LESSON PLAN (BOTANY)

Govt. College For Women, Madlauda (Panipat)

Session 2025-2026 (ODD SEMESTER)

NAME OF PROFESSOR: Dr. Pooja Rani

DESIGNATION: Assistant Professor in Botany

1. **SUBJECT/PAPER: (Botany)**: PLANT PHYSIOLOGY (**BOT-301A**) and BIO-CHEMISTRY AND BIOTECHNOLOGY(**BOT-301B**) **{NON- NEP}**

CLASS- B.Sc. III **(Medical) 5th Semester**

SR. NO.	MONTH	TOPICS TO BE COVERED
1.	**JULY**	Plant Water Relations:- Importance of water to plant life, physical properties of water, diffusion, osmosis, imbibition and plasmolysis. Absorption and transport of water, transpiration - types, Physiology of stomata, factors effecting transpiration, importance of transpiration. Mineral nutrition:- Essential macro and micro-element and their role; mineral uptake, deficiency and toxicity symptoms. A transport of organic substances:- Mechanism of phloem transport, source-sink relation, factors affecting translocation. **PRACTICAL:** ✓ Study of plasmolysis and deplasmolysis. Study of osmotic pressure of cell sap and DPD by plasmolytic method. ✓ Demonstration of imbibition by plaster of Paris method, study of osmotic phenomenon by potato osmoscope. ✓ To measure stomatal frequency and stomatal index by using epidermal peels of leaf. ✓ Comparison of stomatal and cuticular transpiration by four leaf/cobalt chloride method.
2.	**AUGUST**	Photosynthesis:- Significance, Historical aspects, photosynthetic pigments, absorption and action spectra, enhancement effect, Concept of two photo systems, Z- Scheme, Phosphorylation, Calvin cycle, C-4 pathway, CAM plants Photo-respiration. The concept of photo periodism, physiology of flowering, florigen concept, physiology of

		senescence, fruit ripening. Respiration; ATP as biological energy currency, aerobic and anaerobic respiration, kreb cycle, electron transport mechanism (chemi-osmotic theory), redox potential, oxidative phosphorylation, Pentose phosphate pathway Seed dormancy, Seed germination, Factors of their regulation, plant movements. **PRACTICAL:** ✓ Demonstration of transpiration by Ganongs potometer/ farmers potometer ✓ Separation of plant pigments by paper chromatography/thin layer chromatography. ✓ Effect of kind of light intensity and conc. of CO_2 on oxygen evolution during photosynthesis using Wilmot's bubbler. ✓ Demonstration of aerobic and anaerobic respiration. ✓ Evolution of heat during respiration. ✓ Biochemical tests of Carbohydrates/Proteins/Lipids.
3.	**SEPTEMBER**	Basics of Enzymes:-Discovery and nomenclature; characteristics of enzymes; concept of holoenzyme, apoenzyme, coenzyme and co factor, regulation of enzyme activity; mechanism of action. Growth & development- Definitions, phases of growth and development, kinetics of growth. Growth hormones- History and discovery of plant growth regulators, auxins, gibberellins, cytokinins and abscicic acid, ethylene biosynthesis and mechanism of action of PGRS. **PRACTICAL:** ✓ Demonstration of phenomena of fermentation. ✓ Experiment on plant movements and growth. ✓ Determination of peroxidase activity. ✓ To demonstrate amylase activity on starch Experiments of Biotechnology:- ✓ Media preparation, sterilization techniques, demonstration of

		isolation of tissue/cell and culturing & sub culturing of cell/tissue/organ. ✓ To prepare the slants and petriplates for plant tissue culture. ✓ Demonstration of anther culture, Protoplast isolation and culture using suitable models/charts/ photographs etc.
4.	**OCTOBER**	Lipid Metabolism- structure and function of lipids, fatty acid biosynthesis; beta-oxidation; saturated and unsaturated fatty acids; storage and mobilization of fatty acids. Nitrogen Metabolism- Biology of nitrogen fixation; importance of nitrate reductase and its regulation; ammonium-assimilation. Genetic engineering and biotechnology Tools and techniques of recombinant DNA technology; cloning vectors; genomic and cDNA library. Transposable elements- techniques of gene mapping and chromosome walking. **PRACTICAL:** ✓ Demonstration of DNA model. ✓ Brief introduction to the components and working of the instruments (Oven autoclave, incubator, Centrifuge, Laminar air flow chamber and spectrophotometer) Veewt 2/9/10- Sau 113/19 Soushe
5.	**NOVEMBER**	Plant tissue culture:Aspects of plant tissue culture, cellular totipotency, differentiation and morphogenesis; biology of Agrobacterium. Transgenic plants; vectors for gene delivery and marker genes.

2. SUBJECT/PAPER: (Botany): Diversity of Archegoniates and Seed Plants-I (DSC)

Paper Code: B-Bot-301

CLASS- B.Sc. II (Life Sciences) 3rd Semester {{NEP}}

SR. NO.	MONTH	TOPICS TO BE COVERED
1.	**JULY**	Bryohpyta:- Amphibians of Plant kingdom, displaying alternation of generations, General characters, Economic importance, Alternation of generation and classification (up to classes), Structure and Reproduction of Marchantia (Hepaticopsida).Structure and Reproduction of Anthoceros (Anthoceropaida), Funaria (Bryopsida.) . General account of Sporophyte evolution in Bryophytes. **Practical: Study of Specimens from bryophytes (as per syllabus).**
2.	**AUGUST**	Pteridophyta:- The First vascular Plant, General characters, Economic importance, Alternation of neration and classification (up to classes). Structure and Reproduction of Rhynia (Psilopsida), laginella (Lycucture and Reproduction of Equisetum (Sphenopsida), Pteris. (Pteropsida). Evolution of stellar System. **Practical: Study of Specimens from Pteridophytes (as per syllabus).**
3.	**SEPTEMBER**	Characteristics of seed plants; Evolution of seed habit. Seed plants with (angiosperms) & without (gymnosperms) fruits. Evolution & diversity of gymnosperms, general features of gymnosperms. Distribution and economic importance of Gymnosperms. Classification fossilization process & of gymnosperms, fossil gymnosperms. **Practical: Identification and classification of the specimens from gymnosperms with a note on features for identification.**
4.	**OCTOBER**	Fossil gymnosperms:-Lyginopteris, Glossopteris, Williamsonia, Medullosa, Cycadeoidea (Bennettites), Cordaites. Morphology of vegetative & reproductive parts:- Anatomy of root, stem & leaf reproduction and life cycle of Cycas. **Practical: Permanent and double stained slide preparations of gymnosperms. (As per theory syllabus)**
5.	**NOVEMBER**	Morphology of vegetative & reproductive parts: - Anatomy of root, stem & leaf reproduction and life cycle of:-Pinus and Ephedra.

3. SUBJECT/PAPER: (Botany): Cell and Molecular Biology (DSC)

Paper Code: B-BOT-101

CLASS- B.Sc. I (Life Sciences) Ist Semester {{NEP}}

SR. NO.	MONTH	TOPICS TO BE COVERED
1.	**JULY**	Prokaryotic & Eukaryotic cell system, Cell division: Amitosis, Mitosis & Meiosis. Cell Envelops and Bio molecules:-Structure and functions of cell wall and plasma membrane. **Practical**:Study of permanent slides of Mitosis and Meiosis.
2.	**AUGUST**	Ultrustructure and function of nucleus, Golgi apparatus, Endoplasmic reticulum and Ribosomes **Practical**: Qualitative estimation of carbohydrates, proteins and lipids.
3.	**SEPTEMBER**	Ultrustructure and functions of Chloroplast, Mitochondria Lysosomes, Peroxysomes and Vacuole. **Practical**:Study of meiosis from onion flower buds and identification of major stages
4.	**OCTOBER**	General account of carbohydrates and proteins. **Practical:** Slide preparation from Onion root tips & identification of various mitotic stages
5.	**NOVEMBER**	General account of lipids.

4. SUBJECT/PAPER: Fundamental of Biochemistry (MIC)

Paper Code: B-Bot-102

CLASS- B.Sc. I (Life Sciences) Ist Semester {{NEP}}

SR. NO.	MONTH	TOPICS TO BE COVERED
1.	**JULY**	Lipid Metabolism- structure and function of lipids, fatty acid biosynthesis; beta-oxidation; .
2.	**AUGUST**	Nitrogen Metabolism- Biology of nitrogen fixation; importance of nitrate reductase.
3.	**SEPTEMBER**	Nitrate reductase regulation; ammonium-assimilation. Basics of Enzymes:-Discovery and nomenclature; characteristics of enzymes;
4.	**OCTOBER**	Concept of holoenzyme, apoenzyme, coenzyme and co factor,
5.	**NOVEMBER**	Regulation of enzyme activity; mechanism of action.

Signature of Assistant Professor