). Marine plants, N.C.E.R.T. New Delhi.
3. Ring, M., (1982). The biology of mangrove plants. Edward Arnold Publishers, London.
4. Waisel, Y. (1972). Biology of halophytes. Academic press, London and New york.
5. Svedrup, H.U., Johnson, M.W. and Fleming, R.H. (1962). The ocean: their physics, chemistry and biology. Asia Publication house, New Delhi.
6. Nybakken, J. W. (1982). Marine biology: An ecological approach. Harper & Row, N.Y. 446 p.

A.V.C. College (Autonomous), Mannampandal, Mayiladuthurai.

Odd Semester - Model Question Paper

Class: II – M.Sc., Subject: Botany

Title of the Paper: Marine Botany

Date :

Time: 3 Hrs.

Sub. Code: 18 PBOE 302

Max. Marks: 75

SECTION – A (10 X 02 = 20 Marks)

Answer *ALL* the Questions

01. What are tides?

02. Define the term estuary.

03. What are zooplanktons?

04. Define Diatom.

05. What are sand dunes?

06. Define the term pnematophore.

07. Define zonation.

08. What is viviparous germination?

09. What are phycocolloids?

10. Mention the few uses of Agar-agar.

SECTION – B (05 X 05 = 25 Marks)

Answer *ALL* the Questions

11. **(a)** Comment on calcium carbonate precipitation.

(Or)

(b) Write short note on dynamics of seawater.

12. **(a)** Enlist the characteristic features of Dinoflagellates.

(Or)

(b) Writ the characteristic features of red seaweed.

13. **(a)** Give an account of ecological role of seagrasses.

(Or)

(b) Comment on ecological importance of mangroves.

14. **(a)** Write short notes on salt regulation in hydrophytes.

(Or)

(b) Give a brief notes on marine protected area of India.

15. **(a)** Briefly explain the mass production of Spirulina.

(Or)

(b) Comment upon extraction and uses of Carrageenan.

SECTION – C (03 X 10 = 30 Marks)

Answer any THREE Questions

16. Write an essay on marine pollution.

17. Describe the types, causes and impact of algal blooms.

18. Give an account of adaptations in mangroves.

19. Discuss about factors influencing marine biodiversity.

20. Write an essay on economic importance of seaweeds.

*****

SEMESTER – III **Hrs. / WEEK - 4**

CODE – 18 EDBO 302 **CREDIT - 2**

EXTRA DISCIPLINARY COURSE – II : HERBAL MEDICINE

(From the academic year 2018 – 2019 onwards)

OBJECTIVES:

- To enrich the systematic Botany which can be utilized for botanical diagnosis of fragmentary crude drugs.
- To enable the students in identifying medicinal taxa.
- To know the preliminary phytochemistry of plant organs.
- To understand the therapeutic properties of some common medicinal herbs.

UNIT-I **12 hrs.**

Indian System Medicine - General Information: Ayurveda, Yogic Therapy, Unani, Siddha and Homeopathy (AYUSH).

UNIT-II **12 hrs**

General account on Pharmacognosy – Crude and Commercial drugs – Classification and Evaluation of Crude drugs – Substitution – Detection of Adulteration in Crude drugs.

UNIT-III **12 hrs**

Morphology of the useful parts, cultivation, collection, phyto chemical constituents and therapeutic properties of the following medicinal plants;

Hydrocotyl asiatica, Eugenia caryophyllata, Coriandrum sativum, Piper nigrum, Curcuma domestica, Zingiber officinalis and *Aloe vera*

UNIT-IV **12 hrs**

Allergens – pollen, skin allergens and Plant toxins - Remedial plants for the following – CNS, Cardiac, Cancer, Diabetics.

UNIT-V **12 hrs**

Preparation of herbal formulations: Infusion, Decoction, Insect repellents, Tincture, Herbal syrups, Ointments, Herbal oil and Herbal soup and salad

REFERENCES:

Pagare, P.K. 2007. Medicinal Plants, APH Publishing Corporation, New Delhi.

Rasheeduz Zafer, 1994. Medicinal Plants of Inida, CBS Publishers & Distributors, Delhi.

Panda. H. Hand Book of Herbal Medicines, Asia Pacific Business Press, New Delhi.

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Sivarajan, V.V and India Balachandran, 2006. Ayurvedic drugs and their plant sources, Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.

Acharya Vipul Rao, 2005. Herbal cure for common diseases, Diamond Books, Delhi.

Daniel, M. 2013. Useful Herbs of Planet Earth, Scientific Publications, New Delhi

NIIR Board of Technologists, Hand Book of Herbal Products, Vol. I and II, National Institute of Industrial Research, Delhi.

Roseline, A. 2011. Pharmacognosy, MJP Publications, Chennai.

Dharamir Hota, 2007. Bioactive Medicinal Plants, Gene – Tech Books, New Delhi.

Vikas Anand Saharan, 2008. Principles of Pharmacognosy, Agrobios, Jodhpur.

NIIR Board of Consultants & Engineers, Cultivation and Processing of Selected medicinal plants, Asia Pacific Business Press, Delhi.

A.V.C. College (Autonomous), Mannampandal, Mayiladuthurai.

Odd Semester - Model Question Paper

Class: II – M.Sc., Subject: Botany

Title of the Paper: Herbal Medicine

Date : Sub. Code: 18 EDBO 302

Time: 3 Hrs. Max. Marks: 75

SECTION – A (10 X 02 = 20 Marks)

Answer *ALL* the Questions

01. Define AYUSH.

02. Write the principles of homeopathy system of medicine.

03. Define adulterations.

04. What are crude drugs?

05. Write down the morphology of *Curcuma domestica*.

06. Write down the therapeutic uses of *Piper nigrum*.

07. Define the term allergy.

08. Write any two remedial plants for diabetics.

09. What is infusion?

10. Define herbal oil.

SECTION – B (05 X 05 = 25 Marks)

Answer *ALL* the Questions

11. **(a)** Briefly explain about Ayurveda system of medicine.

(Or)

(b) Comment on Unani system of medicine.

12. **(a)** Write a short note on crude drug.

(Or)

(b) Briefly describe the substitution.

13. **(a)** Write down the chemical properties and uses of *Hydrocotyl asiatica*.

(Or)

(b) Write down the systematic position and chemical nature of *Coriandrum sativum*.

14. **(a)** Give a brief note on skin allergens.

(Or)

(b) Write a brief note on remedial plants of CNS.

15. **(a)** Explain the preparation method of herbal syrups.

(Or)

(b) How to prepare herbal tincture? Explain.

SECTION – C (03 X 10 = 30 Marks)

Answer any THREE Questions

16. Give a details account of Siddha system of medicine.

17. Write a detail note on detection of adulterants in crude drugs.

18. Write a detail account of *Eugenia caryophyllata*.

19. Write an elaborate note on remedial plants for Diabetics.

20. Explain the preparations of Ointments, Insect repellants and Decoctions.

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SEMESTER – IV **Hrs. / WEEK - 6**
CODE – 18 PBO 413 **CREDIT - 5**

CORE COURSE – XIII: ETHANOBOTANY AND HERBAL TECHNOLOGY

(From the academic year 2018 – 2018 onwards)

OBJECTIVES:

- To understand the various systems of medicines.
- To enable the students in identifying medicinal taxa.
- To know the preliminary phytochemistry of plant organs.
- To understand the therapeutic properties of some common medicinal herbs.

UNIT-I **18 Hrs.,**

ETHNOBOTANY

Definition, scope and concept of Ethnobotany, Ethnic Groups of India, Plants of Ethno botanical importance – Tribal food, medicinal and Narcotic Plants, acellular plant drugs.

UNIT-II **18 Hrs.,**

ETHNOBOTANY

Ethanobotany – interdisciplinary approaches – Methods of ethno botanical studies - role in domestication and conservation of native plant genetic resources – Important of medicinal plants discovered through Ethno botanical studies.

UNIT-III **18 Hrs.,**

HERBAL TECHNOLOGY

History, Definition and Scope of Pharmacognosy. Traditional Systems of Medicine – Ayurveda, Siddha and Unani. Classification of Crude drugs. Collection, processing and storage of crude and commercial drugs – Drug Adulteration - Methods of drug evaluation

UNIT-IV **18 Hrs.,**

HERBAL TECHNOLOGY

Allergens, Teratogens, Hallucinogens. Remedial plants for Cancer, CNS, Cardiac, Respiratory disorders, Diabetics, Urogenital disorders and wound healing.

Preparation of herbal formulation – Infusion, Decoction, Herbal syrups, Herbal oil, Tincture and Insect repellants.

UNIT-V **18 Hrs.,**

HERBAL TECHNOLOGY

Systematic position, morphology, Cultivation, Collection, phyto-chemical constituents and Therapeutic uses of the following herbal drugs,

Leaves	: *Adhatoda zeylanica, Hydrocotyl asiatica*
Flower	: *Eugenia caryophyllata, Crocus sativus.*
Fruits	: *Coriandrum sativum, Piper nigrum*
Seeds	: *Sesamum indicum, Terminalia chebula*
Rhizome	: *Curcuma domestica, Zingiber officinalis*
Bark	: *Cinchona officinalis, Cinnamom zeylanicum*
Root	: *Rauwolfia serpentina, Gloriosa superba*
Whole plant	: *Phyllanthus amarus, Achyranthus aspera*

REFERENCES:

Pagare, P.K. 2007. Medicinal Plants, APH Publishing Corporation, New Delhi.

Rasheeduz Zafer, 1994. Medicinal Plants of Inida, CBS Publishers & Distributors, Delhi.

Panda. H. Hand Book of Herbal Medicines, Asia Pacific Business Press, New Delhi.

Panda. H. Hers Cultivation and Medicinal Uses, National Institute of Industrial Research, Delhi.

De. Pal & S.K. Jain, 1998. Tribal Medicines, Naya Prokash, Calcutta.

Rajiv K. Sinha, Shweta Sinha, 2005. Ethnobotany, Surabhi Publications, Delhi.

Ashwini Dutt, 2008. An Introduction to Medicinal Plants, Adbyayan Publishers and Distributors, New Delhi.

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Grewal, R.C. 2000. Medicinal Plants, Campus Books International, New Delhi.

Daniel, M. 2013. Useful Herbs of Planet Earth, Scientific Publications, New Delhi

Moshrafuddin Ahmed, Medicinal Plants, MJP Publications, Chennai.

Raveendra Retnam & P. Martin, 2006. Ethnomedicinal Plants, Agrobios (India), Jodhpur.

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Roseline, A. 2011. Pharmacognosy, MJP Publications, Chennai.

Dharamir Hota, 2007. Bioactive Medicinal Plants, Gene – Tech Books, New Delhi.

Srivastava, A.K. 2011. Medicinal Plants, Swastik Publications, New Delhi.

Vikas Anand Saharan, 2008. Principles of Pharmacognosy, Agrobios, Jodhpur.

NIIR Board of Consultants & Engineers, Cultivation and Processing of Selected medicinal plants, Asia Pacific Business Press, Delhi.

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Even Semester - Model Question Paper

Class: II – M.Sc., Subject: Botany

Title of the Paper: Ethanobotany and Herbal Technology

Date : Sub. Code: 18 PBO 413

Time: 3 Hrs. Max. Marks: 75

SECTION – A (10 X 02 = 20 Marks)

Answer *ALL* the Questions

01. Define Ethanobotany.

02. Mention any two narcotic plants used by tribals.

03. What are native plant genetic resources?

04. Mention any two disciplines related to Ethanobotany.

05. What is an adulteration?

06. Define pharmacognosy.

07. What are teratogens?

08. What are hallucinogens?

09. Write the chemical nature of *Terminalia chebula*.

10. Mention any two medicinal uses of *Zingiber officinalis*.

SECTION – B (05 X 05 = 25 Marks)

Answer *ALL* the Questions

11. **(a)** Comment on acellular plant drugs.

(Or)

(b) Write short note on tribal food.

12. **(a)** Enumerate the important medicinal plants discovered through Ethanobotany.

(Or)

(b) Briefly discuss about the role of Ethanobotany in conservations.

13. **(a)** Briefly discuss about siddha system of medicine.

(Or)

(b) Write short notes on drug adulterations.

14. **(a)** Briefly discuss about remedial plants for respiratory disorders.

(Or)

(b) How to prepare Herbal oil? Explain.

15. **(a)** Write the systematic, morphology and uses of *Curcuma domestica*.

(Or)

(b) Write down the chemical nature and uses of *Piper nigrum*.

SECTION – C (03 X 10 = 30 Marks)

Answer any THREE Questions

16. Give an account of ethnic groups of India.

17. Discuss various methods of ethno botanical studies.

18. Write an essay on classification of crude drugs.

19. Discuss about the remedial plants for Diabetics.

20. Give an elaborate account of *Coriandrum sativum*.

*****

SEMESTER – IV **Hrs. / WEEK - 6**
CODE – 18 PBO 414 **CREDIT - 5**

CORE COURSE – XIV : RESEARCH METHODOLOGY

(From the academic year 2018 – 2019 onwards)

OBJECTIVES:

- To learn the biological techniques used in research fields
- To know the principle and methodology of various instruments
- To learn the applications of statistics in scientific research.

UNIT-I **18 Hrs.,**

Principle, structure and application of Light Microscope, Phase contrast, polarized, fluorescence and Electron Microscope (TEM and SEM) - Principles and application of pH meter – Centrifuge and its types

UNIT-II **18 Hrs.,**

Chromatographic techniques:
Paper, TLC, Column, GLC, HPLC.
Basic principles and applications of SDS – PAGE
Blotting Techniques – Western, Northern and Southern

UNIT-III **18 Hrs.,**

BIOPHYSICAL METHODS
Working principle and applications of the following;
UV-VIS Spectrophotometer.
Infra Red Spectrophotometer
Atomic absorption spectrophotometer and
Flame photometer.
Principle and application of PCR

UNIT-IV **18 Hrs.,**

BIOMETRY: Collection of Data - Populations, Samples, Sampling Techniques, Diagrammatic and Graphical representations of data. Measures of central tendency: Mean, Median and Mode.

Standard Deviation, Coefficient of Variance, Test of significance –'t' test, Chi-square test - Correlation and Regression. ANOVA (One way).

UNIT-V **18 Hrs.,**

THESIS WRITING AND PREPARATIONS OF RESEARCH ARTICLES

Abbreviations – Writing of abstract, introduction, Review of Literature, Materials and Methods, Results, Discussion and conclusion – reference, Proof reading and editing.

Preparation for oral and Poster presentation.

REFERENCES:

Gupta S.P. 1990. Statistical Methods, 25th Edition, Sultan & Sons Publications, New Delhi.

Marimuthu. R, 2008. Microscopy and microtechniques, MJP Publications, Chennai.

Anne Regland, 2005. Plant Anatomy and Microtechniques, Saras Publications, Nargercoil.

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Arumugam. M. 2008. Bio Medical Instrumentation, Anuradha Publications, Chennai.

Murugeshan, R, Kiruthiga Sivaprasath, 2006. Optics and Spectroscopy, S. Chand and Company Ltd., New Delhi.

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Wayne W. Baniel, 2009. Biostatistics, 7th Edition, Wiley India Ltd., New Delhi.

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Jerold H. Zar, 1999. Biostatistics Analysis, 4th Edition, Pearson Publications, New Delhi.

A.V.C. College (Autonomous), Mannampandal, Mayiladuthurai.

Even Semester - Model Question Paper

Class: II – M.Sc., Subject: Botany

Title of the Paper: Research Methodology

Date : Sub. Code: 18 PBO 414

Time: 3 Hrs. Max. Marks: 75

SECTION – A (10 X 02 = 20 Marks)

Answer *ALL* the Questions

01. Define the principles of phase contrast microscope.

02. Expand TEM.

03. Define buffer.

04. Expand HPLC.

05. Write down the principles of flame photometer.

06. State the Lambert's Law.

07. Define the term population.

08. What is secondary data?

09. Mention the significance of proof reading.

10. What is bibliography?

SECTION – B (05 X 05 = 25 Marks)

Answer *ALL* the Questions

11. **(a)** Write short note on light microscopy.

(Or)

(b) Explain about the scanning electron microscope.

12. **(a)** Explain about the techniques of gas liquid chromatography.

(Or)

(b) Comment on southern blotting techniques.

13. **(a)** Give a short account of IR spectrophotometer.

(Or)

(b) Comment on application PCR.

14. **(a)** Write short notes on sampling techniques.

(Or)

(b) Bring out the difference between correlation and regression.

15. **(a)** Discuss about the material and methods.

(Or)

(b) Give a short note on abstract and its significance.

SECTION – C (03 X 10 = 30 Marks)

Answer any THREE Questions

16. Give a detail account of fluorescence microscopy.

17. Discuss about the principles and techniques of SDS – PAGE.

18. Describe the principles and application of AAS.

19. Explain the various methods of graphical representations of data.

20. Give a detail account of oral and poster presentations.

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SEMESTER – IV **Hrs. / WEEK - 6**

CODE – 18 PBOP 415 **CREDIT – 4**

PRACTICAL – IV:

HERBAL TECHNOLOGY AND RESEARCH METHODOLOGY

HERBAL TECHNOLOGY

- Microscopical examination of organized and unorganized crude drugs
- Determination of ash values and extractive values of crude drugs
- Qualitative determination of screening of preliminary phytochemical
- Detection of Tannin and Alkaloids
- Submission of economically important plant products (fibers, edible oils, essential oils, resins and gums)
- Quantitative Estimation of secondary metabolites (phenols and flavonoids)

RESEARCH METHODOLOGY

- Separation of leaf pigments (Paper and TLC methods)
- Manuscript preparation and journal format, proof reading, preparation of power point
- Biostatistics problem (mean, median, mode, S.D., 't' test, Chi-square test and ANOVA)

6

SEMESTER – IV **Hrs. / WEEK - 4**

CODE – 18 PBOE 403 **CREDIT - 4**

ELECTIVE COURSE II: BIOINFORMATICS AND BIONANOTECHNOLOGY

(From the academic year 2018 – 2019 onwards)

OBJECTIVES:

- To know the bioinformatics tools in solving biological problems
- To study the role of bionanomaterials in human welfare.

UNIT-I **12 Hrs.,**

Introduction to Computer – Organization of Computer – Input and Output devices.

- Internet and Intranet – Multimedia and Virtual reality.
- Computer net working – LAN, WAN, MODEM, Fiber optics network.
- Introduction to MSDN (Microbial strain Data Network)

UNIT-II **12 Hrs.,**

Introduction and scope of Bioinformatics.

- Nucleic acid databases- Gen bank and DNA Data Bank of Japan, NCBI
- Protein database - Protein Data bank (PDB) SWISSPROT, SCOP
- BLAST and FASTA

UNIT-III **12 Hrs.,**

Software's in Bioinformatics: General software features and trends of C and C++, PERL,

Emerging areas of Bioinformatics: Pharmocogenomics – Chemoinformatics – QSAR - Human Genome Project

UNIT-IV **12Hrs.,**

Bionanotechnology -Introduction – Nanoscience and Nanotechnology – Nanostructures in nature, Carbon Nanostructures - Green synthesis of Nanoparticles – Characterization of nanoparticles

UNIT-V: **12Hrs.,**

Application of Nanotechnology: Biomedical Applications– DNA based Nanomaterials as biosensors – nanomaterials for drug delivery- nanomaterials in food, fabric industries and nanomaterial for environment.

Reference

1. Shah, M.A. and Toker Ahmad, (2010). Principles of nanoscience and nanotechnology. Narosa Publishing house.
2. Subbiah Balaji (2010). Nanobiotechnology. MJP Publisher.
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Even Semester - Model Question Paper

Class: II – M.Sc., Subject: Botany

Title of the Paper: Bioinformatics and Bionanotechnology

Date : Sub. Code: 18 PBOE 403

Time: 3 Hrs. Max. Marks: 75

SECTION – A (10 X 02 = 20 Marks)

Answer *ALL* the Questions

01. What is LAN?

02. Define the term MODEM.

03. Mention the significances of SCOP.

04. What is Gen bank?

05. Define the term genome.

06. Define pharmacogenomics.

07. What is Bionanotechnology?

08. What are dendrimers?

09. Define the term nanotoxicology.

10. What are DNA biosensors?

SECTION – B (05 X 05 = 25 Marks)

Answer *ALL* the Questions

11. **(a)** Briefly discuss about input devices.

(Or)

(b) Write short note on multimedia and its applications.

12. **(a)** Give a brief account on NCBI.

(Or)

(b) Comment on FASTA.

13. **(a)** List out the general features of PERL.

(Or)

(b) Briefly discuss about QSAR.

14. **(a)** Comment upon carbon nanostructure.

(Or)

(b) Write short notes on green synthesis of nanoparticles.

15. **(a)** Give an short account on nanomaterials for drug delivery.

(Or)

(b) Briefly describe the environmental implication of nanoparticles.

SECTION – C (03 X 10 = 30 Marks)

Answer any THREE Questions

16. Give an account of MSDN and add note on its significance.

17. Give an account of BLAST.

18. Write an essay on Human Genome Project.

19. Give an account of characterization of nanoparticles.

20. Discuss the various biomedical applications of nanotechnology.

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