

CC 13 PLANT PHYSIOLOGY (BOT-A-CC-6-13-TH, BOT-A-CC-6-13-P)

Lead Teacher : DR. NANDINI CHAKRABARTY

DR. NANDINI CHAKRABARTY	
THEORETICAL	No of Classes Allotted – Two (2)
4. Plant Growth Regulators: 4.1. Physiological roles of Auxin, Gibberellin, Cytokinin, Abscisic acid, Ethylene, 4.2. Chemical nature –IAA, GA ₃ , Kinetin, 4.3. Biosynthesis and bioassay of IAA, 4.4. Mode of action of IAA, 4.5. Brassinosteroids and Polyamines as PGRs (brief idea). 5.6. Role of GA in flowering, 5.7. Vernalisation – role of low temperature in flowering, 5.8. Concept of biological clock and biorhythm. 6. Seed dormancy: 6.1. Types, Causes and Methods of breaking seed dormancy, 6.2. Biochemistry of seed germination. 7. Physiology of Senescence and Ageing.	
DR. ARKAJO MAJUMDAR	
THEORETICAL	No of Classes Allotted – Two (2)
1. Plant-water relations: 1.1 Concept of water potential, components of water potential in plant system, 1.2. Soil-plant- Atmosphere continuum concept, Cavitation in xylem and embolism, 1.3. Stomatal physiologymechanism of opening and closing, Role of carbon di-oxide, potassium ion, abscisic acid and blue light in stomatal movement, Antitranspirants. 2. Mineral nutrition: essential and beneficial elements, macro- and micronutrients, methods of study and use of nutrient solutions, criteria for essentiality, mineral deficiency symptoms, roles of essential elements, chelating agents. 3. Organic Translocation: 3.1. Phloem sap, P-protein, 3.2. Phloem loading and unloading, 3.3. Mass-flow (pressure flow) hypothesis and its critical evaluation. 5. Photomorphogenesis: 5.1. Concept of photomorphogenesis, 5.2. Photoperiodism and plant types, 5.3. Perception of photoperiodic stimulus, 5.4. Critical day length, concept of light monitoring, 5.5. Phytochrome, cryptochrome and phototropins- chemical nature and role in photomorphogenesis,	
PRACTICAL	DR. NANDINI CHAKRABARTY and DR. ARKAJO MAJUMDAR No of Practical Classes Allotted – Two (2)
PLANT PHYSIOLOGY 1. Determination of loss of water per stoma per hour. 2. Relationship between transpiration and evaporation. 3. Measurement of osmotic pressure of storage tissue by weighing method. 4. Measurement of osmotic pressure of <i>Rhoeo</i> leaf by plasmolytic method. 5. Effect of temperature on absorption of water by storage tissue and determination of Q ₁₀ .	

6. Rate of imbibition of water by starchy, proteinaceous and fatty seeds and effect of seed coat.
7. To study the phenomenon of seed germination (effect of light).
8. To study the induction of amylase activity in germinating grains.
9. To study the effect of different concentrations of IAA on *Avena* coleoptile elongation (IAA bioassay)

CC 14 PLANT METABOLISM (BOT-A-CC-6-14-TH, BOT-A-CC-6-14-P)

Lead Teacher : DR. NANDINI CHAKRABARTY

DR. NANDINI CHAKRABARTY	
THEORETICAL	No of Classes Allotted – Two (2)
<p>4. Nitrogen Metabolism: 4.1. Assimilation of nitrate by plants, 4.2. Biochemistry of dinitrogen fixation in Rhizobium, 4.3. General principle of amino acid biosynthesis (including GS and GOGAT enzyme system).</p> <p>5. Lipid metabolism: 5.1. synthesis and breakdown of triglycerides, β-oxidation, glyoxalate cycle, gluconeogenesis and its role in mobilization of the lipids during seed germinations, α-oxidation.</p> <p>6. Mechanism of signal transduction: receptor-ligand interactions, second messenger concept, calcium-calmodilin, G protein, MAP-kinase cascade.</p>	
DR. ARKAJO MAJUMDAR	
THEORETICAL	No of Classes Allotted – Two (2)
<p>1. Concept of metabolism: Introduction, Anabolic and catabolic metabolic pathways, regulation of metabolism, role of regulatory enzymes (allosteric, covalent modulation and isozymes)</p> <p>2. Photosynthesis:</p> <p>2.1. Chemical structure of chlorophyll a and b, absorption and action spectra, biological significance of carotenoid pigments, 2.2. Red drop and Emerson effect, Components of photosystems (light harvesting complex), photochemical reaction centres, Cyclic and noncyclic electron transport, Water splitting mechanism, 2.3. Calvin cycle – Biochemical reactions & stoichiometry, 2.4. HSK Pathway—three variants of the pathway, 2.5. Photosynthetic efficiency of C₃ and C₄ plants and crop productivity, 2.6. Photorespiration – mechanism and significance, 2.7. Crassulacean Acid Metabolism— mechanism and ecological significance.</p> <p>3. Respiration: 3.1. EMP pathway, regulation and its anabolic role, 3.2. Conversion of Pyruvic acid to Acetyl CoA, 3.3. TCA-cycle and its amphibolic role, 3.4. Oxidative pentose phosphate pathway and its significance, 3.5. Mitochondrial electron transport system, uncouplers, 3.6. Oxidation of cytosolic NADH+H⁺, 3.7. Stoichiometry of glucose oxidation (aerobic).</p>	
PRACTICAL	DR. NANDINI CHAKRABARTY and DR. ARKAJO MAJUMDAR
No of Practical Classes Allotted – Two (2)	

1. A basic idea of chromatography: Principle, paper chromatography and column chromatography; demonstration of column chromatography.
2. Separation of plastidial pigments by solvent and paper chromatography.
3. Estimation of total chlorophyll content from different chronologically aged leaves (young, mature and senescence) by Arnon method.
4. Effect of HCO₃ concentration on oxygen evolution during photosynthesis in an aquatic plant and to find out the optimum and toxic concentration (either by volume measurement or bubble counting).
5. Measurement of oxygen uptake by respiring tissue (per g/hr.)
- 6.. Determination of the RQ of germinating seeds.
7. Test of seed viability by TTC method.

DSE A MEDICINAL AND ETHNOBOTANY (BOT-A-DSE-A-6-3-TH, BOT-A-DSE-A-6-3-P)

Lead Teacher : PROF. SANDGYAY DUTTA

PROF. SANDGYAY DUTTA

THEORETICAL

1. Medicinal botany: History, scope and importance of medicinal plant, a brief idea about indigenous medicinal sciences- ayurveda, siddha and unani. Polyherbal formulations.

4. Pharmacologically active constituents:

Source plants (one example) parts used and uses of: 3.1 Steroids (Solasodin, Diosgenin, Digitoxin), 3.2 Tannin (Catechin), 3.3 Resins (Gingerol, Curcuminoids), 3.4 Alkaloids (Quinine, Atropine. Pilocarpine, Strychnine, Reserpine, Vinblastine), 3.5. Phenols (Sennocide and Capsaicin).

5. Ethnobotany and folk medicine: Definition, methods of study, application, Indian scenario, national interacts, Palaeo-ethnobotany, folk medicines in ethnobotany, ethnomedicine, ethnoecology, ethnic communities of India, application of natural products to certain diseases- Jaudice, cardiac, infertility, diabetics, blood pressure and skin diseases.

DR. SITAL CHATTERJEE

THEORETICAL

2. Pharmacognosy- General account : 2.1 Pharmacognosy and its importance in modern medicine, 2.2 Crude drugs, 2.3 Classification of drugs- chemical and pharmacological, 2.4 Drug evaluation– organoleptic, microscopic, chemical, physical and biological, 2.5. Major pharmacological groups of plant drugs and their uses.

PRACTICAL

PROF. SANDGYAY DUTTA and DR. SITAL CHATTERJEE

No of Practical Classes Allotted – Two (2)

MEDICINAL AND ETHNOBOTANY

1. Chemical tests for (a) Tannin (*Camellia sinensis* / *Terminalia chebula*), (b) Alkaloid (*Catharanthus roseus*) .
2. Powder microscopy – *Zingiber* and *Holarrhena* .
3. Histochemical tests of (a) Curcumin (*Curcuma longa*), (b) Starch in non-lignified vessel (*Zingiber*), (c) Alkaloid (stem of *Catharanthus* and bark of *Holarrhena*).

DSE B NATURAL RESOURCE MANAGEMENT (BOT-A-DSE-B-6-8-TH, BOT-A-DSE-B-6-8-P)

Lead Teacher : DR. PARTHA KARAK

DR. PARTHA KARAK

THEORETICAL

No of Class Allotted – Two (2)

Unit 6: Forests

Definition, Cover and its significance (with special reference to India); Major and minor Forest products; Depletion; Management.

Unit 7: Energy

Renewable and non-renewable sources of energy.

Unit 8: Contemporary practices in resource management

EIA, GIS, Participatory Resource Appraisal, Ecological Footprint with emphasis on carbon footprint, Resource Accounting; Waste management.

Unit 9: National and international efforts in resource management and conservation

DR. RUPAK SENGUPTA

THEORETICAL

No of Class Allotted – One (1)

Unit 1: Natural resources:, Definition and types.

Unit 2: Sustainable utilization: Concept, approaches (economic, ecological and socio-cultural).

Unit 3: Land : Utilization (agricultural, pastoral, horticultural, silvicultural); Soil degradation and management.

DR. ARGHYA KUMAR HAIT

THEORETICAL

No of Class Allotted – One (1)

Unit 4: Water

Fresh water (rivers, lakes, groundwater, aquifers, watershed); Marine; Estuarine; Wetlands; Threats and management strategies.

Unit 5: Biological Resources

Biodiversity-definition and types; Significance; Threats; Management strategies; Bioprospecting; IPR; CBD; National Biodiversity Action Plan).

PRACTICAL

DR PARTHA KARAK

No of Practical Classes Allotted – Two (2)

1. Estimation of solid waste generated by a domestic system (biodegradable and nonbiodegradable) and its impact on land degradation.
2. Estimation of foliar dust deposition.
3. Determination of total solid in water (TDS)
4. Determination of chemical properties of soil by rapid spot test (carbonate, iron, nitrate).
5. Estimation of organic carbon percentage present in soil sample.
6. Collection of data on forest covers of specific area.

TRACKING ACADEMIC PROGRESSION THROUGH INTERNAL ASSESSMENT/EVALUATION

1. **METHOD : CLASS TEST – First during MID TERM and the second before the END TERM by each teacher concerned.**
2. **MENTOR – MENTEE APPROACH**
3. **CAREER COUNSELLING INCLUDING EXPLORATION OF AVENUES FOR HIGHER STUDIES.**