

BOT 301: ANGIOSPERM MORPHOLOGY AND TAXONOMY**UNIT I**

General concept of morphology, origin and evolution of flower. Co-evolution of flower, vis a vis pollinators.

Origin and evolution of polypetal, sympetal, apetal; monoc, dioc. Monocot flower.

UNIT II

Stamens: origin and evolution from foliar to reduced condition, extension of connective beyond anthers; mono, di and polyadelph; nectaries and nectar.

Carpels evolution, conduplicate, involute and other types, validity of the concept of foliar origin of carpel: alternative concepts and approaches ; specialized carpels; poly and syncarpy; superior, semi-inferior and inferior ovary; appendicular and receptacular concepts; evolution of types of placentations.

UNIT III

Role of floral anatomy in interpreting the origin and evolution of a flower and floral parts. Floral anatomy and taxonomy.

Experimental study on flower.

UNIT IV

Botanical exploration-historical perspective, brief account of botanical exploration in south east Asia with special reference to India. Botanical survey of India, its organization and role.

Principles of plant classification with emphasis on modern tools of taxonomy; molecular systematics, utility of taxonomy; biosystematics.

Phylogenetic systems of classification ; Cronquist, Takhtajan, AGP III

UNIT V

Botanical nomenclature, ICBN, principles, articles, recommendation and amendments of code.

Familiarity with botanical literature, monographs, icons and floras, important periodicals with emphasis on Indian floristics, methods of literature consultation.

Threat assessment, different categories of threat, IUCN, Red Data Book. Important threatened plants of India.

PRACTICALS 301:

1. Preparation of cleared whole mounts of floral parts of polypetalae, sympetalae and monocots for vasculature.
2. With the help hand section and dissection prepare longitudinal and transverse sections of flower. Examination of:
 - a. Transmitting tissue/ canal in stigma and style.
 - b. Various types of ovaries and placentations.
 - c. Special types of flowers with emphasis on vasculature of androecium and gynoecium.
3. Preparation of models (plasticine/thermocoll) of vascular skeleton of flower and placentaion.
4. Any other laboratory work based on theory syllabus.
5. Description of specimen.
6. Description of species based on various specimens, collective exercise.
7. Description of various species of a genus.
8. Location of key characters, use of keys at generic levels, after the description a collective exercise.
9. Location of key characters, use of keys at family levels.
10. Identification of diagnostic characters and use of key (provided) at level of various families after the description have been made.
11. Preparation of key (using specimens from three or four species).

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BOT 302: CYTOLOGY AND MOLECULAR BIOLOGY OF PLANTS**UNIT I**

The plant cell: structure, organization, cell cycle mechanism and its molecular basis, cytokinesis.
Nucleus: structure, nucleolus organization.
Generalized structure of plant cell organelles.

UNIT II

Chromosome: structure, molecular basis of Chromosome structure. Eukaryotic genome organization, prokaryotic genome organization, variation in Chromosome and its significance.

UNIT III

DNA: packaging of DNA, nucleosome, nuclear membranes, C-value paradox, cot curves, chemical structure. genetic code.
DNA replication in prokaryotes and eukaryotes.
Transcription, RNA splicing.
Translation: Prokaryotic and eukaryotic gene regulation (Operon concept).

UNIT IV

Meiosis: origin and molecular events during meiosis.
Mitosis: origin and molecular events during mitosis.
Chromosomal aberrations: Heteroploidy, structural changes in chromosomes.

UNIT V

Transposable elements and its molecular basis.
Membrane structure and function, ATPase sites.
Membrane transport with reference to transport protein.
Signal transduction: on overview.

PRACTICALS 302:

1. Staining.
2. Study of the microscope.
3. Study of the size and shape of the cell.
4. Staining and study of flagellum.
5. Vital staining.
6. Staining of mitochondria.
7. Study of chloroplasts.
8. Cytoplasmic streaming.
9. Study of mitosis by squash and smear.
10. Study of meiosis.
11. Measurement of meiosis chromosomes and comparison of their sizes.
12. Study of salivary gland and Meiotic chromosome.
13. Study of chromosome aberration like ring, anaphase bridges etc.
14. Camera-Lucida diagrams of chromosome.
15. Preparation of diagram.
16. Study of ultra structure of various cell organelles from electron micrographs.
17. Collection, fixation and preparation of paraffin blocks of materials.
18. Microtomy and staining of the slides by various methods.

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BOT 303: BIOMETRY, BIOINFORMATICS AND INSTRUMENTATION**UNIT I**

Measurement of central tendency: mean, median, mode and standard deviation.
Chi square test.
Analysis of variance (ANOVA).
Application of probability distribution; binomial and normal.

UNIT II

Test of significance.
Correlation and regression.
Growth curve: exponential and logarithmic.
Principle of experimental design: randomization. Replication and local control.

UNIT III

A general idea of chromatographic techniques theories and applications.
High performance liquid chromatography (HPLC) basic study.
Electrophoresis techniques and applications: basic study.
Centrifugation: general theory: instrumentation and application.

UNIT IV

Microscopy: Light and electron microscopy.
Spectrophotometry: a general study of instrumentation and application of colorimetry.
UV-Visible spectrophotometry NMR and ESR spectrophotometry.
Polarimetry.

UNIT V

Brief overview of information technology and science. Computerised database and DBMS
Introduction of bioinformatics and sequence analysis.
BLAST and FASTA
Data types and database in molecular biology.
Sequence databases and sequence alignment.
AL computer graphic and information retrieval.

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BOT 304: ECOLOGY-II SYNECOLOGY, ECOSYSTEMATOLOGY & PHYTOGEOGRAPHY**UNIT I**

- Concept and characteristics of plant community.
- Methods of studying vegetation.
- Raunkiers Life Forms.
- Biological spectrum.
- Seasonal aspect of vegetation.

UNIT II

- Plant succession.
- Concept of climax and climax communities.
- Energy flow.
- Trophic dynamics aspect of ecology.
- Food chain, food web, pyramid of number, biomass and energy.

UNIT III

- System transfer function.
- Agroecosystem.
- Biogeochemical cycles.
- Forest ecosystem.
- Rangeland management.

UNIT IV

- Vegetation types of India.
- Floristic regions of India.
- Production and productivity of various ecosystems.

UNIT V

- Phytogeography as a border line science.
- Principles of interpretation phytogeography.
- Age and Area Hypothesis.
- Discontinuous distribution, endemics and endemism.
- Satpura hypothesis.
- Gates of angiospermy.

PRACTICALS : 304

1. Determination of minimum size of quadrat by species area curve method.
2. Determination of minimum number of quadrat by species area curve method.
3. Determination of frequency of various species by quadrat method and preparation of frequency diagram.
4. Determination of density of quadrat method.
5. Determination of abundance of species by quadrat method.
6. Determination of relative frequency by quadrat method.
7. Determination of relative density by quadrat method.
8. Determination of basal area by quadrat method.
9. Determination of relative dominance by quadrat method.
10. Determination of IVI by quadrat method.
11. Determination of community coefficient of two sties by quadrat method.
12. Preparation of biological spectrum of a locality.