



PERIYAR UNIVERSITY

PERIYAR PALKALAI

NAGARSALEM -

636011

DEGREE OF BACHELOR OF SCIENCE
CHOICE BASED CREDIT SYSTEM

Syllabus for

B.SC. BOTANY

(SEMESTER PATTERN)
(For Candidates admitted in the Colleges affiliated
to Periyar University from 2021-2022 onwards)

DEFINITION

PROGRAMME:

“Programme” means core degrees offered in various disciplines.

COURSE:

“Course” refers to the courses offered under the degree programme spread over the complete Programme of study as under.

- Part I** - Refers Foundation “Tamil/other languages” offered under the programme.
- Part II** - Refers Foundation “Communicative English” offered under the programme.
- Part III** - Refers “the core subjects” related to the programme concerned including Practicals.
- Part III Allied** - Refers “Allied subjects” offered as allied, which is interdisciplinary in nature but related to the programme.
- Part III Electives** - Includes “Core/Elective subjects” related to the core subjects of the programme concerned.
- Part IV (i)** - “Non-Major Electives” means option is being given to students who do not come under the above two categories (i & ii).
- (ii)** - Skill based subject means the courses offered under the programme related to Advanced Skill acquisition for industrial application for which a separate Diploma will be awarded along with the Degree.
- (iv)** - “Foundation Course” means courses offered as
 - 1) Environmental Studies (1st year)
 - 2) Value Education - Yoga (1st year)
 - 3) Professional English for Life
 - 4) science
- Part V** - “Extension Activities” means all those activities which form part of NSS/NCC/Sports/YRC and other co and extracurricular activities.

B.Sc. BOTANY

A detailed explanation of the above with relevant credits are given under “Scheme of Examination along with Distribution of Marks and Credits”

Duration of the Course:

Currently for the undergraduate programme the duration of study is THREE years. The course of the degree of Bachelor of Science shall consist three academic years divided into six semesters. Practical examinations will be at the end of even semesters. These regulations apply to the regular course of study in approved institutions of the University.

Credits:

Means the weightage given to each course of study (subjects) attributed by the experts of the Board of Studies concerned.

Credit System:

Means, the course of study under this pattern, where weightage of credits are spread over to different semesters during the period of study and the Cumulative Grade Point Average will be awarded based on the credits earned by the students. The following are the total credit points:

For Undergraduate Programme (Three years) : 148

AIM AND SCOPE OF THE COURSE:

1. To acquire knowledge in different areas of plant science.
2. The topics included in different units of different papers would enable the students to develop technical skills in Basic Botany and its applied branches.
3. Skill based subjects like Mushroom Technology, Horticulture, Plant Tissue Culture, Agriculture Microbiology, Plant Breeding and Plant utilization as food, Medicoethnobotany and Seed Technology have been included in order to provide opportunities in employment and research in Government and Private Organizations.
4. The above courses also provides foundation for enterprenership.
5. Practicals included in the syllabus will improve the skills of the students in Microscopic techniques, Observations, Drawing and Physiological and Ecological Laboratory techniques.

ELIGIBILITY FOR ADMISSION:

Candidate for admission to the first year of the degree of Bachelor of Science Course shall be required to have passed the Higher secondary examination (Academic or vocational stream with Botany/Biology along with Chemistry under higher secondary board of examination Stream) conducted by the Government of Tamil Nadu or an Examination accepted by the Syndicate, Subject to such conditions may be prescribed therefore shall be permitted to appear and qualify for B.Sc degree examination in Botany.

DURATION OF THE COURSE:

The course for the degree of Bachelor of Science shall consist of three academic years divided in to six semesters. Each semester consists of 90 working days.

PASSING MINIMUM:

The candidate shall be declared to have passed the examinations if he /she secures not less than 40 marks.

DISTRIBUTION OF MARKS:

THEORY

University examination = 75 marks
Internal assessment = 25 marks

INTERNAL ASSESSMENT STRUCTURE:

Test = 15 marks
Assignments = 05 marks
Attendance = 05 marks
Passing minimum for Internal Assessment = 10 rmarks
Passing minimum of University examinations = 30 maks

PRACTICALS

University Examinations = 60 marks
Internal Assessment = 40 marks

INTERNAL ASSESSMENT STRUCTURE:

Submission - 10 Marks Test - 10 Marks Attendance - 5 Marks Total - 40 Marks
Submission = 10 marks
Test = 10 marks
Regularity in Practical = 10 marks
Continues assessment =10 Marks
Passing minimum for internal assessment = 10 marks
Passing minimum for University examinations = 30 marks

CLASSIFICATION OF SUCCESSFUL CANDIDATES:

- Candidates who secure not less than 60 % of the aggregate marks in the whole examinations shall be declared to have passed the examinations in First class.
- Candidates who secure above 50 % and below 60 % shall be declared to have passed the examinations in Second class.
- Other successful candidates who secure below 50% shall be declared to have passed the examination in Third class.

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Course Structure (CBCS)

B.Sc BOTANY COURSE STRUCTURE FROM THE YEAR 2021-2022 ONWARDS

| Sem | Part | Course | IntHrs | Credit | Exam Hrs | Marks | | | |
|-----|------|--|--|--|---|-------|----|-------|-----|
| | | | | | | CIA | EA | Total | |
| I | | | | | | | | | |
| | I | Language paper I | 6 | 3 | 3 | 25 | 75 | 100 | |
| | II | Communicative English paper I | 6 | 3 | 3 | 25 | 75 | 100 | |
| | | Professional English I | 6 | 4 | 3 | 25 | 75 | 100 | |
| | III | Core Course I (Plant Diversity I) | 5 | 5 | 3 | 25 | 75 | 100 | |
| | | Core Course II (Major Practical I) | 3 | (Practical Assessment and credit carried to II sem Core Course II) | | | | | |
| | | First Allied –Zoology/Chemistry | 4 | 3 | 3 | 25 | 75 | 100 | |
| | | First Allied – Zoology/Chemistry I Practical | 3 | Practical Assessment and credit carried to II sem Allied Course II | | | | | |
| | IV | Environmental Studies | 1 | | | | | | |
| | IV | Value Education | 2 | 2 | 3 | 25 | 75 | 100 | |
| | | TOTAL | 36 | 20 | | | | 600 | |
| II | I | Language paper II | 6 | 3 | 3 | 25 | 75 | 100 | |
| | II | Communicative English paper II | 6 | 3 | 3 | 25 | 75 | 100 | |
| | | Professional English II | 6 | 4 | 3 | 25 | 75 | 100 | |
| | III | Core Course III (Plant Diversity II) | 5 | 3 | 3 | 25 | 75 | 100 | |
| | III | Core course II (Major Practical I) | 3 | 3 | 3 | 40 | 60 | 100 | |
| | III | First Allied Zoology/Chemistry | 4 | 4 | 3 | 25 | 75 | 100 | |
| | III | First allied – Zoology/Chemistry (Practical) | 3 | 3 | 3 | 40 | 60 | 100 | |
| | IV | Environmental Studies | 1 | 2 | 3 | 25 | 75 | 100 | |
| | IV | SBEC I Mushroom Technology | 2 | 2 | 3 | 25 | 75 | 100 | |
| | | | | 36 | 27 | | | | 800 |
| III | I | Language paper III | 6 | 3 | 3 | 25 | 75 | 100 | |
| | II | Communicative English -III | 6 | 3 | 3 | 25 | 75 | 100 | |
| | III | Core course –IV (Plant Diversity III) | 4 | 4 | 3 | 25 | 75 | 100 | |
| | III | Core course V (Major Practical II) | 3 | 3 | (Practical Assessment and credit carried to IV Sem Core Course V) | | | | |
| | III | Second Allied –Zoology/Chemistry | 4 | 4 | 3 | 25 | 75 | 100 | |
| | III | Second Allied practical Zoology/Chemistry | 3 | (Practical Assessment and credit carried to IV Sem Second allied II) | | | | | |
| | IV | SBEC –II (Horticulture) | 2 | 2 | 3 | 25 | 75 | 100 | |
| | IV | NMEC-I (Mushroom Culture) | 2 | 2 | 3 | 25 | 75 | 100 | |
| | | | | | 21 | | | | 600 |
| | IV | I | Language paper IV | 6 | 3 | 3 | 25 | 75 | 100 |
| II | | Communicative English -IV | 6 | 3 | 3 | 25 | 75 | 100 | |
| III | | Core course –VI (Anatomy &Embryology of Angiosperms) | 4 | 4 | 3 | 25 | 75 | 100 | |
| III | | Core course V (Major Practical II) | 3 | 3 | 3 | 25 | 75 | 100 | |
| III | | Second Allied – Zoology/Chemistry | 4 | 4 | 3 | 25 | 75 | 100 | |
| III | | Second Allied Practical Zoology/Chemistry | 3 | 3 | 3 | 25 | 75 | 100 | |
| IV | | SBEC –III (Plant Tissue Culture) | 2 | 2 | 3 | 25 | 75 | 100 | |
| IV | | NMEC-II Herbal Botany | 2 | 2 | 3 | 25 | 75 | 100 | |
| | | | Internship Programme: Landscaping and Ornamental Gardening, Organic Farming, Waste Recycling and Vermicomposting, Mushroom Production, Nursery Techniques of Horticultural Plants, Preservation of Fruits and Vegetables. | | | | | | |
| | | TOTAL | 30 | 24 | | | | 800 | |
| V | III | Core course VII (Morphology &Taxonomy of Angiosperms) | 5 | 5 | 3 | 25 | 75 | 100 | |

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|----|-----|---|----|--|---|----|----|------|
| | III | Core course VIII (Cell Biology) | 5 | 5 | 3 | 25 | 75 | 100 |
| | III | Core course IX (Genetics and Plant Breeding) | 5 | 5 | 3 | 25 | 75 | 100 |
| | III | Core course X (Major Practical III)(Core course VII, VII& IX) | 3 | (Practical Assessment and credit carried to VI Sem Core Course X) | | | | |
| | III | Core course XI (Major Practical IV) (Core course X, XI & XII) | 3 | (Practical Assessment and credit carried to VISem Core Course XI) | | | | |
| | III | Major Elective course I (Plant and Environmental Biotechnology) | 5 | 5 | 3 | 25 | 75 | 100 |
| | IV | SBEC-IV – (Agricultural Microbiology) | 2 | 2 | 3 | 25 | 75 | 100 |
| | IV | SBEC-V-(Biological Techniques and Computer Application) | 2 | 2 | 3 | 25 | 75 | 100 |
| | | Evaluation of Internship | 0 | 0 | | | | |
| | | TOTAL | 30 | 24 | | | | 600 |
| VI | III | Core course XII (Plant Physiology) | 5 | 5 | 3 | 25 | 75 | 100 |
| | III | Core course XIII (Plant Ecology and Plant Geography) | 5 | 5 | 3 | 25 | 75 | 100 |
| | III | Core course XIV (Plant Protection) | 5 | 5 | 3 | 25 | 75 | 100 |
| | III | Core course X (Major Practical III) (Core course VII, VII & IX) | 3 | 4 | 4 | 25 | 75 | 100 |
| | III | Core course XI (Major Practical IV) (Core course X, XI & XII) | 3 | 4 | 4 | 25 | 75 | 100 |
| | III | Major elective course (Biochemistry) | 5 | 5 | 3 | 25 | 75 | 100 |
| | IV | SBEC VI- Medicoethnobotany | 2 | 2 | 3 | 25 | 75 | 100 |
| | IV | SBCE VII- Seed Technology | 2 | 2 | 3 | 25 | 75 | 100 |
| | IV | Extension Activities | 1 | | | | | |
| | | TOTAL | 30 | 32 | | | | 800 |
| | | GRAND TOTAL | | 148 | | | | 4200 |

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B.Sc., BOTANY

PU- B.Sc., Botany (College), 2021-22/5 Credit /5hrs/week/75hrs/ I SEM

SEMESTER -I

CORE COURSE-I SUBJECT CODE: 21UBO01

PLANT DIVERSITY –I (ALGAE & BRYOPHYTES)

ALGAE

UNIT I

15 hrs

General characteristics of algae. Evolutionary trends in algae. Classification (F.E. Fritsch) of algae.

Habit and habitats of freshwater, marine and soil algae.

Pigmentation and Reserve food in algae.

Economic importance of Algae – Agar-Agar, Carrageenan, Single cell protein(SCP)- Chlorellin, Algae in sewage Disposal , Algae as Food and Fodder, Diatomite.

Significant contributions of important phycologists (F.E. Fritsch, T.V. Desikachary, M.O.P.Iyengar).

UNIT II

15hrs

A detailed study of Structure, Reproduction and life cycle of the following algae genera:

Cyanophyceae: Oscillatoria, Anabaena,

Chlorophyceae: Chlamydomonas, Volvox and Oedogonium

Chlorophyceae: Caulerpa, Chara,

UNIT III

15hrs

A detailed study of Structure, Reproduction and life cycle of the following algae genera:

Xanthophyceae: Vaucheria

Bacillariophyceae: Cyclotella,

Phaeophyceae: Sargassum

Rhodophyceae: Gracilaria

BRYOPHYTES

UNIT IV

15hrs

Bryophytes-General characteristics. Occurrence, Distribution and Classification (Rothmaler, 1951) of Bryophytes.

A detailed study of the Structure, Reproduction and life cycles of the following genera – *Marchantia*

UNIT V

15hrs

A detailed study of the Structure, Reproduction and life cycles of the following genera *Porella, Anthoceros* and *Polytrichum*.

Evolution of sporophytes of Bryophytes. Economic importance of Bryophytes.

PRACTICAL: 3hrs /Week

1. Micro preparation and detailed microscopic analysis of vegetative and reproductive parts of the following Algae -*Oscillatoria*, *Anabaena*, *Chlamydomonas*, *Volvox*, *Oedogonium*, *Caulerpa*, *Chara*, *Vaucheria*, *Cyclotella*, *Sargassum* and *Gracilaria*.

2. Micro preparation and detailed microscopic analysis of vegetative and reproductive parts of the following Bryophytes –*Marchantia*, *Porella*, *Anthoceros* and *Polytrichum*.

3. Study the Economic importance of Algae (Spotter-Agar-Agar, Carrageenan, SCP (*Spirulina*) - *Chlorellin*, Gelling agent (*Ulva*), Fodder (*Sargassum*) - Diatomite.

ALGAE

Text Books

Annie R, Kumaresan V & Arumugam N (2014). Algae and Bryophytes. Saras Publication; I Edition, Nagercoil, Tamilnadu.

Kumar, HD (1999). Introductory Phycology. 2nd edition. Affiliated East-West Press Pvt. Ltd. Delhi.

Pandey, BP (1994). Algae. S. Chand & Company Ltd. New Delhi.

Sharma, OP (2011). Algae. Tata McGraw Hill Education Private Ltd. New Delhi.

Vashishta, BR, Sinha AK, and Singh, VP (2011). Botany for Degree Students-Algae. S. Chand Pub. New Delhi

References

Bold, HC & Wynne, MJ (1985). Introduction to the Algae. Prentice Hall of India. New Delhi.

Chapman, VJ & Chapman DJ. The Algae. Macmillan Publication. New York.

Fritsch, FE (1945). Structure and reproduction of Algae. Cambridge University press. Cambridge, UK.

Lee, RD (2008). Phycology 4th Edition, Cambridge University Press, New York.

Round, FE (1984). The Ecology of Algae. Cambridge University Press.

BRYOPHYTES

Text Books

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

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

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

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

References

Cavers, F (1971). The interrelationship of Bryophyta. Dawsons of Pall Mall, London

PremPuri (1981). Bryophytes: Morphology, Growth and differentiation. Atma Ram and Sons, New Delhi.

Rashid, A (1998). An Introduction to Bryophyta. Vikas Pub. Ltd. New Delhi.

Smith, AJE (1982). Bryophyta: Ecology. Chapman and Hall. London.

Watson, EV (1968). British Mosses and Liverworts. Hutchinson and Co., London.

Watson, EV (1970). Structure and life of Bryophytes. Hutchinson and Co., London.

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B.Sc., BOTANY

PU- B.Sc., Botany (College), 2021-22/ 5 Credit /5hrs/Week/75hrs/II SEM

SEMESTER –II

CORE COURSE –III SUBJECT CODE: 21UBO02

PLANT DIVERSITY –II

(FUNGI, LICHENS, BACTREIA AND VIRUSES)

FUNGI

UNIT I

15hrs

A study of the general characteristics and mode of life of fungi: Vegetative organization, nutrition, asexual reproduction, sexual reproduction, Heterothallism and Parasexuality. Life cycles in Fungi-Haplontic, Diplontic and haplodiplontic. Classification of fungi (C.J. Alexopoulos and Mims, 1979). Economic importance of Fungi.

UNIT II

15hrs

Detailed study of occurrence, Morphology, Reproduction, Lifecycle and Economic importance of the following genera:

Oomycetes: Albugo,
Hemiascomycetes: Saccharomyces,
Plectomycetes: Aspergillus/ Eurotium,
Pyrenomycetes: Neurospora,
Discomycetes: Peziza.

UNIT III

15hrs

Detailed study of Occurrence, Morphology, Reproduction, Life cycle and Economic importance of the following genera:

Teliomycetes: Puccinia,
Hymenomycetes; Polyporus and
Deuteromycetes: Cercospora

LICHENS AND VIRUSES

UNIT IV

15hrs

Lichens: General characteristics, Occurrence, Distribution, Classification, Reproduction and Economic importance of Lichens.

Detailed study of *Usnea*.

Viruses: General characters of Plant viruses.

General structure with special reference to viroids and prions;

General account of Bacteriophages –Cyanophages, Mycophages. Reproduction of T4 phage

BACTERIA

UNIT V

15hrs

Bacteria – Major characteristics, Occurrence, Distribution, Classification of Bacteria.

Morphology of Bacterial cell – Ultra structure of Bacterial cell.

Mode of nutrition in bacteria – Photosynthetic and chemosynthetic.

Growth and Reproduction in Bacteria.

Wall-less forms (mycoplasma)

Economic importance of bacteria.

PRACTICAL: 3hrs /Week

1. Micro preparation and Detailed microscopic analysis of Vegetative and Reproductive Parts of the following Fungi- *Albugo*, *Saccharomyces*, *Aspergillus*, *Neurospora*, *Peziza*, *Puccinia*, *Polyporus* and *Cercospora*.
2. Micro preparation and detailed microscopic analysis of vegetative and Reproductive Parts of the *Usnea*.
3. Study of viruses, viroids and prions using electron micrographs (photographs).
4. Study of Structure of Bacteria using permanent slides / photographs.
5. Economic importance of fungi: Yeast, antibiotic- Penicillin, Wood rotting- *Polyporus*, edible fungi: *Agaricus*.
6. Economic importance of bacteria: *Lactobacillus*

Fungi

Text Books

Alexopoulos, CJ & Mims, CW (1979). Introductory Mycology. Wiley Eastern Ltd., New Delhi.

Dube, HC (1990). An Introduction of Fungi. Vikas Publication House Ltd. New Delhi.

Dube, HC (1983). Introduction of Modern Mycology. Blackwell Science Pb. Oxford.

Sharma, OP (2011). Fungi and allied microbes. The McGraw –Hill, New Delhi.

Sharma, PD (2003). The Fungi. Rastogi Publications, Meerut.

References

Burnett, J.H. (1971). The fundamentals of Mycology. ELBS Publication, London

Bessey, E.A (1979). Morphology and Taxonomy of fungi. Vikas publishing House Pvt. Ltd. New Delhi.

Mehrotra, RS & Aneja, KR (1990). An Introduction to Mycology. New Age International Pub. New Delhi.

Sundararajan, S (2004). Practical manual of fungi. Anmol Publications Pvt. Ltd New Delhi.

Webster, J (1970). Introduction to fungi. Cambridge University Press. London.

LICHENS

References

Dharani Dhar Awasthi (2000). A Handbook of Lichens. Vedams eBooks (P) Ltd. New Delhi.

Hale, ME. (1983). The Biology of Lichens. Edward Arnold, London.

Muthukumar, S & Tarar, JL (2006). Lichen Flora of Central India. Eastern book Corporation. New Delhi.

Nash, TH (1996). Lichen Biology. Cambridge University Press, London.

BACTERIA

Text Books

Pelzer, MJ, Chan, ECS and Krieg, NR .(1983). Microbiology. Tata MaGraw Hill

Publishing House, New Delhi

Powar and Dagainwala. (1994). General Microbiology. Himalayan publishing House, New Delhi

Sharma, PD (1992). Microbiology. Rastogi & Co., Meerut

Tauro, P, Kapoor, KK & Yadav, KS (1996). An Introduction to Microbiology. New age International Pvt. Ltd. Pub. New Delhi.

References

Stainer ,RY, Adelberg, EA & Ingram, JL (1978). General Microbiology. Mac Millan & Company. London .

VIRUSES

Text Books

Biswas, SB & Biswas, A(1997). An introduction to viruses. 4th Ed. Vikas pub. House Pvt. Ltd. New Delhi.

References

Cooper, J.J. (1995). Viruses and the environment. (2nd ed) Chapman & Hall, London.

Nayudu, M.V. (2008). Plant viruses. Tata McGraw-Hill Education. New Delhi.

Mandahar, C.I. (1987). Introduction to plant viruses, S. Chand & company, Pvt. Ltd. New Delhi.

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B.Sc., BOTANY

PU- B.Sc., Botany (College), 2021-22/ 2 Credit /2hrs/Week/30hrs/II SEM

SEMSETR- II

SKILLED BASED ELECTIVE COURSE – I: SUBJECT CODE: 21UBOS01

MUSHROOM TECHNOLOGY

UNIT I

6 hrs

Introduction - history of mushroom technology.

Scope of edible mushroom cultivation.

Types of edible mushrooms available in India - temperate mushroom, sub-tropical mushroom and tropical mushroom.

Detail study of *Pleurotus citrinopileatus*, *Agaricus bisporus*.

UNIT II

6 hrs

Pure culture - preparation of medium (PDA and Oatmeal agar medium).

Sterilization.

Preparation of test tube slants to store mother culture.

Culturing of *Pleurotus* mycelium on Petri plates.

Preparation of mother spawns in saline bottle and polypropylene bag and their multiplication.

UNIT III

6hrs

Cultivation Technology: Infrastructure: substrates (locally available) Polythene bag, vessels, Inoculation hood, inoculation loop, low cost stove, sieves, culture rack, mushroom unit (Thatched house), water sprayer, tray, small polythene bag.

Mushroom bed preparation - paddy straw, sugarcane trash.

Factors affecting the mushroom bed preparation - Low cost technology.

UNIT IV

6 hrs

Storage and nutrition: Short-term storage (Refrigeration - upto 24 hours) Long term

Storage (canning, pickles, pappads), drying, storage in salt solutions.

Nutrition - Proteins - amino acids, mineral elements nutrition - Carbohydrates, Crude fibre content - Vitamins.

Medicinal values of mushrooms

UNIT V

6 hrs

Food Preparation: Types of foods prepared from mushroom; Soup, Cutlet, Omelets, Samosa, Pickles, Curry.

Value added products of mushroom– mushroom soup powder, mushroom biscuit, mushroom nuggets, mushroom ketchup, candy, murabba, chips etc.

Research Centers - National level and Regional level.

Cost benefit ratio - Marketing in India and abroad, Export Value.

References:

- Manjit Singh, Bhuvnesh vijay, Shwet kamal, GC Wakchaure (Eds.) 2011. Mushrooms-cultivation, marketing and consumption. Directorate of Mushroom research, ICAR, Chambaghat, Solan , HP-173213.
- Marimuthu, T, Krishnamoorthy, AS, Sivaprakasam, K & Jayarajan, R (1991). Oyster Mushrooms. Department of Plant Pathology, Tamil Nadu Agricultural University, Coimbatore.
- Nita Bahl (1984-1988). Hand book of Mushrooms, II Edition, Vol. I & Vol. II.
- Swaminathan, M. (1990). Food and Nutrition. Bappco, The Bangalore Printing and Publishing Co. Ltd., Bangalore.
- Tewari, Pankaj Kapoor, S.C., (1988). Mushroom cultivation, Mittal Publications. New Delhi.

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PU- B.Sc., Botany (College), 2021-22/4Credit /4hrs/Week/60hrs/III SEM

SEMESTER –III

CORE COURSE –IV, SUBJECT CODE: 21UBO03

PLANT DIVERSITY- III

(PTERIDOPHYTES, GYMNOSPERMS AND PALEOBOTANY)

UNIT I

10 hrs

Pteridophytes: General characteristics

Classification (Reimers 1954).

Sporangial organization – Homospory, Heterospory and seed habit.

Aposopory and Apogamy.

Stelar evolution.

Ecological and economic importance of Pteridophytes

UNIT II

10 hrs

Morphology, Anatomy, Reproduction and life cycle of *Lycopodium*, *Selaginella*, *Equisetum*.

UNIT III

10 hrs

Morphology, Anatomy, Reproduction and life cycle of *Gleichenia*, *Adiantum* and *Marsilea*

UNIT IV

15 hrs

Gymnosperms-General Characteristics,

Classification(Pilger and Melchior,1954).

Morphology, anatomy and reproduction of *Cycas* and *Pinus*.

Economic importance.

UNIT V

15hrs

Gymnosperm and Paleobotany:

Detailed study of the *Gnetum*.

Paleobotany – Geological time scale, Radiocarbon dating

Fossilization process.

Brief study of the following fossils: *Lepidodendron*, *Lepidocarpon*, *Calamites*, *Williamsonia*.

PRACTICAL 3HRS /Week

1. Study of the Habit, TS of leaf and Stem, Morphology of Reproductive structures of following Pteridophytes: *Lycopodium*, *Selaginella*, *Equisetum*, *Gleichenia*, *Adiantum* and *Marsilea*

2. Study of the Habit, TS of leaf and stem, Morphology of Reproductive structures of following gymnosperm genera *Cycas*, *Pinus* and *Gnetum*.

3 Study the following fossil members: *Lepidodendron*, *Lepidocarpon*, *Calamites*, *Williamsonia* through permanent slides/photographs.

Text Books

- Pandey et al., (1998). A Text Book of Botany Vol. II. S. Chand & Co. Ltd.
Pandey.B.P.(1977). A Text book of Bryophyta, Pteridophyta and Gymnosperms. K.Nath and Co., Meerut.
Parihar.N.S.(1977). An introduction to Embryology. Vol-II. Pteridophyta and Gymnosperms. K.Nath and Co, Meerut.
Shukla.A.C and Misra.S.P 1982 Essentials of Palaeobotany, Vikas publishing house Pvt Ltd., Delhi.
Vasishta BR, Sinha AK & Anilkumar. (2005). Botany for degree students: Pteridophytes. S Chand, New Delhi.
Vashishta. P.C (1972). Botany for Degree Students, Vol IV-Vascular Cryptogams (Pteridophyta), S.Chand & Co Pvt Ltd.
Vashista.P.C. (1976). Gymnosperms, S.Chand & Co Pvt Ltd, 1976.
Vasishta PC, Sinha AK & Anilkumar. (2005). Botany for degree students: Gymnosperms. S Chand and Company Ltd., New Delhi.

References

- Arnolds, C.A.(1947). An Introduction to Paleobotany, McGraw Hill Book Co., New York.
Chamberlin, C.J. (1934). Gymnosperms: structure and Evolution. Chicago reprinted 1950. NewYork.
Eames, A.J.(1936). Morphology of lower vascular plants. Tata McGraw Hill Publishing Co., New Delhi.
Rashid, A. (1976). An Introduction to Pteridophytes. Vikas Publishing House, New Delhi.
Shukala, A.C and Sharma. M.(1992). Plant fossils. A link with the past, Birbal Shani Institute of Paleobotany, Lucknow, India.
Smith, G.M. (1935). Cryptogamic Botany. Vol-III, Tata McGraw Hill Publishing Co., New Delhi.
Sporne, KR. (1975). The Morphology of Pteridophytes, Hutchinson & Co., London.
Sporne, KR. (1967). The Morphology of Gymnosperms, Hutchinson & Co., London.
Sporne, K.R.(1991).The Morphology of Gymnosperms. B.I. publications Pvt., Mumbai

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PU- B.Sc., Botany (College), 2021-22/2 Credit /2hrs/Week/30hrs/III SEM

SEMESTER –III SKILLED BASED ELECTIVE COURSE –II, SUBJECT CODE: 21UBOS02 HORTICULTURE

UNIT I 6hrs

Fundamentals of Horticulture: Definition, Branches, Importance and Scope.
Classification of Horticultural Crops: fruits and vegetables.
Gardening: Definition, objectives and scope - different types of gardening- Formal, informal and kitchen garden.

UNIT II 6hrs

Plant propagation: Cutting, layering, Budding and grafting. Selection and significance of Stock and scion.
Role of plant growth regulator in Horticulture: Induction of Rooting, flowering, Fruit set, Fruit development.

UNIT III 6hrs

Soil bed preparation, Potting, Repotting, Weeding, Pruning, Topiary.
Lawn making: Types of lawn grasses, maintenance of lawn.
Hedge plant and its importance.

UNIT IV 6hrs

Floriculture: Importance and Scope of Floriculture.
Commercial Floriculture: Production and packaging of cut flowers
Flower arrangements; Methods to prolong vase life
Cultivation of Important cut flowers (*Chrysanthemum*, *Jasmine*, *Rose*).
Ikebana.

UNIT V 6hrs

Ornamental gardens: Flowering annuals; Herbaceous, perennials; Divine vines; Shade and ornamental trees; Ornamental bulbous and foliage plants; Cacti and succulents; Palms.
Ornamental garden: Green House, Water garden, Rockery.
Bonsai techniques.

HORTICULTURE

Text Books

Chadha, KL (2003). Hand book of Horticulture. ICAR Publication , New Delhi
Edmond Musser & Andres (1994). Fundamentals of Horticulture. McGraw Hill Book Co. New Delhi.
Kumar, N (1997). Introduction to Horticulture. Rajalakshmi Pub. Nagercoil.
Manibhushan Rao, K. Text book of Horticulture. Macmillan India Ltd.

References

- Randhava, GS (1973). Ornamental Horticulture in India. Today and Tomorrow Printers and Publishers, New Delhi.
- Williams, CN, Uzo, JO & Peregrine, WTH (1991). Vegetable production in Tropics. Longman Scientific & Technical, Essex (UK).
- Yawalkar, K.S. (1961). Vegetable crops of India. Agri-Horticultural Publishing House, Dharmapath, Nagpur.

PU- B.Sc., Botany (College), 2021-22/2 Credit /2hrs/Week/30hrs/III SEM

SEMESTER- III

NON – MAJOR ELECTIVE COURSE –I SUBJECT CODE: 21UBON01

MUSHROOM CULTURE

UNIT I

6hrs

Introduction, History. Nutritional and medicinal value of edible mushrooms; Poisonous mushrooms. Types of edible mushrooms available in India - *Pleurotus citrinopileatus*, *Agaricus bisporus*.

UNIT II

6hrs

Pure culture: Preparation of Medium (Potato dextrose and Oatmeal Agar medium), Sterilization culturing of *Pleurotus* mycelium on test tube Slants, Petri plate. Preparation of mother spawns in saline bottle and poly propylene bag. Substrate for spawn preparation (cereal grain, coir pith)

UNIT III

6hrs

Cultivation Technology: Infrastructure: substrates (locally available) Polythene bag, vessels, Inoculation hook, inoculation loop, low cost stove, sieves, culture rack, mushroom unit (Thatched house) water sprayer, tray, small polythene bag. Mushroom bed preparation - paddy straw, sugarcane trash, maize straw, banana leaves. Factors affecting the mushroom bed preparation - Low cost technology.

UNIT IV

6hrs

Storage and nutrition: Short-term storage (Refrigeration - upto 24 hours) Long term Storage (canning, pickles, pappads), drying, storage in salt solutions. Nutrition - Proteins -amino acids, mineral elements nutrition - Carbohydrates, Crude fibre content – Vitamins

UNIT V

6 hrs

Food Preparation: Types of foods prepared from mushroom. Research Centre - National level and Regional level. Cost benefit ratio - Marketing in India and abroad, Export Value.

References

- Marimuthu, T, Krishnamoorthy, AS, Sivaprakasam, K & Jayarajan R (1991). Oyster Mushrooms. Department of Plant Pathology, TNAU, Coimbatore.
- Swaminathan, M. (1990). Food and Nutrition. Bappco. The Bangalore Printing and Publishing Co. Ltd., Bangalore - 560018.
- Tewari, & Pankaj Kapoor, SC (1988). Mushroom cultivation. Mittal Publications. New Delhi.
- Nita Bahl (2009). Hand book on Mushrooms. Oxford & IBH Publishers. New Delhi.
- Tripathi, DP (2005). Mushroom Cultivation. Oxford & IBH Publishers. New Delhi.
- Muthusamy, AD & Yesuraja, I (1999). Mushrooms Culture. TNAU Publishers New Delhi.

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B.Sc., BOTANY

PU- B.Sc., Botany (College), 2021-22/4Credit /4hrs/Week/60hrs/IVSEM

SEMESTER –IV

CORE COURSE – VI SUBJECT CODE: 21 UBO04
ANATOMY AND EMBRYOLOGY OF ANGIOSPERMS

ANATOMY

UNIT – I

10hrs

Meristems: Classification, distribution, structure and function.

Shoot apex and Root apex organization. Theories: Histogen, Tunica – Corpus and quiescent center.

Simple permanent tissues: Parenchyma, Collenchyma, Sclerenchyma. (Fibers and Sclereids)

UNIT – II

15 hrs

Complex tissues: Xylem – Tracheids, Vessels, Xylem fibres and Xylem parenchyma. Secondary Xylem, Annual rings, Heart wood and Sap wood, Tyloses.

Phloem: Sieve elements, companion cells, phloem fibre and phloem parenchyma. Secondary phloem.

Epidermal tissues: Stomatal types: Anomocytic, Anisocytic, Paracytic, Diacytic and Gramineous.

Ground tissues and vascular tissues- types.

Trichomes- Types.

UNIT – III

15hrs

Primary and secondary structure of Dicot Stem and Root.

Anomalous secondary growth in stems of *Nyctanthes*, *Boerhaavia*, *Dracaena*.

Anomalous secondary growth in roots of *Beta vulgaris*

Primary structure of monocot stem and root.

Structure of Dicot and Monocot leaf.

Nodal anatomy – Uni, tri and multilacunar node.

EMBRYOLOGY OF ANGIOSPERMS

UNIT – IV

10hrs

Structure and development of Anther.

Development of male gametophyte.

Types of ovules. Nucellus.

Development of Female gametophyte: Monosporic (*Polygonum*).

UNIT – V

10 hrs

A brief account on pollination, Fertilization, Double fertilization and Triple fusion.

Endosperm: Nuclear, Cellular, Helobial and Ruminant.

Endosperm haustoria.

Development of Embryo in Dicot (*Capsella-bursa pastoris*).

Polyembryony.

PRACTICALS

ANATOMY OF ANGIOSPERMS

1. Study of simple and complex tissues by using permanent slides.
2. Study of primary structure and sectioning of Dicot stem, root, leaf, Monocot stem, root and leaf.
3. Normal secondary thickening in Dicot stem and root.
4. Anomalous secondary structures –*Nyctanthes*, *Boerhaavia* *Dracaena* and *Beta vulgaris*. (Permanent slides)
5. Stomatal types: Anomocytic, Anisocytic, Paracytic, Diacytic and Gramineous. (Peel out From leaf).

EMBRYOLOGY OF ANGIOSPERMS

1. Structure of Anther (Young and Mature from *Datura* or *Cassia* flower)
2. Types of ovules: Anatropous, Orthotropous, Circinotropous, Amphitropous, Campylotropous. (Permanent slides).
3. Stages in Microsporogenesis and Megasporogenesis (Permanent slides onion flower Bud).
4. Structure of Male gametophyte and Female gametophyte (Permanent Slides/photographs).
5. Dissection of embryo and observe the globular and Heart shape
6. Structure of Endosperm. Nuclear (Coconut water) cellular endosperm (Cucumber seed) Ruminant (fruit of *Areca catechu*)

ANATOMY

Text Books

- Pandey B.P., (2015)(Edn.) Plant Anatomy S. Chand Publ. New Delhi.
- Pijushroy,(2010). Plant Anatomy, New central Book Agency, Pvt. Ltd, New Delhi.
- Vashista P.C (1984). *Plant Anatomy* –Pradeep publication , Jalandhar

References

- Cutter, E.G. (1970). Plant Anatomy: Experimental and interpretation. Edward,ArnoldPub. Ltd., London.
- Cutter, E.G. (1971). Plant Anatomy, Edward Arnold Pub. Ltd., London.
- Cutter, E.G. (1978). Plant Anatomy, Experimental and Interpretation. Edward Arnold Pub.Ltd., London.
- Esau, K.(1960). Plant Anatomy, Wiley Eastern Private Ltd., New Delhi.
- Esau, K.(1977). Anatomy of seed plants. Wiley Eastern Publication, New Delhi.
- Fahn, A.(1989). Plant Anatomy. Macmillan Publication (P) Ltd, Singapore.
- Coutler E.G (1969) *Plant Anatomy-Part1 Cells and Tissues* –Edward Arnold London.

EMBRYOLOGY

Text Books

- Bhatnagar, SP, Dantu, PK and Bhojwani, SS. (2014).The Embryology of Angiosperms 6thEditionVikas Publishing House. Delhi.
- Bhojwani, SS. and Bhatnagar, SP. (2011). The Embryology of Angiosperms.

5th Edition, Vikas Publishing House. Delhi.

Pandey, AK. (2000). Introduction to Embryology of Angiosperms. 1st Edition: CBS; New Delhi.

Maheswari, P. (1976). An introduction to the Embryology of Angiosperms. TATA McGraw-Hill Publishing Co., Ltd., New Delhi.

References

Johri, BMI (1984). Embryology of Angiosperms. Springer-Verlag.

PU- B.Sc., Botany (College), 2021-22/2 Credit /2hrs/Week/30hrs/IV SEM

SEMESTER –IV

SKILLED BASED ELECTIVE COURSE -III SUBJECT CODE: 21UBOS03

PLANT TISSUE CULTURE

UNIT I

6hrs

Introduction to Plant Tissue culture- Historical background.

Principle – Polarity, Symmetry and Totipotency, Morphogenetic Centres of origin and organization-differentiation–dedifferentiation and re-differentiation; vascular differentiations.

Laboratory organization, Tools and techniques, methods of sterilization. Laboratory contaminants- it's control and measures.

UNIT II

6hrs

Media and Culture Preparation: Role of Micro and Macro nutrients, Vitamins and carbon source in tissue culture, Media preparation- pH, Temperature, Solidifying agents. Maintenance of cultures. Environmental Conditions. Explants selection.

UNIT III

6hrs

Types of culture - Cell, tissue and organ culture – Callus induction, subculture and maintenance. Isolation of single cells, selection and types of cells. Cell suspension cultures -Batch, continuous. Synchronization of suspension culture.

UNIT IV

6hrs

Somatic hybridization and cybridization. Organogenesis -anther culture and production of haploids- somatic embryogenesis –synthetic seed production-cryopreservation – Gene conservation Bank.

UNIT V

6hrs

Application of tissues and Cell culture: Micro propagation, Clonal propagation. Production of genetically variable plants – Resistance to herbicides, insecticides, virus and other diseases.

Production of secondary metabolites – Alkaloids.

Text Books

Dubey, R.C., (2001). A text book of biotechnology. S. Chand & Co., New Delhi.

Gupta, P.K. (1994). Elements of Biotechnology. Rastogi Publications, Meerut.

Ignacimuthu, S.J.(2003). Plant Biotechnology. Oxford & IBH Publishing, New Delhi.

John Jothi Prakash, E. (2005). Outlines of Plant Biotechnology. EmkayPb., New Delhi.

Kalyankumar De,(2008). Plant tissue culture.New Central Book Agency, Calcutta.

Sathanarayana BN and Vergheese DB (2007). Plant tissue culture- Practices and new experimental protocols, ILK Publ. New Delhi.

References

Bhojwani, S.S. &Razdan, M.K. (2004). Plant Tissue Culture, Read Elsevier India Pvt. Ltd.

Dix, P.J. (1990). Plant cell line and selection. VCH Publ.

Islam, A.S. (1996). Plant tissue culture. Oxford & IBH Publ. Purohit S.S.(2010). Plant tissue culture , Student edition, Jodhpur.

Hammond, J.C. McGarvey and V. Yusibov, (2009). Plant Biotechnology, Springer Verlag. New York.

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B.Sc., BOTANY

PU- B.Sc., Botany (College), 2021-22/2 Credit /2hrs/Week/30 hrs./VSEM

SEMESTER –IV
NON –MAJOR ELECTIVE –II SUBJECT CODE: 21UBON02
HERBAL BOTANY

UNIT I

6hrs

Herbal medicines: History and scope – Indian system of medicines – Siddha, Ayurvedha and Unani systems.

Classification of Crude drugs.

UNIT II

6 hrs

Organized drugs –Drugs obtained from Wood – *Ephedra*.

Drugs obtained from Barks– *Cinchona* .

Drugs obtained from Roots and Rhizomes – *Catheranthus*, *Rauwolfia* and *Ginger*.

UNIT III

6hrs

Drugs obtained from leaves –*Aloe vera*, *Gymnema sylvestre*, *Ocimum sanctum*.

Drugs Obtained from Flower –*Syzygium aromaticum*.

Drugs from fruits –*Coriandrum sativum*.

Drugs from Seed –*Strychnos nux vomica*.

Plants and Herbs– *Bacopa monnieri*, *Andrographis paniculata*

UNIT IV

6 hrs

Pharmacological action of plant drugs-action on the autonomic nervous system, central nervous system(*Mucuna pruriens*, *Withania somnifera*)

Heart, muscle, Blood vessels (*Terminalia arjuna*, *Azadirachta indica*).

Gastro-intestinal tract (*Curcuma longa*, *Foeniculum vulgare*)

UNIT V

6 hrs

Collection of crude drugs-Harvesting of crude drugs-

Drying of crude drugs (Natural drying and artificial drying)

Garbling-packing of crude drugs

Storage of crude drug.

Marketing.

Drug adulteration.

Text books

John Jothi Prakash, E. (2003). Medicinal Botany and Pharmacognosy. JPRPub, Vallioor, Tirunelveli.

Gokhale SB Kokate CK & Purohit AP (1995). Pharmacognosy. NiraliPrakashan, Pune.

Prajapathi, Purohit, Sharma and Kumar. (2003). A Hand book of Medicinal plants.

Agrobios Publications, Jodhpur.

Kumar, NC (1993). An Introduction to Medical Botany and Pharmacognosy.

Chopra RN, Nayar SL and Chopra IC (1956). Glossary of Indian medicinal plants. CSIR, New Delhi.

References

Kanny, Lall, Dey and Raj Bahadur, (1984). The indigenous drugs of India, International Book Distributors.

Sivarajan VV and Balachandran Indra (1994). Ayurvedic drugs and their plant source.

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B.Sc., BOTANY

PU- B.Sc., Botany (College), 2021-22/5Credit /5hrs/Week/75hrs/VSEM

SEMESTER –V
CORE COURSE – VII SUBJECT CODE:21UBO05
MORPHOLOGY AND TAXONOMY OF ANGIOSPERMS

UNIT I **10 hrs**

The plant body (Parts). Root types and Modification.
Stem – Types Aerial and underground Stem modification.
Leaf: Morphology; Types; Venation; Phyllotaxy.

UNIT II **15hrs**

Inflorescence: Racemose types - Cymose types - Special type.
Morphology of flower- Flower as modified-shoot
detailed structure of flowers-floral parts-their arrangement, Relative position, symmetry,
Aestivation and placentation types- Floral Diagram and Floral Formula.
Fruits: Types and classification

UNIT III **15hrs**

Aim, Scope and Significance of taxonomy
System of Classification- Artificial (Linnaeus), Natural system (Bentham and Hooker)
and Phylogenetic (Engler and Prantl)
Angiosperm Phylogeny Group system 2009(APG IV) (Introduction only).
Only outline of Classification with merits and Demerits need be indicated.
Plant nomenclature- Binomial, ICBN/ICN - Principles-Rule of priority and author
citation. Type concept.
Herbarium technique- Preparation of herbarium, their preservation.
Important herbaria, Flora and uses.

UNIT IV **20 hrs**

Detailed study of families: Study the following families of Bentham and Hooker's system
with special reference to their morphological and floral characters. Special attention
should be given to common and economically important plants within the families,
Annonaceae, Capparidaceae, Rutaceae, Leguminosae (Mimosaceae, Caesalpiniaceae and
Fabaceae), Myrtaceae, Cucurbitaceae, Apiaceae,

UNIT V **20 hrs**

Detailed study of families: Study the following families of Bentham and Hooker's
System w.s.r.t. their morphological and floral characters. Special attention should be
given to common and economically important plants within the families: Apocyanaceae,
Asclepiadaceae, Verbenaceae, Lamiaceae, Euphorbiaceae, Orchidaceae, Liliaceae,
Poaceae.

PRACTICAL 3hrs /Week

1. Describe the plant parts with suitable plants- Technical term habit, habitat form....types

of leaves, with leaf shape, margin, texture, modification of leaf.

2. Study the Types and modification of root and stem with suitable example

Identify the following inflorescence and fruits:

(a) Inflorescence - Simple raceme, Spike, Corymb, Head, simple cyme, Cyathium
And Hypanthodium.

(b) Fruits

3. Floral formula from floral description.

1. Identify the families mentioned in the syllabus by noting their vegetative and floral Characters.

2. Students must describe the floral parts, draw the L.S., floral diagram and write the floral formula of at least one flower from each family

4. Study the products of plants mentioned in the syllabus of economic botany with Special reference to the morphology, botanical name and family.

5. Prepare **herbarium of 15 plants** with field notes (internal assessment).

6. Conduct field trips for a minimum of 3 to 5 days under the guidance of a teacher and Submit field report.

Text Books

Lawrence, GHM. (1995). The Taxonomy of vascular Plants (Vol I-IV), Central Book, Dept., Allahabad.

Heywood VH. (1967). Plant Taxonomy, Edward Arnold, London.

Jeffery C. (1982). An introduction to Plant Taxonomy, J& A Churchill Ltd., London.

Sivaraajan VV(1989). Introduction to Principle of Plant Taxonomy, Oxford and IBH, New Delhi.

Pandey BP(1997). Taxonomy of Angiosperms, S.Chand & Co., New Delhi.

Singh, V. & Jain, KK (1989). Taxonomy of Angiosperms – Rastogi, Meerut.

Vashista, PC (1990). Taxonomy of Angiosperms – S.Chand & Co., New Delhi.

Sharma, O.P. (1996). Plant Taxonomy. TATA McGraw Hill, New Delhi.

Gurcharan Singh. (2016). Plants Systematics 3 edition. CRC Press.

References

Hutchinson, J. (1973). The Families of Flowering plants, Oxford University press, London.

Gamble, J.S, Fisher, L.E.F. (1967). The Flora of The presidency of Madras (Vol-III) BSI, Calcutta.

Davis, P.H and Heywood, V.M. (1965). Principles of Angiosperm Taxonomy, Oliver and Boyd Edinburgh.

Mathew, K.M. (1983). The Flora of Tamil Nadu Carnatic, The Rapinat Herbarium, Trichy.

Simpson MG (2006). Plant systematics, Elsevier Academic Press, USA.

Takhtajan, AL. (1969). Flowering Plants – Origin and dispersal – Oliver & Boyd.

Gangulee HC Das KS and Datta CT (1964). College Botany – Vol I, Basant Panchami, Calcutta.

Narayanaswamy RV and Rao, KN (1976). Outline of botany. S. Viswanthan printer and publisher, Chennai.

Heywood VH (1967). Plant Taxonomy. London: Edward Arnold.

PERIYAR UNIVERSITY, SALEM – 636011

B.Sc., BOTANY

Hill AF 1982. Economic Botany.: Mc Graw Hill, New York.

1Jain SK and Rao RR (1976). A hand book of field and herbarium technique. Today andtomorrow's Publishers, New Delhi.

Jeffery C (1968) An Introduction to Plant Taxonomy, J and A Churchill. London.

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B.Sc., BOTANY

PU- B.Sc., Botany (College), 2021-22/5Credit /5hrs/Week/75hrs/VSEM

SEMESTER –V CORE COURSE – VIII SUBJECT CODE 21UBO06 CELL BIOLOGY

CYTOLOGY

UNIT I

15hrs

History and Development of cell biology.

Techniques of Cell Biology: Purification of cells and their parts. Cell separation and culture, flow cytometry, Fractionation of cell contents, Tracing cellular molecules with radioactive isotopes and antibodies.

Cell as a unit of structure and function;

Characteristics of prokaryotic and eukaryotic cells

Unit II

15hrs

Ultra structure of a Plant cell.

Cell wall Chemistry, structure and function of Plant cell wall.

Plasma membrane. Overview of membrane function; fluid mosaic model; Chemical composition of membranes; Membrane transport – Passive, active and facilitated transport, endocytosis and exocytosis

Unit III

15hrs

Endomembrane system: Endoplasmic Reticulum – Structure, targeting and insertion of proteins in the ER, protein folding, processing;

Smooth ER and lipid synthesis, export of proteins and lipids;

Golgi Apparatus – organization, protein glycosylation, protein sorting and export from Golgi Apparatus;

Ribosome; Lysosomes

Cellular inclusions- Starch grains, Aleurone grains, Inulin Crystals, Raphides and Cystoliths.

Unit IV 15 hrs

Cell organelles

Nucleus: Structure-nuclear envelope, nuclear pore complex, nuclear lamina, molecular organization of chromatin; nucleolus.

Chloroplast and mitochondria: Structural organization; Function;

Semi-autonomous nature of mitochondria and chloroplast.

UNIT V

15hrs

Chromosomes –Morphology, Structure of Polytene, Lampbrush and B-chromosomes. Nucleic acid –Structure and types of DNA and RNA, Nucleosomes. Replication-DNA.

RNA Structure and types. Cell division– Amitosis, mitosis and meiosis.

Gene regulation – Lac operon.

PRACTICAL 3hrs /week

1. To observe the plant cell structure with onion epidermal peel out.
2. Study of the photomicrographs of cell organelles
3. Microscopic view of cell organelles in plant cells – Chloroplast (Hydrila leaf)
4. Starch grains (potato), Aleurone grains (wheat), Inulin Crystals(potato), Raphides (Petiole–Colacasia/Nymphaea) and Cystoliths–(leaf peel out -Ficus/Momordica).
5. Study the polytene and lamp brush chromosome structure through photograph
6. Identification of different stages of mitosis by using squash and smear techniques –
Onion Root tip.

Text Books

Rastogi, SC (1992). Cell biology. Tata McGrew-Hill, New Delhi.

Sundararajan ,S (2000). Cytology. Anmol publication (P) Ltd, New Delhi.

References

Dyansager, V.R (1986). Cytology and Genetics. Tata McGrew-Hill, New Delhi.

Freifelder, D.(1993). Essentials of Molecular Biology. Jones & Bartlett, Boston.

Karp, G (1995). Cell and Molecular Biology. John Wiley and Sons, New York.

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B.Sc., BOTANY

PU- B.Sc., Botany (College), 2021-225Credit /5hr/Week/75/VSEM

SEMESTER –V

CORE COURSE IXSUBJECT CODE:21UBO07

GENETICS and PLANT BREEDING

GENETICS

UNIT I

15hrs

Mendelian genetics – Mendel's laws of inheritance –Monohybrid, Dihybrid Cross. Incomplete dominance and Complementary interaction of genes, Epistasis and lethal alleles.

Multiple alleles- general account: ABO blood group in man.

UNIT II

15hrs

Linkage and crossing over,

Cytological basis of crossing over, mapping of genes on chromosomes, Sex linkage in *Drosophila* (Eye color) and Humans (color blindness).

Cytoplasmic inheritance (Plastid inheritance- , Mitochondria- male sterility in maize)

UNIT III

15hrs

Sex determination in plants.

Mutations.

Chromosome aberrations- deficiencies, duplications, inversions, translocations.

Polyploid types- aneuploids, euploids and allopolyploids.

Population genetics- Hardy – Weinberg principle.

PLANT BREEDING

UNIT IV

15hrs

Plant Breeding: Historical aspect of plant breeding. Objectives of plant breeding.

Breeding Methods: Plant introduction - Types and procedures

Centers of diversity and origin of cultivated plants Vavilov's centres of origin.

Acclimatization.

Selection methods, (pure line, clonal and mass)

UNIT V

15 hrs.

Hybridization: Types and procedure of hybridization.

Heterosis, Hybrid vigour. Somatic hybridization.

Anther culture and its Role in plant breeding.

Role of mutation and polyploidy in plant breeding.

PRACTICAL 3hr /Week

1. Simple problems of monohybrid and Dihybrid ratios and factor interaction
2. Construction of chromosome map – three point test cross.
3. Demonstration of Hybridization technique.

Text Books

Verma, P.S. & V.K. Agarwal, 2003, Genetics. S. Chand & Co.Ltd., New Delhi

References

Lewin (2007). Gene IX. Jones and Barlett Pub.ISBN. O 7637 5222 3

Brown, T.A.(2006). Genomes 3, Garland science, New York.

Gupta, PK.(2002).Genetics. Rastogi publishers, Meerut.

Meyyan RP (2000) genetics , Saras Publication, Nagercoil.

Strickberger,M.W(1999).Genetics. Prentice Hall of India Pvt Ltd., New Delhi.

Singh. B.D (2000).Fundamentals of Genetics. Kalyani Publishers, NewDelhi.

Mirta, S (1994).Genetics- A Blue print of life. Tata McGraw Hill,New Delhi.

PLANT BREEDING

Text Books

Chauduri, HK. (1971). Elementary Principles of Plant Breeding, Oxford and IBH Co.,
New Delhi.

Singh BD (2002). Plant Breeding. Kalyani Publishers, Ludhiana.

Gupta SK (2010). Practical Plant Breeding. Second ed., Agrobios (India) Jodhpur.

Allard RW (1960). Principles of Plant Breeding. John Willey and Sons, Inc.

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B.Sc., BOTANY

PU- B.Sc., Botany (College), 2021-22/5Credit /5hrs/Week/75hrs/V SEM

SEMESTER –V

MAJOR ELECTIVE COURES I – SUBJECT CODE:21UBOE01

PLANT AND ENVIRONMENTAL BIOTECHNOLOGY

UNIT I

15hrs

Biotechnology – History, scope and significance.
Recombinant DNA technology. Role of Restriction enzymes.
Cloning vectors – Plasmid, Cosmids, Bacteriophages. Transposons.
Applications of Genetic Engineering.

UNIT II

15hrs

Gene transfer in plants - Aims, strategies for development of transgenic plants.
Direct gene transfer methods- Electroporation, Lipofection and Microinjection.
Indirect gene transfer– *Agrobacterium* mediated gene transfer.
Advantages and disadvantages of transgenic plant

UNIT III

15hrs

Techniques and application of biotechnology – Polymerase chain reaction: Principle and Application of PCR and RTPCR.
–DNA Sequencing – Sanger’s method.
Introduction and application of molecular marker’s –brief account DNA finger printing and Bar coding of plants.

UNIT IV

15hrs

Genes of agronomic interest and transgenic crops: Golden rice, Bt cotton and Bt brinjal.
Disease resistance.
Biosafety and bioethics of transgenic plants.
Enhancement of shelf life of flowers and fruits.

UNIT V

15 hrs

Environmental Biotechnology: Biodiversity and conversation.
Waste management - Solid waste; waste water, Biogas and phytoremediation(only outline).
Industrial biotechnology– Bioethanol, Food biotechnology –SCP.
Improved food and food products

Text Books

Kumaresan, V(2009). Biotechnology. Saras Publications, Nagercoil,
Dubey, RC (2004). A text book of Biotechnology. 3rd Ed.S.Chand& Co. New Delhi.
Gupta, PK.(2004). Elements of Biotechnology. Ist ed. Rastogi publications – Meerut.
Purohit, SS.(2005). Biotechnology Fundamentals & Applications. 3rd Ed. Mrs. Saraswathi Purohit for student Edition, India.
Razdan, MK (2008) Introduction to plant tissue culture.2nd ed. Oxford & IBH publishing Co. Pvt. Ltd., New Delhi.

References

Brown TA (2006). Gene cloning and DNA analysis. Blackwell scientific publishers
Prime rose SB, Twyman RM & old RW (2001). Principle of gene manipulation; an
Introduction to genetic engineering. 6th Ed Blackwell oxford.

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B.Sc., BOTANY

PU- B.Sc., Botany (College), 2021-2122Credit /2hr/Week/30hr/V SEM

SEMESTER –V

SKILL BASED ELECTIVE COURSE -IV SUBJECT CODE: 21UBOS04

AGRICULTURAL MICROBIOLOGY

UNIT I

6hrs

General characterization – Soil microflora- Bacteria, Fungi, Actinomycetes, Algae and Phosphate solubilizing bacteria.

Rhizosphere and non rhizosphere concept.

Role of Rhizosphere microorganisms in soil fertility.

UNIT II

6hrs

Nitrogen cycle in nature- biological N₂ fixation.

Symbiotic and non-symbiotic bacteria.

Rhizobium and *Azospirillum* -Isolation, Mass Production and Field application.

UNIT III

6hrs

Azotobacter - Isolation, Mass production and Field application.

Cyanobacteria (blue green algae), *Azolla* and *Anabaena azollae* association, nitrogen fixation, factors affecting growth, Blue green algae and *Azolla* in rice cultivation.

UNIT IV

6hrs

Mycorrhizal association, types of mycorrhizal association, taxonomy, occurrence and distribution, phosphorus nutrition, growth and yield – colonization of AM – isolation and inoculum production of AM, and its influence on growth and yield of crop plants.

UNIT V

6hrs

Organic farming- green manuring and organic fertilizers, recycling of biodegradable municipal, agricultural and industrial wastes- Biocompost making methods, types and methods of vermicomposting- field application.

References

Dubey, RC (2005). Text book of Biotechnology S.Chand& Co, New Delhi.

Kumaresan, V(2005). Biotechnology, Saras Publications, New Delhi.

John Jothi Prakash, E (2004). Outlines of Plant Biotechnology. Emkay Publication, New Delhi.

Sathe, TV (2004). Vermiculture and Organic Farming. Daya publishers.

Subha Rao, NS (2000). Soil Microbiology, Oxford & IBH Publishers, New Delhi.

Vayas,SC, Vayas, S. and Modi, HA (1998). Bio-fertilizers and organic Farming Akta Prakashan, Nadiad.

PERIYAR UNIVERSITY, SALEM – 636011

B.Sc., BOTANY

PU- B.Sc., Botany (College), 2021-22/ 2Credit /2hrs/Week/30hr/SEM

SEMESTER V

SKILL BASED ELECTIVE COURSE – V SUBJECT CODE: 21UBOS05

BIOLOGICAL TECHNIQUES AND COMPUTER APPLICATION

UNIT I

6hrs

Basic principles of Light microscopes. Compound microscope, Phase contrast microscope, Scanning and Transmission Electron microscopes. Micrometry-Principle and Applications of Stage and Ocular micrometer. Haemocytometer.

UNIT II

6hrs

Micro technique – preparation for microscopic observation – Whole mount, Smears, Squash, sections.

Microtomy: Fixation, Dehydration, Infiltration, Embedding, Sectioning.

Microtome's – Types- Principles and operating mechanisms of Rotary Microtome.

Stains and Staining techniques - Preparation of following stains: Safranin, Cotton blue in lactophenol, Acetocarmine, Methylene blue and Crystal violet.

UNIT III

6hrs

Centrifugation: Principles, components, mechanism and application of clinical, Refrigerated and ultra-centrifuges.

Chromatography: Basic principles, types – Paper, Column, Thin layer.

Principle and Application of pH meter, Colorimetry and Spectrophotometer.

UNIT IV

6hrs

Biostatistics – Statistics data, population, samples, parameters; Representation of Data:

Tabular, Graphical; Measures of central tendency: Arithmetic mean, mode, median;

Measures of dispersion: Range, mean, Standard deviation, ANOVA, SPSS.

UNIT V

6hrs

Computer application in the Art of Scientific Presentation-Numbers, units, abbreviations and nomenclature used in scientific writing. Writing references.

Microsoft word for assignment and project work.

Microsoft excel for tabular and graph work.

Microsoft Power Point Presentation for preparing slides

Poster presentation.

Text Books

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

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

Wilson K, Walker, J. (1994). Principle and techniques of practical biochemistry,4thed) Cambridge University Press, Cambridge.

Palanivelu P (2013). Analytical Biochemistry and Separation techniques , 20th century publications ,Palkalainage, Madurai.

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

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

Department of Foundation Course, “Computer Literacy”, St. Joseph’s College, 2017.

References

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

Peter Gray (1964). Hand book of Basic Microtechnique. McGraw Hill Pub,New York.

Steven Ruzin (2005).Plant Microtechnique and Microscopy. Oxford University Press, London.

Cooper.TG (1991).The Tools of Bio-chemistry, John Wiley &sons, London.

Dey P.M. and Harborne,JB (2000). Plant Biochemistry Harcourt Asia Pvt. Ltd.

Plummer DT (2003).An introduction to practical Biochemistry. 3rd Edn. Tata McGraw Hill Publishing Company Ltd. New Delhi.

Zar, JH (1984). Biostatistics Analysis, Prentice Hall International, England Cliffs, New Jersy,.

Alexis Leon, “Introduction to computers”, Vikas Publishing House Pvt. Ltd., New Delhi, 2008. 2. Alexis Leon and Mathew Leon, “Introduction to computers with Ms Office 2000”, Tata McGraw Hill Publishing Co. Ltd., New Delhi, 2005.

PERIYAR UNIVERSITY, SALEM – 636011

B.Sc., BOTANY

PU- B.Sc., Botany (College), 2021-22/5Credit /5hrs/Week/75hrs/VI SEM

SEMESTER –VI
CORE COURSE – XI SUBJECT CODE :21UBO08
PLANT PHYSIOLOGY

UNIT I

15hrs

Plant water relations- Diffusion, imbibition, osmosis, OP, DPD, TP, WP.
Absorption of water and Mineral – Active absorption and passive absorption.
Ascent of sap.
Transpiration – types, mechanism of stomatal movement.
Factors affecting transpiration. Guttation.
Role of macro and microelements.

UNIT II

15hrs

Photosynthesis- Photosynthetic pigments - Concept of photosynthetic unit – Emerson's enhancement effect – Stages of photosynthesis – light reactions – cyclic and non-cyclic photophosphorylation. Calvin cycle. C₄ and CAM pathway. Photorespiration (Brief study only). Factors affecting photosynthesis.

UNIT III

15hrs

Respiration – Aerobic and Anaerobic respiration. Glycolysis, Krebs cycle, Electron transport System. Oxidative phosphorylation. Factors affecting respiration.

UNIT IV

15hrs

Nitrogen Metabolism: nitrogen fixation- nitrification and denitrification. Nitrate assimilation- Synthesis of amino acids - Reductive amination and Transamination. Stress physiology –Definition - water stress, salt.

UNIT V

15Hrs

Plant Growth regulators – Types of plant hormones – Auxins, Cytokinins, Gibberellins, Abscisic acid, Salicylic acid and Ethylene. Photomorphogenesis- Phytochrome – photoperiodism. Vernalization. Senescence. Plant movements.

PRACTICAL 3Hrs /Week

1. Determination of DPD by using Rheo leaf /Onion leaf
2. Effect of temperature on Membrane permeability
3. Effect of chemical on Membrane permeability
4. Calculation of stomatal index and stomatal frequency of a mesophyte and a Xerophyte
5. Effect of light on transpiration using Ganong's potometer
6. Separation of plant pigments by paper chromatography.
7. To study the effect of light intensity on Photosynthesis by using Wilmott's bubbler
8. To study the effect of and concentration of CO₂ on Photosynthesis by using Wilmott's bubbler

9. Measurement of rate of respiration in germinating seed using Simple Respiroscope
10. Measurement of rate of respiration in flower buds using Simple Respiroscope

Text Books

- Pandey, SN and Sinha, BK (2001). Plant Physiology. Third revised edition, Vikas publishing House Pvt. Ltd, New Delhi
- Devlin, RM (1974). Plant Physiology, Affiliated East West Press Pvt. Ltd
- Noggle, GR. and Fritz, GJ (1976). Introductory Plant Physiology, Prentice - Hall, India.
- Jain ,VK (2007). Fundamentals of plant physiology , S. Chand &Company ltd, New Delhi.
- Nobel, PS (1970). Introduction to Biophysical Plant Physiology. W. H. Freeman and Company, San Francisco
- Verma,V(2008).Text book of plant Physiology, Ane's student edition, New Delhi.
- Bajracharya, D., (1999). Experiments in Plant Physiology- A Laboratory Manual. Narosa Publishing House, New Delhi.

References

- Beevers, L (1976). Nitrogen metabolism in plants. William & Sons Ltd. London.
- Bray, CM (1983). Nitrogen Metabolism in Plants. Longman.
- Kramer, PJ (1969).Plant and soil water relationship- A Modern Synthesis.
- Salisbury, F B and Ross, CW (1986). Plant Physiology. Third edition, CBS Publishers and Distributors, New Delhi
- Levitt (1972). Responses of plants to environmental stress. Academic press, New York.
- Bidwell RGS (1979). Plant Physiology, Mac Millan Publishing Company. New Delhi.
- Taiz, L and Zeiger, E (1991). Plant physiology. The Benjamin/Cummings Publishing company, Inc., California, New York.

PU- B.Sc., Botany (College), 2021-22/ 5Credit /5hr/Week/75hr/VISEM

SEMESTER –VI

CORE COURSE – XII SUBJECT CODE: 21UBO09

PLANT ECOLOGY AND PLANT GEOGRAPHY

UNIT I

15hrs

Approaches to the study of ecology- autecology and synecology. Plant environment: climatic, edaphic and biotic factors.

UNIT II

15hrs

Ecosystem concept: Ecosystem components (Abiotic and Biotic) –Autotrophs, Heterotrophs. Ecosystem function: Ecological pyramids. Productivity of ecosystem - Primary Productivity –Gross primary productivity -Net primary productivity-Net productivity- Secondary productivity. Food chain. Food web. Biogeochemical cycling: Cycling of carbon, nitrogen and Phosphorous. Pond ecosystem.

UNIT III

15hrs

Succession – Types of Succession.Process of Succession - Nudation - migration -Ecesis aggregation - competition -Reaction –climax. Hydrarch and Xerarch succession. Ecological group of plants – Hydrophytes, Mesophytes, Xerophytes, parasites, epiphytes and halophytes.

UNIT IV

15hrs

Environmental pollution- introduction, definition;

Air pollution- air pollutants, types, sources, effect of air pollution on plants and humans, control measures.

Water pollution-water pollutants, types, sources, impact. Control measures.

Eutrophication.

Soil Pollution- causes, sources, solid waste, biodegradable, non-biodegradable, waste dumps, municipal waste, Agrochemical management of solid waste, Composting, e – waste.

UNIT V

15hrs

Definition, Concept, Scope and significance of phytogeography.

Phytogeographical zones of India.

Vegetational types in Tamilnadu.

Hotspots – Endemic distribution, Age and Area Hypothesis.

Continental drift theory. Conservation – *In situ* and *Ex situ*.

PRACTICALS 3Hrs/ Week

1. Study of the morphological and structural adaptation of locally available hydrophytes, Mesophytes, xerophytes to correlate to the particular habitat.
2. Determination of Dissolved oxygen in water
3. Determination of dissolved carbon di oxide in water.

Text Books

- Sharma, P.D (2009).Ecology and Environment. Rastogi Publications.
Shukla, R.S. &P.S. Chandel (1991) : Plant Ecology & Soil Science. S.Chand & Co.,
New Delhi
Vasishta, P.C, 1979 Plant Ecology. Vishal Publication.
Verma, V,A 1981 Text Book of plant Ecology. Emkay Publication.
Sharma, J.P.2004 Environmental Studies. Laxmi Publications (P) Ltd. New Delhi.

References

- Ambasht RS (1978). The Book of Plant Ecology. Students friends Co.
Willings WD (1964).Plants and Ecosystem. Wasworti Publishing Co.
Daubenmire RF (1973). Plant and Environment. John Willey.
Gopal B and Bhardwaj (1979). Elements of Ecology. Vikas Pub. House Pvt. Ltd.
Cain SA (1944). Foundations of Plant Geography. Harper & Brothers, N.Y.
Mani MS (1974). Ecology &Biogeography of India. Dr. W. Junk Publishers, The
Haque
Good, R. (1997). The Geography of flowering Plants (2ndEdn.,) Longmans,
Green & Co., Inc., London & Allied Science Publishers, New Delhi-495pp.,

PERIYAR UNIVERSITY, SALEM – 636011

B.Sc., BOTANY

PU- B.Sc., Botany (College), 2021-22/5Credit /5hrs/Week/75hrs/VI SEM

SEMESTER –VI

CORE COURSE –XIII SUBJECT CODE:21UBO10

PLANT PROTECTION

UNIT I

15 hrs

Types of insects causing damage to crop. Nature and classification of plant nematodes. Damage to crops of India by Insects, Nematodes, Rodents, Fungi, Bacteria and viruses- a general outline.

UNIT II

15 hrs

Types of plant diseases and causal agents. A general account of preventive measures of plant diseases including plant protection and quarantine measures. Legislations in plant protection, seed certification, weed control.

UNIT III

15 hrs

Study of symptoms, etiology and control measures of the following diseases: damping off of seedling, bud rot of coconut, black rust of wheat, blast of paddy, smut of maize, Tikka disease of groundnut.

UNIT IV

15 hrs

Characteristic features of plant pathogenic bacteria. General symptoms of bacterial diseases. Survival and spread of bacterial plant pathogens. Insect transmission of bacteria. Study of symptoms, etiology and control measures of the following diseases: Soft rot of Vegetables, Bacterial blight of rice, canker disease of citrus, ring rot of potato.

UNIT V

15 hrs

Nature of Plant Virus. Transmission of plant viruses. Causal organism, symptoms, control measures of Viral diseases: Tobacco Mosaic, Bunchy top of banana, Mosaic disease of Lady's finger, Leaf Mosaic of Tapioca.
General account of Mycoplasma with reference to Little leaf of brinjal and Papaya leaf curl

PRACTICAL

1. Collection and study of diseased plant materials.
2. Study of fungal, bacterial and viral diseases mentioned in the syllabus.
3. Handling of plant protection appliances (Dusters, sprayers, and other appliances.)
4. Preparation of 5 herbarium sheets of Pathology – specimens studied

Text Books

Chaudhury and Majid, (1954). Hand Book of plant protection. Department of Agriculture, Government press, Shillong, Assam.

Agros, GN (1997) Plant Pathology (4th ed.) Academic Press.

Bilgrami KH. and Dube HC (1976). A textbook of Modern Plant Pathology. International Book Distributing Co. Lucknow.

Mehrotra, RS (1980). Plant Pathology – TMH, New Delhi.

Pandey, BP. (1999). Plant Pathology-Pathogen and Plant diseases. Chand & Co. New

Delhi.

Rangaswami, G (1999). Disease of Crop plants of India. Prentice Hall of India Pvt. Ltd.

Sharma PD(2004). Plant Pathology. Rastogi Publishers.

PERIYAR UNIVERSITY, SALEM – 636011

B.Sc., BOTANY

PU- B.Sc., Botany (College), 2021-22/5Credit /5hrs/Week/75hrs/VI SEM

SEMESTER –VI

MAJOR ELECTIVE COURSE – II SUBJECT CODE: 21UBOE02

BIOCHEMISTRY

UNIT I

15hrs

Atomic structure of elements. Bonding: Covalent and non-covalent bonds - Hydrogen bond, Van der Waal's forces. Structure and properties of water, Acids and Bases - pH and Buffer system.

UNIT II

15hrs

Carbohydrates: Structure and properties of Mono - Disaccharides , polysaccharides. Chemical structure and function of starch and cellulose.

UNIT III

15hrs

Amino acids: Basic structure & properties (physical and chemical); function, Essential and standard amino acids. Proteins: structure-peptide bond -solubility and composition. The peptide bond- primary structure- secondary structure- tertiarystructure -quaternary structure–function of protein

UNIT IV

15hrs

Enzymes: Nomenclature, classification -mechanism and regulation of enzyme action, enzyme kinetics, factors affecting enzymeaction .

UNIT V

15hrs

Lipids - structure of simple lipid and compound lipid (phospholipids and glycolipids), fatty acids- saturated and unsaturated fatty acids-Secondary carbon metabolism and the metabolites: Polyphenolics - Terpenoids and Alkaloids.

Text Books

Rastogi , S.C (2003). Outlines of Biochemistry , CBS Publishers &Distributors , New Delhi

Stryer, L., (1988). Biochemistry, WH Freeman & Co., NY.

Jain J.L. *et al.*, (2008). Fundamentals of Biochemistry, Chand ,New Delhi.

Conn et al.(2005) . Outlines of Biochemistry 5/Ed, Wiley&Sons Pvt. Ltd.

Satyanaryana U, Chakrapani U, (2006). Biochemistry, Books and Allied (P)Ltd.

References

Apps *et al.*, (1992). Biochemistry. ELBS.

Caret et al., (1993). Inorganic, Organic and Biological Chemistry, WMC Brown Pub. USA.

Nelson D.L, Cox M.M.(2005). Lehninger Principle of Biochemistry, W.H. freeman and Company, New York.

Rawn, D. (1989). Biochemistry, Neil Patterson.

Zuley G.L., (1998).Biochemistry, Wm.C .Brown Publishers USA.

PU- B.Sc., Botany (College), 2020-21/ 2 Credit /2hrs/Week/30 hrs/SEM

PU- B.Sc., Botany (College), 2021-22/5Credit /5hrs/Week/75hrs/VI SEM

SEMESTER –VI

SKILL BASED ELCTIVE COURSE –VISUBJECT CODE :21UBOS06

MEDICO- ETHNO BOTANY

UNIT I

6hrs

History. Scope and Importance of Medicinal Plants.Indigenous Medicinal Sciences - Definition and Scope- Ayurveda, Siddha and Unani medicine; History and concept.Classification of natural drugs, (Alphabetical, Morphological, Taxonomical, Chemical and Pharmacological)

UNIT II

6hrs

Ethnobotany – definition, scope and objectives. Major and minor ethnic groups in South India and their Ethnobotanical and Ethnobiologicalheritage.Ethnomedicines.Role of ethnic groups in conservation of plant genetic resources. Endangered taxa and forestmanagement (participatory forest management).Mythology andconservation of ecosystems.Conservation of selected plant species: sacredgroves.Ethnobotanical field methods.

UNIT III

6hrs

Role of ethnobotany in modern Medicine-Medico-ethnobotanical sources in India; Significance of the following plants in ethnobotanical practices (along with their habitat and morphology) a) *Azadiracthaindicab*)*Ocimum sanctum* c) *Vitexnegundo* d) *Gloriosa superb* e) *Tribulusterrestrisf*) *Pongamiapinnatag*) *Cassia auriculatah*) *Indigoferatinctoria*.

Role of ethnobotany in modernmedicine with special example *Rauvolfiasepentina*, *Trichopuszeylanicus*, *Artemisia*, *Withania*.

UNIT IV

6hrs

Drugs obtained from leaves - *Aloe vera*, *Gymnema sylvestre*, *Ocimum sanctum*.

Drugs Obtained from Flower-*Syzygium aromaticum*.

Drugs from fruits - *Coriandrum sativum* .

Drugs from Seed *Strychnosnux vomica*-

Plants and Herbs– *Bacopa monnieri*, *Andrographis paniculata*

UNIT V

6hrs

Collection of crude drugs-Harvesting of crude drugs-Drying of crude drugs (Natural drying and Artificial drying)-Garbling- packing of crude drugs-Storage of crude drug. Marketing.

Drug adulteration. Drug evaluation: Chemical and Biological. Phytochemicalinvestigations.Quality control of herbal drugs. Role of NMPB, AYUSH and CDRI.

Text Books

Gokhale SB, Kokate, CK and Purohit, AP (2003). Pharmacognosy. Nirali Prakashan, Pune.

Arumugam, K.R. and Muruges, N (1990). Text book of Pharmacognosy. Sathya Publishers, Chinnalapatti (Tamilnadu) 624 201.

References

Amruth, (1996) The Medicinal plants Magazine (All volumes) Medicinal plant Conservatory Society, Bangalore.

Bhattacharjee, SK (2004). Hand Book of Medicinal plants. Pointer Publishers, Jaipur.

Handa SS and Kapoor V K (1993). Pharmacognosy. Vallabh Prakashan, New Delhi.

Harbourne, JB (1998). Phytochemical methods: A Guide to Modern Techniques of Plant Analysis (3rd edition). Chapman and Hill Co., New York.

Jain, (2001). Medicinal plants. National Book Trust, New Delhi.

PU- B.Sc., Botany (College), 2021-2122 Credit /2hrs/Week/30hrs/VI SEM

SEMESTER –VI

SKILL BASED ELECTIVE COURES -VIISUBJECT CODE: 21UBOS07

SEED TECHNOLOGY

UNIT I

6hrs

Floral biology.Seed formation.Seed morphology and structural details of Dicot (Castor) and Monocot (Paddy) seeds. Roles and goals of seed technology, importance of quality seeds in agriculture, characteristics of quality seed.

UNIT II

6hrs

Seed sampling – Method of sampling – Seed Purity – Seed Germination – Methods of Seed Germination using paper, Sand or soil – Standard Germination Test. Seed dormancy.

UNIT III

6hrs

Seed viability – Topographical tetrazolium or T2 test embryo excision method. Seed moisture – Importance – methods of moisture determination- basic methods.

UNIT IV

6hrs

Certified seed production of the following: Paddy, groundnut and cotton.

UNIT V

6hrs

Seed certification – objectives – fundamental concepts of seed certification – sources and classes of seed: Breeder's seed, certified seed. Seed analysis – Tagging of seedlings – field standards.

References:

Agarwal, R.L. Seed Technology Oxford and IBH Publishing Co. Pvt. Ltd.,

Bewley J.D. and Black M (Edn) 1985 – Seed Physiology of development and germination. Plenum Press, New York.

Kowalsky. Seed Biology. Vol. I, Vol. II and Vol. III. Academic Press, New York.

PERIYAR UNIVERSITY, SALEM – 636011

B.Sc., BOTANY

PU- B.Sc., Botany (College), 2021-22/4 Credit /4hrs/Week/60hrs/SEM

FIRST ALLIED COURSE – I SUBJECT CODE :21UBOA01 THALLOPHYTES, BRYOPHYTES, PTRERIDOPHYTES, GYMNOSPERMS, PLANT PHYSIOLOGY AND ECOLOGY.

UNIT I

12 hrs

Thallophytes: Algae: general characters. Study of the structure and life cycle of the following genera-*Oscillatoria*, *Oedogonium*, *Sargassum* and *Polysiphonia*.

Fungi: General Characters. Study of the structure and life cycle of the following genera *Albugo*, *Penicillium* and *Agaricus*. Economic importance of fungi

UNIT II

12hrs

A general study of Bacteria and viruses. Economic importance of bacteria.

Bryophytes: General Characters. Study of the structure and life cycle of *Marchantia*.

UNIT III

12hrs

Pteridophytes and Gymnosperms: Structure and lifecycle of *Lycopodium* and *Cycas*.

UNIT IV

12 hrs

Plant Physiology: Osmosis, absorption of water. Photosynthesis-Light reaction, Calvin cycle. Transpiration– types, mechanism of stomatal movement.

Nitrogen cycle.

Hormones (Auxins only).

UNIT V

12 hrs

Plant Ecology: Factors affecting vegetation - climatic, edaphic and biotic. Morphological and anatomical adaptations in Hydrophytes and Xerophytes

Text books

Fuller HJ and Trippo O. (1949). College Botany, Henry Holt & Co.

Ganguly AK (1975) General Botany Vol I (1971) & Vol II, The New Book Stall, Calcutta.

Rao, K.. Krishnamurthy, KV and Rao GS (1979). Ancillary Botany, S. Viswanathan Pvt. Ltd., Madras.

Palaniappan, S. (1985) . Thavaraviyal Thunaippaadam (Tamil), Mohan Padippagam, Chennai.

Pandey BP (1986). Text Book of Botany (College Botany) Vol I and II, S.Chand and Co. New Delhi.

Rasool SK and Sekar T (2002). Allied Botany, Popular Book House, Chennai -15.

PU- B.Sc., Botany (College), 2021-22/4 Credit /4hrs/Week/60hrs/SEM

ALLIED BOTANY

FIRST ALLIED COURSE – II SUBJECT CODE: 21UBOA02
EXTERNAL MORPHOLOGY, TAXONOMY OF ANGIOSPERMS, CYTOLOGY,
GENETICS, ANATOMY AND EMBRYOLOGY.

UNIT I **12hrs**

Morphology of Plant: Plant and its parts. Structure and function of Root and Stem. Leaf and its parts. Phyllotaxy. Types of leaf – simple and compound. Terminology with reference to leaf description. Inflorescence - Racemose, Cymose, Special types. Terminology with reference to flower description.

UNIT II **12hrs**

Taxonomy: Bentham and Hooker's system of classification. Study of the following families and their economic importance - Leguminosae, Cucurbitaceae, Rubiaceae, Asteraceae, Euphorbiaceae and Poaceae.

UNIT III **12hrs**

Cytology: Ultra structure of plant cell and brief outline of cell wall, Plasma membrane, Endoplasmic reticulum, Mitochondria, Chloroplast, Nucleus. Cell division - Mitosis and Meiosis. Genetics-Mendel's law. Mono and dihybrid cross.

UNIT IV **12hrs**

Anatomy: Meristem. Simple permanent tissues - Parenchyma, Collenchyma, Sclerenchyma. Complex permanent tissues - Xylem and Phloem. Primary structure of Dicot stem, Dicot root and Dicot Leaf. (Mesophytic only)

UNIT V **12hrs**

Embryology - Structure and development of anther, male gametophyte. Structure and development of ovule and female gametophyte (Polygonum type). Fertilization. Structure and development of dicot embryo (*Capsella* type).

PRACTICAL

1. To describe in technical terms plants belonging to any of the families prescribed and Identify the family.
2. To identify the plant family and morphology of the parts used for the following plant Specimens.
 1. *Arachis hypogea* - Ground nut
 2. *Dolichos biflorus* - Horse gram
 3. *Cicer arietinum* - Bengal gram

4. *Pisum sativum* - Pea
5. *Phaseolus mungo*– Blackgram
6. *Phaseolus radiatus*– Greengram
7. *Tamarindus indica* - Fruit
8. *Abrus precatorius* - Seed
9. *Acacia concinna*– Soapnut
10. *Luffa aegyptiaca* -Fibrous skeleton of the fruit
11. *Cucumis sativus* - Fruit
12. *Coffea arabica* - Seeds
13. *Ixora* - Flower
14. *Cinchona officinalis* - Plant
15. *Musa Paradisica* – Fruit
16. *Phoenix sylvestris*-Date fruit
17. *Areca catechu*-Nut
18. *Cocos nucifera*-Kernal

3. To make suitable Micropreparations, describe and identify materials of Algae, Fungi, Bryophytes, Pteridophytes, Gymnosperms and Angiosperms prescribed.

4. To describe simple experimental set-up in plant physiology section of the syllabus.

Text books

Fuller HJ and Tippo O. (1949). College Botany, Henry Holt & Co.

Ganguly AK (1975) General Botany Vol I (1971) & Vol II, The New Book Stall, Calcutta.

Rao, K.. Krishnamurthy, KV and Rao GS (1979) Ancillary Botany, S. Viswanathan Pvt. Ltd., Madras.

Palaniappan, S. (1985) . Thavaraviyal Thunaippadam (Tamil) Vol I and II, Mohan Padippagam, Chennai.

Pandey B.P, 1986, Text Book of Botany (College Botany) Vol I and II, S.Chand and Co. New Delhi.

Rasool SK and Sekar T (2002). Allied Botany, Popular Book House, Chennai -15.

PERIYAR UNIVERSITY, SALEM – 636011

B.Sc., BOTANY

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

PAPER MODEL.

B.Sc., Degree Examination, APRIL / NOVEMBER 20__

Time: 3 hrs.

Max. Marks: 75

Part - A: (15 x 1 = 15 marks)

Answer all the questions.

Choose the correct answer

(Three questions from each unit)

Q.No. 1- Q.No. 15

Part – B (2x5 = 10 marks)

Answer any TWO questions

Q.No. 16. - UNIT-I

Q.No. 17. - UNIT-II

Q.No. 18 - UNIT-III

Q.No. 19. - UNIT-IV

Q.No. 20. - UNIT-V

Part – C (5x10 = 50 marks)

Answer all the questions.

All Question carry equal marks. Each answer should not exceed 500 words.

Q.No. 21.a (or) B - UNIT-I

Q.No. 22.a (or) B - UNIT-II

Q.No. 23.a (or) B - UNIT-III

Q.No. 24.a (or) B - UNIT-IV

Q.No. 25.a (or) B - UNIT-V

PU-B.Sc., Botany (College), 2021-22

MODEL QUESTION PAPER

B. Sc., Botany Degree Examination

((For Students Admitted from the Academic Year 2021 – 2022 onwards under CBCS Pattern)

CORE COURSE – II. MAJOR PRACTICAL I SUBJECT CODE 21UBOP01

(Covering the core courses I &III)

(ALGAE, BRYOPHYTES, FUNGI, LICHENS, BACTERIA, VIRUSES)

Time : 3 hrs.

Maximum: 60 Marks

Practical: 50 Marks

Record : 10 Marks

1. Cut transverse section of A, B and C. Stain and mount in glycerin. Identify giving reason. Draw diagrams. Leave the slides for valuation. (7X3=21)
2. Draw diagrams and write notes of interest on D, E, F, and G. (4X4=16)
3. Name the genus, group and morphology of given part of H , I, and J. (Diagrams not Necessary) 3X3=9
4. Identify and write notes on economic importance of K, L, and M. 2X2=4

Key

A - Algae

B - Fungi

C - Bryophytes

(Preparation-2, Identification -1, Diagram -2, Reason -2)

(7X3=21)

D - Algae- slide

E - Fungi- slide

F - Bryophyte-slide

G - Lichens- fruit body Bacteria/ Viruses- electron micrograph

(Identification -1, Diagram -1 , Reason -2)

(4X4=16)

H - Algae

I - Fungi

J - Bryophytes

(Genus 1, Group 1, Morphology 1)

(3X3=9)

K – Algae/Fungi

L- Bacteria/Viruses

(identification 1, importance 1)

(2X2=4)

PU-B.Sc., Botany (College), 2020-21

MODEL QUESTION PAPER

B. Sc., Botany Degree Examination

((For Students Admitted from the Academic Year 2021 – 2022 onwards under CBCS Pattern)

CORE COURSE – V. SUBJECT CODE :21UBOP02

MAJOR PRACTICAL II

(Covering the core courses IV&VI)

(PTERIDOPHYTES, GYMNOSPERMS AND PALEOBOTANY; ANATOMY & EMBRYOLOGY OF ANGIOSPERM)

Time : 3 hrs.

Maximum: 60 Marks

Practical: 50 Marks

Record : 10 Marks

1. Cut transverse sections of A, B and C. Stain and mount in glycerin. Identify giving Reasons. Draw diagrams. Leave the slides for valuation. (4X6=24 marks)
2. Make a suitable micro preparation of D. Identify giving reasons. Draw diagrams. Leave the Slides for valuation. (6 marks)
3. Dissect and mount any one of the stages of the given material E. (Diagram and notes not necessary) (4Marks)
4. Name the genus, group and morphology of given part of F and G. (2X3=6marks)
5. Write notes on H, I, J, K and L. (5X2=10marks)

KEY

- A. Angiosperm – Anatomy – Vegetative part.
- B. Pteridophyte – Anatomy – Vegetative part.
- C. Gymnosperm - Anatomy – Vegetative part.

(Preparation 2, Identification 1, Diagram 1, Reason 2)

D. Reproductive part – Pteridophyte (or) Gymnosperm.

(Preparation 2, Identification 1, Diagram 1, Reason 2)

E. Embryo – dicot – Tridax - 4 mark.

F. (Slide -3, Identification-1)

F&G. Macroscopic –Pteridophyte (or) Gymnosperm.

(Genus 1, Group 1, Morphology 1) (2X3=6mark)

H, I, J, K and L. Permanent slides (Anatomy, Embryology, Pteridophytes, Gymnosperms, Fossil slides) (Identification 1, Reason 1) (5X2=10)

PERIYAR UNIVERSITY, SALEM – 636011

B.Sc., BOTANY

PU-B.Sc., Botany (College), 2021-22 onwards

MODEL QUESTION PAPER

B. Sc., Botany Degree Examination

((For Students Admitted from the Academic Year 2021 – 2022 onwards under CBCS Pattern))

CORE COURSE – XIV. SUBJECT CODE :21UBOP03

MAJOR PRACTICAL III

(Covering the core courses VII ,VIII&IX)

**MORPHOLOGY AND TAXONOMY OF ANGIOSPERMS,
CELL BIOLOGY, GENETICS, AND PLANT BREEDING)**

Time: 3 hrs.

Maximum: 60 Marks

Practical : 45 Marks

Record: 10 Marks

Herbarium: 5 Marks

1. Refer A and B, to their respective families. Point out the characters on which the identification is based at each level. (Diagrams not necessary) (2X4=8 Marks)
 2. Make acetocarmine preparation of C (Squash) any one stage. draw diagram. 4 Marks
 3. Describe D in Technical terms. Draw diagrams of the floral parts only. Construct the floral Diagram. Give the floral formula 5 Marks
 4. Construct the chromosome map with the data provided E 5 Marks
 5. Solve the given genetic problem F and G (2X4=8 Marks)
 6. Spot at sight H and I (2X2=4 Marks)
 7. Write the name of the genus, species, family and morphology of the useful parts of J and K – (4X2=8 Marks)
 8. Briefly describe the plant breeding technique in spotter L 3 Marks
- Key**
- A&B-Family - 2X4=8 marks
C-Onion root tip - preparation =3 marks , diagram -1 marks -4 marks
D-Plant with flowers –preparation -1 marks, Floral diagram – 2 marks, Floral formula -2 marks - 5 marks
E-Chromosome map - 5 marks
F&G-Genetic problems - 2X3 = 8 marks
H&I-Cytology spotter - Identification -1 marks, Reason -1 2X2=4 marks
- J& K -Morphological parts- Genus -1mark, Species -1 marks, family-1mark, Morphology -1 mark
L- Any Plant breeding technique- - 3 marks

PU- B.Sc., Botany (College), 2021-22 onwards

MODEL QUESTION PAPER

B. Sc., Botany Degree Examination

((For Students Admitted from the Academic Year 2021 – 2022 onwards under CBCS Pattern)

CORE COURSE – XV.SUBJECT CODE :21UBOP04

MAJOR PRACTICAL IV

(Covering the core courses XI, XII & XIII)

**(PLANT PHYSIOLOGY, PLANT ECOLOGY AND PLANT GEOGRAPHY,
PLANT PROTECTION)**

Time: 3 hrs.

Maximum: 60 Marks

Practical : 50 Marks

Record: 10 Marks.

1. Outline the procedure, apparatus and materials required for investigating the physiological Problem.A, assigned. Set up the experiment. Tabulate the data obtained and report the Results. Leave the set up for valuation. (16marks)
2. Based on morphological and anatomical characters, assign, B and C to their respective probable habitats. Draw suitable diagrams. Submit slides for valuation. 2X8=16
3. Identify the causal organism of the diseased material 'D'. and ' E'. Draw diagrams. Describe the symptoms and list the control measures. (2X8=16)
4. Comment on 'F' 2 Marks

Key

A- Physiology - Materials – 2 marks, Procedure-4, Setup – 4 marks, Spot Viva- strictly pertained to the concerned physiology experiment- 2 marks-Result - 4marks

B&C Ecology material –preparation -2 marks , identification -1 mark ,Diagram-2 reason -3 marks

D, E, - Any disease in the syllabus - Name disease – 1marks, Causative organism – 1 marks, Symptom-2 Control measure – 2 marks, diagram –2marks)

G- Plant protection appliances – 2 marks

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B.Sc., BOTANY

PU- B.Sc., Botany (College), 2021-22

MODEL QUESTION PAPER

(For Students Admitted from the Academic Year 2021 – 2022 onwards under CBCS Pattern)

B.Sc., BOTANY ALLIED PRACTICAL

SUBJECTCODE: 21UBOAP01

Time : 3 hrs.

Maximum: 60 Marks

Practical : 50 Marks

Record : 10 Marks

- 1.Refer A&B to their families giving reasons (Diagrams not necessary)10 Mark
2. Identify the plant, family and morphology of the parts used for C, D, E,F and G.15 mark
3. Cut transverse section of H & I. Stain and mount in Glycerin. Identify giving reasons. Draw diagrams. Submit the slides for valuation.10 mark
4. Write critical notes on J, K, L, M, N, O. Draw diagrams. 12 mark
5. physiology Experiment P 3 mark

KEY

1. For A and B - Any 2 plants prescribed in the syllabus.
Reasons 3, Identification -2 2 x 5 = 10 mark
- 2 For C, D, E, F and G - any 5 specimens given in the practical syllabus. 5X3=15 Mark
4. For H and I – Slide -2 Identification -1 Reasons – 2 2 x 5= 10 mark
4. Notes 1, Diagram 1 for J, K, L, M, N, O 2 x 6 = 12 mark
5. Physiology Experiment P 3 Mark

