ST 301: ANGIOSPERM MORPHOLOGY AND TAXONOMY

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

UNIT II
Stamens: origin and evolution from foliar to reduced condition, extension of connective beyond anthers: monad and polyadelphe; nectaries and nectar.
Carpels: evolution, conduplicate, involute and other types, validity of the concept of foliar origin of carpels; alternative concepts and approaches; specialized carpels; poly and syncarpous: 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
Principles of plant classification with emphasis on modern tools of taxonomy: molecular systematic, utility of taxonomy: biosystematics.
Phylogenetic systems of classification: Cronquist, Takhtajan, APG III

UNIT V

PRACTICALS 301:
1. Preparation of cleared whole mounts of floral parts of polypetalous, sympetalous and monocots for vasculature.
2. With the help hands section and dissection prepare longitudinal and transverse sections of flower.
Examination of:
   a) Transverse section
   b) Various types of stamens and placentations.
   c) Special types of flowers with emphasis on vasculature of androecium and gynoecium.
3. Preparation of models (plasticine/thermocol) of vascular skeleton of flower and placentation.
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).
DT 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
Mitosis: origin and molecular events during mitosis.
Meiosis: origin and molecular events during meiosis.
Chromosomal aberrations: Heterozygote, 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: an 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.
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.
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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FT 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 microscopes.
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.
AI: computer graphic and information retrieval.
T 304: ECOLOGY-II SYNECOLOGY, ECOSYSTEMATOLOGY & PHYTOGEOGRAPHY

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

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.

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

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

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

ACTUALS : 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.
10. Determination of IVI by quadrat method.
11. Determination of community coefficient of two sites by quadrat method.

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