

LESSON PLAN (Session 23-24)

Semester -Odd

Department: BIOTECHNOLOGY

Class : BSC I BIOTECHNOLOGY

Name of the faculty: Ms. REETU KAMBOJ AND Ms.PREETI HANDA

Paper code: B23-BTY-101

Nomenclature of the paper: INTRODUCTION OF BIOTECHNOLOGY

| Month | Week | Topics to be covered |
|-----------|--------------------|---|
| July | 21.07.23-22.07.23 | Introduction of biotechnology paper |
| | 24.07.23-31.07.23 | Interdisciplinary pursuit, main areas of application of biotechnology, Introduction of genetic engineering. |
| August | 01.08.23- 05.07.23 | Biotechnology research in India & Developing world, Genes and genomes. |
| | 07.08.23-12.08.23 | Public perception of biotechnological products, proteins and proteome. |
| | 14.08.23-19.08.23 | Safety Guidelines & risk assessment in biotechnology, Revision of basic steps of genetic engineering. Assignment-1. |
| | 21.08.23-26.08.23 | Intellectual property rights, History of genetic manipulation . Class test-1 |
| | 28.08.23-31.08.23 | Substrates & future of bio technology . Class test -2 |
| September | 01.09.23-09.09.23 | Scope & techniques of preservation, Fermentation technology. Genetic manipulation topic completed Assignment -2 |
| | 11.09.23-16.09.23 | Animal tissue culture (history, culture media, surface is , culture procedures), DNA fingerprinting. |
| | 18.09.23-23.09.23 | Cell lines, Organ culture and tissue engineering , Forensic analysis. Class Test-3 |
| | 25.09.23-30.09.23 | Plant tissue culture, (history, culture media, explant) Class test-4 |
| October | 01.10.23-07-10.23 | Scope & Application of Animal & plant bio technology, Brief account of Immuno technology, Industrial Genetics. |
| | 09.10.23-14.10.23 | Hybridoma Technology and Monoclonal antibodies, Biohazards of genetic engineering. Sessional exam. |
| | 16.10.23-21.10.23 | Invitro fertilization and Embryo transfer technology, Molecular markers, Genetic mapping. |
| | 23.10.23-28.10.23 | Biological control of Environment, bioremediation |

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| | | and waste treatment , Introduction of enzyme technology. Microbial insecticides, Bio fertilizers , oil recovery & bioleaching . Class Test -5 |
| | 30.10.23-31.10.23 | Applications of Bio technology. Class Test -6 |
| | 02.11.23-9.11.23 | Revision syllabus. |
| Vacations | 10.11.23-16.11.23 | Diwali Vacations |

LESSON PLAN (Session 23-24)

Semester -Odd

Department: BIOTECHNOLOGY & INDUSTRIAL MICROBIOLOGY.

Class : BIOTECH. MINOR (BSC I MEDICAL) .

Name of the faculty: Ms. REETU KAMBOJ & Ms. PREETI HANDA

Paper code: B23-BTY -103

Nomenclature of the paper: LABORATORY TECHNIQUES AND PRACTICES

| Month | Week | Topics to be covered |
|-----------|--------------------|--|
| July | 21.07.23-22.07.23 | Laboratory rules and Safety Measures |
| | 24.07.23- 31.07.23 | Common use equipment - Laminar air flow, Centifuge, Sterlization techniques. |
| August | 01.08.23-05.08.23 | pH meter, Incubator , Fermentor, Dry and Wet sterilization. |
| | 07.08.23-12.08.23 | Colony counter, autoclave, inoculating loop, needle, preferred method of sterlization for different materials. |
| | 14.08.23-19.08.23 | Microscope, colorimeter & spectrophotometer, biological indicators . Class test -1 |
| | 21.08.23-26.08.23 | Qualitative estimation of sugars. Class test- 2 |
| | 28.08.23- 31.08.23 | Qualitative estimation of Sugars ,checking the efficiency of sterlization process. |
| September | 01.23-09.09.23 | Qualitative and Quantitative estimation of Proteins. |
| | 11.09.23-16.09.23 | Determination of various meta bolites, Class test - 3 |
| | 18.09.23-23.09.23 | Preparation of Standard curve buffers, Evaluation of different dis infectants . |
| | 25.09.23-30.09.23 | Preparation of normal, molar, Percent solution . Class test-4. |
| October | 01.10.23-07-10.23 | Thin layer& paper Chromatography , Evaluation of Different Antiseptics. |
| | 09.10.23-14.10.23 | Two dimensional chromatography , Sessional exam. |
| | 16.10.23-21.10.23 | Paper electrophoresis, preparation of cotton plugs under microbiology. |
| | 23.10.23-28.10.23 | Types of culture Media , Animal and Plant cell culture Media. |
| | 30.10.23-31.10.23 | Preparation of Dilutions . Picking of Technique. Class test-5 |
| | 02.11.23-09.11.23 | Revision of syllabus. |
| Vacations | 10.11.23-16.11.23 | Diwali Vacations |

LESSON PLAN (Session 23-24)

Semester -Odd

Class : Bsc II BIOTECHNOLOGY

Name of the faculty: Ms. PREETI HANDA

Paper code: PAPER-VII

Nomenclature of the paper: MOLECULAR BIOLOGY.

| Month | Week | Topics to be covered |
|-----------|-------------------|--|
| July | 21.07.23-22.07.23 | Introduction to molecular aspects of life. |
| | 24.07.23-31.07.23 | DNA as the genetic material experiments proving DNA and RNA as genetic material. |
| August | 01.08.23-05.08.23 | Nucleic acids: Structure, function and properties of DNA and RNA. Watson and Crick model of DNA. DNA forms (A, B and Z), their characteristic |
| | 07.08.23-12.08.23 | Different types of RNA, their structure and function. Assignment |
| | 14.08.23-19.08.23 | Organization of Genomes bacterial .Class test-1 |
| | 21.08.23-26.08.23 | viral, human, organelles. |
| | 28.08.23-31.08.23 | Eukaryotic genomes: Chromosomal organization and structure. Class test -2 |
| September | 01.09.23-09.09.23 | Euchromatin, heterochromatin, centromere, telomere. Chromatin structure (nucleosome), histone and non-histone proteins. Insertion elements and transposons; IS elements, transposable elements of Maize and P elements of Drosophila. Extra chromosomal DNA in prokaryotes plasmids. |
| | 11.09.23-16.09.23 | DNA Replication: Central dogma of molecular biology. Semi-conservative mode of DNA replication, experimental proof. Unidirectional and |

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| | | bidirectional mode of DNA replication, theta model and rolling circle model. DNA replication in prokaryotes and eukaryotes, different stages, proteins and enzymes involved. |
| | 18.09.23-23.09.23 | DNA damage and repair: causes of DNA damage, mutations |
| | 25.09.23-30.09.23 | Repair mechanisms- photo reactivation, excision repair, mismatch repair, SOS repair. Class test-3 |
| October | 01.10.23-07-10.23 | Genetic Code: concept, elucidation or cracking of genetic code, features of genetic code, Wobble hypothesis. Structure of gene- introns/exons, regulatory sequences, structure of prokaryotic gene. |
| | 09.10.23-14.10.23 | Transcription in prokaryotes and eukaryotes, diff. stages, mechanism, promoters, transcription factors, RNA polymerases. Post transcriptional modifications- 5 cap formation, 3-end processing/ poly adenylation and gene splicing and generation of mature mRNA. Class test-4 |
| | 16.10.23-21.10.23 | Inhibitors of transcription. Translation/Protein synthesis: Mechanism of initiation, elongation and termination of protein synthesis in prokaryotes and eukaryotes. Inhibitors of translation. Post-translational modifications. Sessional exam. |
| | 23.10.23-28.10.23 | Regulation of Gene Expression in prokaryotes and eukaryotes, induction and repression, positive and negative regulation. Operon model- lac, ara, trp, catabolite repression, transcription attenuation. |

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| | 30.10.23-31.10.23 | Molecular mechanisms of DNA recombination in eukaryotes Site Specific and Homologous recombination. Recombination in prokaryotes Transformation, transduction and conjugation. Class test -5. |
| | 02.11.23-09.11.23 | Revision of syllabus. |
| Vacations | 10.11.23-16.11.23 | Diwali Vacations |

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Department: BIOTECHNOLOGY

Class : Bsc II BIOTECHNOLOGY

Name of the faculty: Ms. REETU KAMBOJ

Paper code: PAPER-VI

Nomenclature of the paper: IMMUNOLOGY

| Month | Week | Topics to be covered |
|-----------|-------------------|--|
| July | 21.07.23-22.07.23 | History and Scope. Terminology of immune system |
| | 24.07.23-31.07.23 | Definition, types of Immunity- Innate, Adaptive/acquired (active, passive, natural/ artificial. |
| August | 01.08.23-05.08.23 | Humoral and Cell mediated immunity, recognition of self and non-self. |
| | 07.08.23-12.08.23 | Cells of the Immune System B and T cells |
| | 14.08.23-19.08.23 | Null cells, Monocytes, Polymorphs. Assignment. |
| | 21.08.23-26.08.23 | Organs of the Immune System Class test-1. |
| | 28.08.23-31.08.23 | Primary Lymphoid organs. |
| September | 01.09.23-09.09.23 | Secondary Lymphoid organs. |
| | 11.09.23-16.09.23 | Antigen Antibodies. |
| | 18.09.23-23.09.23 | Antigen Antibody Interactions. RIA, ELISA etc. techniques . Class test-2 |
| | 25.09.23-30.09.23 | Immune Response: Introduction, Humoral Immunity Primary and Secondary immune response B cells in antibody formation . |
| October | 01.10.23-07.10.23 | Role of MHC molecules, Antigen presenting cells. |
| | 09.10.23-14.10.23 | Complement system . Sessional exam. |
| | 16.10.23-21.10.23 | Major Histocompatibility Complex- Class I and Class II MHC molecules. |

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| | 23.10.23-28.10.23 | Hypersensitivity and allergic reactions |
| | 30.10.23-31.10.23 | Autoimmunity, immunological tolerance. |
| | 02.11.23-10.11.23 | Vaccines: concept, types of vaccines- Inactivated, Attenuated and Recombinant vaccines Class test-3 |
| Vacations | 10.11.23-16.11.23 | Diwali Vacations |

LESSON PLAN (Session 23-24)

Semester -Odd

Class : Bsc III BIOTECHNOLOGY

Name of the faculty: Ms. PREETI HANDA

Paper code: PAPER-XI

Nomenclature of the paper: ANIMAL BIOTECHNOLOGY

| Month | Week | Topics to be covered |
|--------|-------------------|---|
| July | 21.07.23-22.07.23 | Introduction, Principles & practice. History and Development of animal cell culture. Scope and Applications. |
| | 24.07.23-31.07.23 | Culture Media: Media components, Serum containing and serum free media. Natural media Plasma clot, biological fluids, tissue extracts. Growth factors required for proliferation of animal cells. Chemically defined media, balanced salt solutions |
| August | 01.08.23-05.08.23 | Physical requirements for growing animal cells in culture. Washing, drying, sterilization practices, various instruments and their uses in animal cell culture practices. Assignment-1. |
| | 07.08.23-12.08.23 | Primary Cell Culture techniques: Initiation of cell culture-substrates (glass, plastic, metals) their preparation and sterilization. Isolation of tissue explants, disaggregation- enzyme disaggregation and mechanical disaggregation of the tissue. development of primary culture and cell lines. Subculture. Contamination.. Suspension culture, Growth curve of animal cells in culture. Secondary cell culture transformed cell and continuous cell lines. |

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| | 14.08.23-19.08.23 | Cell lines: Insect and animal cells. Commonly used cell lines- their organization and characteristics. Cell repositories and their function. Karyotyping, biochemical and genetic characterization of cell lines. Class test-1 |
| | 21.08.23-26.08.23 | Organ Culture: technique, advantages, applications and limitations. Artificial skin. Assignment-2 |
| | 28.08.23-31.08. 23 | Transfection of animal cells: transfection methods. Methods for cell fusion, Selectable markers, HAT selection and Antibiotic resistance. Class test- 2 |
| September | 01.09.23-09.09.23 | Cloning and expression of foreign genes in animal cells: Expression vectors. Over production and preparation of the final product i.e. expressed proteins. |
| | 11.09.23-16.09.23 | Production of vaccines in animal cells. Hybridoma Technology: Production of monoclonal antibodies and their applications. |
| | 18.09.23-23.09.23 | Embryo transfer technology- technique, its applications |
| | 25.09.23-30.09.23 | Artificial insemination. Class test-3 |
| October | 01.10.23-07-10.23 | Animal clones. Transgenic Animals. |
| | 09.10.23-14.10.23 | transgenic sheep, cow, pig, goat etc. Sessional exam. |
| | 16.10.23-21.10.23 | Production of transgenic mice, ES cells can be used for gene targeting in mice, applications of gene targeting |
| | 23.10.23-28.10.23 | Therapeutic products through genetic engineering |
| | 30.10.23- 31.10.23 | blood proteins, insulin, growth hormone etc. Gene Therapy: introduction, types of gene therapy, vectors in gene therapy, major |

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| | | achievements, problems and prospects. Class test-4 |
| | 02.11.23-09. 11.23 | Revision of syllabus. |
| Vacations | 10.11.23-16.11.23 | Diwali Vacations |

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Semester -Odd

Department: BIOTECHNOLOGY

Class : Bsc III BIOTECHNOLOGY

Name of the faculty: Ms. REETU KAMBOJ

Paper code: PAPER-XII

Nomenclature of the paper: PLANT BIOTECHNOLOGY

| Month | Week | Topics to be covered |
|-----------|-------------------|--|
| July | 21.07.23-22.07.23 | History, Scope and Applications of plant biotechnology. |
| | 24.07.23-31.07.23 | Plant Tissue Culture Laboratory |
| August | 01.08.23-05.08.23 | Aseptic Techniques. Assignment. |
| | 07.08.23-12.08.23 | Washing, drying and sterilization of glassware, sterilization of media, surface sterilization, aseptic work station. |
| | 14.08.23-19.08.23 | Culture Media: Nutritional requirements for plant tissue culture, role of different media components, plant growth regulators. |
| | 21.08.23-26.08.23 | Different culture media viz. MS, B5 Nitsch and Whites medium, Preparation of culture media. |
| | 28.08.23-31.08.23 | Explants, their cellular characteristics, dedifferentiation and redifferentiation |
| September | 01.09.23-09.09.23 | Cellular totipotency, organogenesis and somatic embryogenesis. |
| | 11.09.23-16.09.23 | Micropropagation/clonal propagation of elite species (different routes of multiplication-axillary bud proliferation, somatic embryogenesis, organogenesis), Synthetic seeds. |

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| | 18.09.23-23.09.23 | Callus and suspension culture techniques. |
| | 25.09.23-30.09.23 | Somaclonal variation. Class test-1 |
| October | 01.10.23-07-10.23 | Organ culture: Anther & Pollen culture, ovary, ovule, embryo and endosperm culture concept, technique, applications and limitations. Embryo rescue. |
| | 09.10.23-14.10.23 | Protoplast culture. Somatic hybridization protoplast fusion techniques (chemical and electro-fusion), selection of hybrids, production of symmetric and asymmetric hybrids and cybrids. |
| | 16.10.23-21.10.23 | Production of secondary metabolites ,Biotransformation. |
| | 23.10.23-28.10.23 | Plant germ plasm conservation and cryopreservation. Genetic Engineering in plants. |
| | 30.10.23-31.10.23 | Gene transfer in plants - micro projectile bombardment, electroporation, liposome mediated, Calcium phosphate mediated etc. Class test |
| | 02.11.23-9.11.23 | Transgenic Plants, edible vaccines and Improving food Quality. |
| Vacations | 10.11.23-16.11.23 | Diwali Vacations |