**PG.GOVT COLLEGE FOR GIRLS, SECTOR-42, CHANDIGARH**

**Teaching Plan Session Odd Semester**

**(2018-19)**

**Class: BSc 1st Sem (BIOTECH (HONS.) Name of the Teacher: Dr Smita**

**Subject: cell biology Period : 3rd ( Mon)2nd (Wed, Fri) 1st (Sat)**

**Paper :Theory Room No : 111**

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| **S. No** | **Date From** | | **Topics to be covered** | |
| Week 1 | 14 /01/2019 – 19/01/2019 | | Cell as a basic unit of living systems: the cell theory, pre-cellular evolution, artificial creation of "cells", | |
| Week 2 | 21/01/2019 –  25/01/2019 | broad classification and ultrastructure of cell types (PPLOs, Bacteria, eukaryotic microbes, plant and animal cells), | |
| Week 3 | 28/01/2019 –  2/02/2019 | tissue, organ and organism at different level of organization of other  genetically similar cells; biochemical composition of cells (proteins, lipids, carbohydrates, nucleic  acids and metabolic pool). | |
| Week 4 | 4/02/2019 –  9/02/2019 | Ultrastructure of cell membrane and cell organelle:- structure and function of cell organelles,ultrastrucure of cell membrane, cytosol, | |
| Week 5 | 11/02/2019 –  16/02/2019 | golgi bodies, vacuoles, endoplasmic reticulum (rough and smooth), ribosomes, cytoskeletal structures (actin microtubules etc), | |
| Week 6 | 18/02/2019 –  23/02/2019 | mitochondria, chloroplast, lysosomes, peroxisomes, nucleus (nuclear membrane, nucleoplasm, nucleolus) | |
| Week 7 | 25/02/2019 –  02/03/2019 | Cellular transport: Passive & active transport, permeases, | |
| MID TERM EXAM | | | |
| Week 8 | 11/03/2019 –  16/03/2019 | sodium, potassium, Calcium, ATPase  pumps, lysosomal and vacuolar membrane, ATP dependent proton pumps, co-transport, symport, antiport, | |
| Week 9 | 18 /03/2019 –  22/03/2019 | transport into prokaryotic cells, endocytosis and exocytosis, entry of viruses and toxins into cells. | |
| Week 10 | 25/03/2019 –  30/03/2019 | Cell locomotion: Amoeboid, Flagellar and Ciliar. | |
| Week 11 | 1/04/2019 –  6/04/2019 | Chromosomes: discovery, morphology, chemical composition,structural organization of chromatids,  centromere, telomere, | |
| Week 12 | 8/04/2019 –  12/04/2019 | chromatin, nucleosome organization, euchromatin and heterochromatin, special chromosomes (polytene, lampbrush chromosomes), banding patterns in human chromosomes. | |
| Week 13 | 15/04/2019 –  20/04/2019 | Basics of stem cells: Introduction to concepts in stem cell biology, Cell differentiation in multicellular organisms: (renewal, potency: Totipotent, pleuripotent, multipotent); | |
| Week 14 | 22/04/2019 –  27/04/2019 | types of stem cells: early embryonic stem cells, blastocyst embryonic stem cells, fetal stem cells, umbilical cord  stem cells, adult stem cells; | |
| Week 15 | 29 /04/2019 –  3/05/2019 | applications; ethical issues related to stem cells. | |

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**Teaching Plan Session Odd Semester**

**(2018-19)**

**Class: BTH 6 th Sem(Biotech)(Hons) Name of the Teacher: Dr Smita**

**Subject: Genetic Engineering Period: 3rd(Wed, Thus, Fri, Sat)**

**Paper: Theory Room No : 110**

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| **S. No** | **Dates** | | **Topics to be covered** | |
| Week 1 | 14 /01/2019 – 19/01/2019 | | **1. Introduction to genetic engineering.** Why gene cloning and DNA analysis is important. . How to clone a gene - What is clone, overview of the procedure | |
| Week 2 | 21/01/2019 –  25/01/2019 | **2. Tools in Recombinant DNA Technology:**  Restriction and modifying enzymes, Type I , Type II and Type III enzymes and their characteristic features; restriction sequences, isoschizomers, rare cutting enzymes, enzyme cutting similar sequence in different manner. | |
| Week 3 | 28/01/2019 –  2/02/2019 | .DNA Modifying enzymes: Characteristics and applications of Nucleases – DNase and RNase, DNA-Pol I, Klenow fragment, T4DNA polymerase, T7 DNA polymerase, | |
| Week 4 | 4/02/2019 –  9/02/2019 | T4 Polynucleotide kinase, Phosphatase, Reverse transcriptase, Taq polymerase and Ligase. Terminal deoxy ribonucleotidyl transferase | |
| Week 5 | 11/02/2019 –  16/02/2019 | 3. **Polymerase Chain Reaction**: Types and applications | |
| Week 6 | 18/02/2019 –  23/02/2019 | **Basic biology of plasmids and Phage vectors** Basic features of plasmids, plasmid classification,Bacteriophage λ, lytic & lysogeny, Promoter control circuits. linear and circular forms of lambda vector, DNA cloning with single stranded DNA vectors. | |
| Week 7 | 25/02/2019 –  02/03/2019 | **DNA cloning vectors** Cloning vectors for E. coli- Nomenclature, pBR 322, pBR 327, pUC 8, pGEM3Z. Insertion and replacement vectors; Vectors based on M13. | |
| **MID TERM EXAM** | | | |
| Week 8 | 11/03/2019 –  16/03/2019 | Methods of identification of recombinants: Insertional inactivation, blue/white selection.  Cloning vectors for yeast- YEp, YIp, YRp. | |
| Week 9 | 18 /03/2019 –  22/03/2019 | **Advanced Vectors:** cosmid, phagemid, Bacterial Artificial Chromosomes (BACs), shuttle vectors, yeast  artificial chromosomes. | |
| Week 10 | 25/03/2019 –  30/03/2019 | **Preparation of genomic and cDNA library:** Partial digests, Choice of vectors, Construction and Evaluation  of a genomic library. cDNA library: mRNA enrichment, cDNA synthesis, Random, arrayed and Ordered library. | |
| Week 11 | 1/04/2019 –  6/04/2019 | **Finding The Right Clone:** Gene identification, Nucleic acid hybridization, screening Procedure, Probe  selection, immuno screening, functional complementation. Southern blotting, northern blotting. | |
| Week 12 | 8/04/2019 –  12/04/2019 | **Preparation of nucleic acid probes:** DNA and RNA labeling techniques, nick translation , random priming, end labelling, radioactive and non- radioactive labels | |
| Week 13 | 15/04/2019 –  20/04/2019 | **Site directed mutagenesis** (cassette , primer extension, RT, real time, multiplex, inverse), | |
| Week 14 | 22/04/2019 –  27/04/2019 | **DNA sequencing** (Maxam-Gilbert, Sanger, pyro). | |
| Week 15 | 29 /04/2019 –  3/05/2019 | **Production of Protein from Cloned Genes:** Special vectors for expression of foreign genes in *E. coli,*  General problems with the production of recombinant protein in *E. coli.* Production of recombinant protein by  eukaryotic cells. | |