DEPARTMENT OF BOTANY
LESSON PLAN
Session 2023-24
SEMESTER – VI

Name of Teacher: Bhanumati Sarkar

Paper Allotted: Plant Biotechnology (BOTACOR14T&BOTACOR14P,), Biostatistics(BOTADSE06T& BOTADSE06P), Analytical Techniques in Plant Science (BOTGDSE04T), Ethnobotany (BOTSSEC02M)

Month	Paper	Topic	No of classes
March 2024 (02.03.2024)	Plant BiotechnologyBOTACOR14T	Unit 2: Recombinant DNA technology: Restriction Endonucleases (Types I-IV, biological role and application); Restriction mapping (linear and circular); cloning vectors: prokaryotic (pBR322, Ti plasmid, BAC);	4
	Plant Biotechnology BOTACOR14P	Unit.3. Construction of restriction map of circular and linear DNA from the data provided	8
	Discipline Specific Elective 4 Course Code: BOTADSE06T	Unit 4: Correlation; Types and methods of correlation	4
	Biostatistics BOTADSE06P	Unit:2; Calculation of correlation coefficient values and finding out the probability.	8
	Analytical Techniques in Plant Science BOTGDSE04T	Unit:4: Spectrophotometry Principle and its application in biological research. Unit:6 Characterization of protein and nucleic acids: Mass spectrometry	4
	Skill Enhancement Course -4 Ethnobotany Course code: BOTSSEC02M	Unit 2: Methodology of Ethnobotanical studies: a) Field work b) Herbarium c) Ancient Literature d) Archaeological findings e) temples and sacred places.	4
April 2024	Plant BiotechnologyBOTACOR14T	Unit 2: lambda phage, cosmid; eukaryotic vectors (YAC). Unit 3: Gene Cloning: Recombinant DNA, bacterial transformation and selection of recombinant clones, PCR-mediated gene cloning; gene construct;	6
	Plant Biotechnology BOTACOR14P	Unit:6. Isolation of genomic DNA and its gel electrophoresis	6

	Discipline Specific Elective 4 Biostatistics Course Code: BOTADSE06T	**Unit 4: Regression, simple regression equation, fitting prediction**	**6**
	Biostatistics BOTADSE06P	**Unit:2; Calculation of correlation coefficient values and finding out the probability**	**8**
	Analytical Techniques in Plant Science BOTGDSE04T	**Unit:6 Characterization of protein and nucleic acid ; X-ray diffraction; X-ray crystallography; Characterization of proteins and nucleic acids**	**4**
	Ethnobotany BOTSSEC02M	**Project on Methodology of Ethnobotanical studies**	**2**
May 2024	**Plant BiotechnologyBOTACOR14T**	**Unit 3: Gene Cloning: construction of genomic and cDNA libraries, screening DNA libraries to obtain gene of interest by genetic selection; complementation, colony hybridization; PCR**	**6**
	DisciplineSpecific Elective4 Biostatistics Course Code: BOTADSE06T	**Unit 5: Statistical inference Chi square test**	**6**
	Biostatistics BOTADSE06P	**Practice problem on correlation.**	**4**
	Analytical Techniques in Plant Science BOTGDSE04T	**Unit:6 Characterization of protein and nucleic acids: Electrophoresis: AGE, PAGE, SDS-PAGE**	**4**
3rd Week of May		**Revision classes**	**3**
Last week of May 2024		**Internal Examination&**	
1st Week June 2024		**Class for Slow Learners and revision class & Solve model Question paper and previous university Questions.**	**6**
2nd Week June 2024		**Student's seminar(with ppt), Peer learning, Mock test and Revision class**	**6**
14/6/2024		**END SEMESTER EXAMINATION**	
Total Classes			**99**

NAME OF TEACHER: **MADHURIMA ROY**

PAPER ALLOTTED: PLANT METABOLISM (BOTACOR13T, BOTACOR13P), PLANT BIOTECHNOLOGY (BOTACOR14T, BOTACOR14P), ANALYTICAL TECHNIQUES IN PLANT SCIENCES (BOTGDSE04T)

Month	Paper	Topic	No. of classes
March 2024 (02.03.2024)	BOTACOR13T	Concept of metabolism: Introduction, anabolic and catabolic pathways, regulation of metabolism, enzymes – mechanism and factors, kinetics, role of regulatory enzymes (allosteric, covalent modulation and isozymes), enzyme inhibition. (Unit-1)	4
	BOTACOR13P	Demonstration of absorption spectrum of photosynthetic pigments (spectrophotometer). (UNIT-2) To study the effect of light intensity on the rate of photosynthesis. (UNIT-3)	8
	BOTACOR14T	Methods of gene transfer: *Agrobacterium*-mediated direct gene transfer by electroporation, microinjection, Microprojectile bombardment; (Unit-4) Continued…	4
	BOTACOR14P	Study of methods of gene transfer through photographs: Agrobacterium-mediated, direct gene transfer by electroporation, microinjection, microprojectile bombardment. (Expt.4)	6
	BOTGDSE04T	Cell fractionation: Centrifugation: Differential and density gradient centrifugation (Unit-2) Continued…	2
April 2024	BOTACOR13T	Carbon assimilation: Photosynthetic pigments, role of photosynthetic pigments (chlorophylls and accessory pigments), antenna molecules and reaction centres (Unit-2) Continued…	4
	BOTACOR13P	To compare the rate of respiration in different parts of a plant. (UNIT-5) To demonstrate activity of Nitrate reductase in germinating leaves of different plant sources. (UNIT-6)	8
	BOTACOR14T	Methods of gene transfer: Selection of transgenics– selectable marker and reporter genes (luciferase, GUS, GFP) (Unit-4) Applications of Biotechnology: Pest resistant (Bt-cotton); herbicide resistant plants (roundup ready soybean); transgenic crops with improved quality traits (Golden rice) (Unit-5) Continued…	6
	BOTACOR14P	Study of steps of genetic engineering for production of Bt cotton, Golden rice, Flavr Savr tomato through photographs (Expt.5)	4
	BOTGDSE04T	Cell fractionation: sucrose density gradient, CsCl2 gradient, analytical centrifugation, ultracentrifugation, marker enzymes. (Unit-2) Radioisotopes: Pulse chase experiment, auto-radiography (Unit-3)	4
May 2024	BOTACOR13T	Carbon assimilation: Photochemical reactions, photosynthetic electron transport, PSI, PSII, Q cycle, CO2 reduction (Calvin cycle),photorespiration,C4pathways; Crassulacean acid metabolism; (Unit-2) Continued…	5
	BOTACOR13P	To study the activity of lipases in germinating oilseeds. (UNIT-7)	4
	BOTACOR14T	Applications of Biotechnology: improved horticultural varieties (Moondust carnations); role of transgenics in bioremediation (Superbug); edible vaccines; industrial enzymes (Aspergillase, protease, lipase); genetically engineered products–human	4

		growth hormone (Unit-5) Continued…	
	BOTACOR14P	Revision class	6
	BOTGDSE04T	Biostatistics: Statistics, data, population, samples, parameters; Representation of Data: Tabular, Graphical (Unit-7) Continued…	4
May (4th Week) 2024		Internal Examination & Class for Slow Learners	6
June 2024	BOTACOR13T	Carbon assimilation: factors affecting CO2 reduction. (Unit-2) Class Tests	4
	BOTACOR13P	Revision class	6
	BOTACOR14T	Applications of Biotechnology: Humulin; biosafety concerns. Class Tests	3
	BOTGDSE04T	Biostatistics: Measures of central tendency	2
June (3rd Week) 2024		END SEMESTER EXAMINATION	
Total Classes			94

NAME OF TEACHER: DR. MOULI SAHA

PAPER ALLOTTED: PLANT METABOLISM (BOTACOR13T, BOTACOR13P), ANALYTICAL TECHNIQUES IN PLANT SCIENCES (BOTADSE04T, BOTADSE04P), ANALYTICAL TECHNIQUES IN PLANT SCIENCES BOTGDSE04T

Month	Paper	Topic	No of classes
March 2024 (02.03.2024)	BOTACOR13T	Carbohydrate metabolism: Synthesis and catabolism of sucrose and starch. (UNIT-2) Carbon Oxidation: Glycolysis, fate of pyruvate, regulation of glycolysis, oxidative pentose phosphate pathway, oxidative decarboxylation of pyruvate. (UNIT-3)	5
	BOTACOR13P	Demonstration of absorption spectrum of photosynthetic pigments (spectrophotometer). (UNIT-2) To study the effect of light intensity on the rate of photosynthesis. (UNIT-3)	12
	BOTADSE04T	Imaging and related techniques: Use of fluorochromes: (a) Flow cytometry (FACS); (b) Applications of fluorescence microscopy (UNIT-1)	4
	BOTADSE04P	Study of different microscopic techniques using photographs/micrographs (freeze fracture, freeze etching)	4

		(UNIT-7) Continuations…	
	BOTGDSE04T	**Imaging and related techniques: Principles of microscopy; Light microscopy; Fluorescence microscopy. (UNIT-1)**	**4**
April 2024	**BOTACOR13T**	**Carbon Oxidation: Regulation of PDH, NADH shuttle; TCA cycle, amphibolic role, anaplerotic reactions, regulation of the cycle, mitochondrial electron transport, oxidative phosphorylation, cyanide-resistant respiration, factors affecting respiration. (UNIT-3)**	**5**
	BOTACOR13P	**To compare the rate of respiration in different parts of a plant. (UNIT-5)** **To demonstrate activity of Nitrate reductase in germinating leaves of different plant sources. (UNIT-6)**	**8**
	BOTADSE04T	**Imaging and related techniques: Chromosome banding, FISH, chromosome painting; Transmission and Scanning electron microscopy – sample preparation for electron microscopy, cryofixation, negative staining, shadow casting, freeze fracture, freeze etching. (UNIT-1)**	**4**
	BOTADSE04P	**Study of different microscopic techniques using photographs/micrographs (negative staining, positive staining, fluorescence and FISH). (UNIT-7)**	**4**
	BOTGDSE04T	**Imaging and related techniques: Confocal microscopy; Use of fluorochromes: (a) Flow cytometry (FACS); (b) Applications of fluorescence microscopy: Chromosome banding. (UNIT-1)**	**4**
May 2024	**BOTACOR13T**	**ATP-Synthesis: Mechanism of ATP synthesis, substrate level phosphorylation, chemiosmotic mechanism (oxidative and photophosphorylation), ATP synthase; role of uncouplers, ATP-Synthesis: ATP synthase; role of uncouplers. (UNIT-4)**	**6**
	BOTACOR13P	**To study the activity of lipases in germinating oilseeds. (UNIT-7)**	**4**
	BOTADSE04T	**Radioisotopes: Use in biological research, auto-radiography, pulse chase experiment. Pulse chase experiment. (UNIT-3)**	**5**
	BOTADSE04P	**Preparation of permanent slides (double staining)-any material with saffranin and light green stain. (UNIT-8)**	**4**
	BOTGDSE04T	**Imaging and related techniques: FISH, chromosome painting; Transmission and Scanning electron microscopy – sample**	**5**

		preparation for electron microscopy, Imaging and related techniques: Cryofixation, negative staining, shadow casting, freeze fracture, freeze etching. (UNIT-1)	
May (4th Week) 2024		**Internal Examination & Class for Slow Learners**	**6**
June 2024	**BOTACOR13T**	**Cass Tests**	**1**
	BOTACOR13P	**Revision class**	**4**
	BOTADSE04T	**Class Tests**	**1**
	BOTADSE04P	**Revision class**	**2**
	BOTGDSE04T	**Class Tests**	**1**
June (3rd Week) 2024		**END SEMESTER EXAMINATION**	
Total Classes			**93**

NAME OF TEACHER: NANDITA DEY

PAPER ALLOTTED: PLANT METABOLISM (BOTACOR13T, BOTACOR13P), ANALYTICAL TECHNIQUES IN PLANT SCIENCES (BOTADSE04T, BOTADSE04P), ANALYTICAL TECHNIQUES IN PLANT SCIENCES BOTGDSE04T

Month	Paper	Topic	No of classes
March 2024 (02.03.2024)	**BOTACOR13T**	**Lipid Metabolism: synthesis and breakdown of triglycerides,beta oxidation,glyoxylate cycle,gluconeogenesis and it's role in mobilization of lipids during seed germination,alpha oxidation. (UNIT-6)**	**8**
	BOTACOR13P	**To study the activity of lipase in germinating oil seeds.(Sl.no-7)**	**2**
	BOTADSE04T	**Chromatography-principle,paper chromatography,column chromatography,TLC,GLC,HPLC,Ion-exchange chromatography,molecular sieve chromatography,affinity chromatography (UNIT-5)**	**6**
	BOTADSE04P	**Study the blotting techniques-southern,northern,western through photographs.**	**2**
	BOTGDSE04T	**Radioisotopes-use in biological researches. (UNIT-3)**	**1**

April 2024	BOTACOR13T	Nitrogen metabolism-nitrate assimilation,biological nitrogen fixation(examples of legumes and non-legumes),physiology and biochemistry of nitrogen fixation,ammonia assimilation and transaamination. (UNIT-7)	8
	BOTACOR13P	To demonstrate activity of Nitrate reductase in germinating leaves of different plant sources. (UNIT-6)	2
	BOTADSE04T	Characterization of proteins and nucleic acids: mass spectrometry,X-ray diffraction,X-ray crystallography,characterization of protein and nucleic acids,electrophoresis,AGE,PAGE,SDS-PAGE. (Unit-6)	8
	BOTADSE04P	Study DNA fingerprinting,DNA sequencing,PCR through photograph. (UNIT-1)	2
	BOTGDSE04T	Chromatography-principle,paper chromatography,column chromatography,TLC,GLC,HPLC,Ion-exchange chromatography,molecular sieve chromatography,affinity chromatography. (UNIT-5)	4
May 2024	BOTACOR13T	Mechanism of signal transduction: receptor-ligand interactions,G-protein,second messenger concept,calcium calmodulin,MAP kinase cascade. (UNIT-8)	5
	BOTADSE04P	Preparation of permanent slides (double staining)-any material with saffranin and light green stain. (UNIT-8)	3
4th week of May 2024		Internal Examination& Class for Slow Learners	3
June 2024	BOTACOR13P	Revision class	3
	BOTADSE04T	Revision class, Class Tests	3
	BOTADSE04P	Revision class, Class Test	2
	BOTGDSE04T	Revision class, Class Test	2
3rd week of June 2024		END SEMESTER EXAMINATION	
Total Classes			64

NAME OF TEACHER: MR. RAJATESH CHAKRABORTY

PAPER ALLOTTED: PLANT BIOTECHNOLOGY (BOTACOR14T,BOTACOR14P); BIOSTATISTICS (BOTADSE06T,BOTADSE06P);ANALYTICAL TECHNIQUES IN PLANT SCIENCES (BOTGDSE04T),ETHNOBOTANY(BOTSSEC04M)

Month	Paper	Topic	No of classes
March 2024 (02.03.2024)	BOTACOR14T	Plant Tissue Culture :Historical perspective; composition of media; nutrient and hormone requirements (role of vitamins and hormones); totipotency; organogenesis; embryogenesis (somatic and zygotic) (UNIT -1)	5
	BOTACOR14P	1a.Preparation of MS medium 1b. Process of *in vitro* sterilization and inoculation methods by using different explants (leaf of tobacco)	6
	BOTADSE06T	Measures of central tendency : Mean, median, mode, geometric mean - merits & demerits. Measures of dispersion - range, standard deviation (UNIT-3)	4
	BOTADSE06P	1) Calculation of mean, standard deviation and standard error.	6
	BOTGDSE04T	Biostatistics :Statistics, data, population, samples, parameters; Representation of Data: Tabular, Graphical (UNIT-7)	4
April 2024	BOTACOR14T	Plant Tissue Culture :Protoplast isolation, culture and fusion; Tissue culture applications (micropropagation, androgenesis, virus elimination, secondary metabolite production, haploids(UNIT-1)	4
	BOTACOR14P	1b.Process of *in vitro* sterilization and inoculation methods by using different explants nodal bud and seeds of *Datura*, *Brassica* 2. Study of anther, embryo and endosperm culture through photographs.	9
	BOTADSE06T	Measures of central tendency: mean deviation, quartile deviation - merits and demerits; Co- efficient of variations.(UNIT-3) Statistical inference :Hypothesis - simple hypothesis - student 't' test (unpaired t-test) (UNIT-5)	4
	BOTADSE06P	Calculation of 'F' value and finding out the probability value for the F value.	6
	BOTGDSE04T	Biostatistics :Measures of central tendency: Arithmetic mean, mode, median; Measures of dispersion: Range, mean deviation, variation, standard deviation (UNIT-7)	4
May 2024	BOTACOR14T	Plant Tissue Culture :Tissue culture applications triploids and hybrids; cryopreservation; germplasm conservation, hardening of the tissue culture raised plants for field plantation & Revision Class &Class Test (UNIT-1)	5
	BOTACOR14P	Study of micropropagation, somatic embryogenesis & artificial seeds through photographs	6
	BOTADSE06T	Statistical inference :Hypothesis - simple hypothesis - student 't'	3

		test (paired t-test) (UNIT-5)	
	BOTADSE06P	Revision Class	6
	BOTGDSE04T	Biostatistics :Chi-square test for goodness of fit.(UNIT-7)	2
	BOTSSEC04M	Ethnobotany and legal aspects: Ethnobotany as a tool to protect interests of ethnic groups. Sharing of wealth concept with few examples from India. Biopiracy, Intellectual Property Rights and Traditional Knowledge (UNIT-4)	4
May (4th Week) 2024		Internal Examination& Class for Slow Learners	6
June 2024	BOTACOR14T	Class Tests	2
	BOTACOR14P	Revision Class	2
	BOTADSE06T	Class Test	2
	BOTGDSE04T	Revision Class	2
June (3rd Week) 2024		END SEMESTER EXAMINATION	
Total Classes			92

NAME OF TEACHER: DR. RAM PRASAD MUKHOPADHYAY

PAPER ALLOTTED: ANALYTICAL TECHNIQUES IN PLANT SCIENCES (BOTADSE04T, BOTADSE04P), BIOSTATISTICS(BOTADSE06T), ANALYTICAL TECHNIQUES IN PLANT SCIENCES (BOTGDSE04P), ETHNOBOTANY (BOTSSEC04M)

Month	Paper	Topic	No of classes
March 2024 (02.03.2024)	BOTADSE04T	Imaging and related techniques Principles of microscopy; Light microscopy; Fluorescence microscopy; Confocal microscopy (Unit-1) Cell fractionation: Centrifugation: Differential and density gradient centrifugation, sucrose density gradient,.(Unit-3)	5
	BOTADSE04P	To separate nitrogenous bases by paper chromatography. To separate sugars by thin layer chromatography	6
	BOTADSE06T	Biostatistics Definition - statistical methods - basic principles. Variables - measurements, functions, limitations and uses of statistics.(Unit-1)	5
	BOTGDSE04P	To separate nitrogenous bases by paper chromatography. To separate sugars by thin layer chromatography.	6

		To estimate protein concentration through Lowry's methods.	
	BOTSSEC02M	**Methodology of Ethnobotanical studies :a) Field work b) Herbarium c) Ancient Literature (Unit-2)**	**4**
April 2024	**BOTADSE04T,**	**Cell fractionation: CsCl2 gradient, analytical centrifugation, ultracentrifugation, marker enzyme,(Unit-3) Spectrophotometry Principle and its application in biological research.**	**6**
	BOTADSE04P	**To estimate protein concentration through Lowry's methods.** **To separate proteins using PAGE.** **To separate DNA (marker) using AGE**	**9**
	BOTADSE06T	**Collection of data primary and secondary :Types and methods of data collection procedures - merits and demerits (Unit-2)**	**4**
	BOTGDSE04P	**To separate proteins using PAGE.** **To separate DNA (marker) using AGE.** **Study of different microscopic techniques using photographs/micrographs (freeze fracture, freeze etching, negative staining, positive staining, fluorescence and FISH).**	**8**
	BOTSSEC02M	**Methodology of Ethnobotanical studies :c) Ancient Literature d) Archaeological findings e) temples and sacred places.**	**4**
May 2024	**BOTADSE04T,**	**Biostatistics :Statistics, data, population, samples, parameters; Representation of Data: Tabular, Graphical; Measures of central tendency: Arithmetic mean, mode, median;Measures of dispersion: Range, mean deviation, variation, standard deviation; Chi-square test for goodness of fit.(Unit-7)**	**6**
	BOTADSE04P	**Revision**	**6**
	BOTADSE06T	**Collection of data primary and secondary: Classification - tabulation and presentation of data - sampling methods. (Unit-2)**	**6**
	BOTGDSE04P	**Preparation of permanent slides (double staining)- any material with saffranin and light green stain.** **Study of Blotting techniques: Southern, Northern and Western, DNA fingerprinting, DNA sequencing, PCR through**	**8**

		photographs	
	BOTSSEC02M	**Revision**	
May (4th Week) 2024		**Internal Examination&** **Class for Slow Learners**	**6**
June 2024	**BOTADSE04T,**	**Class Test**	**1**
	BOTADSE04P	**Revision**	**4**
	BOTADSE06T	**Class Test**	**1**
	BOTGDSE04P	**Revision**	**2**
	BOTSSEC02M	**Class Test**	**1**
June (3rd Week) 2024		**END SEMESTER EXAMINATION**	
Total Classes			**98**