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

**Teaching Plan Session Odd Semester**

**(2017-18)**

**Class: B.Sc. Biotech. (Elective) 5th Sem. Name of the Teacher: SUMIT DABHI**

**Subject: Biotechnology Period : I (MON TO SAT)**

**Paper: Plant & Animal Biotechnology Room No : 222**

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| **S. No** | **Date From** | **Date Upto** | **Topics to be covered** |
| Week 1 | July 24,2017 | July 29, 2017 | Media composition, Organization of plant tissue culture room, |
| Week 2 | July 31,2017 | Aug 5, 2017 | Introduction to *in vitro* methods : Plant tissue culture, Micropropagation, ovule and ovaryculture, embryo culture, endosperm culture, |
| Week 3 | Aug 7, 2017 | Aug 12, 2017 | somatic embryogenesis &  organogenesis, somaclonal & gametoclonal variations, haploids & their  applications. |
| Week 4 | Aug 14, 2017 | Aug 19, 2017 | Protoplast isolation, methods, testing their viability & regeneration, various  methods of fusion: somatic hybridization & their applications |
| Week 5 | Aug 21, 2017 | Aug 26, 2017 | Direct and indirect transformation of plants. Tumor formation in plant using  *Agrobacterium tumefaciens*. Mechanism of T-DNA transfer to plants, plasmid  vectors for plant transformation |
| Week 6 | Aug 28, 2017 | Sep 2, 2017 | Genetic manipulation of plants for virus  resistance, pest resistance herbicide tolerance, resistance to fungi and bacteria. |
| Week 7 | Sep 4, 2017 | Sep 9, 2017 | Introduction to animal cell cultures  Requirement (laboratory equipment, media etc. primary and secondary culture  cell lines) Anchorage dependence and contact inhibition. |
| Week 8 | Sep 11, 2017 | Sep 16, 2017 | Introduction to animal cell cultures  Requirement (laboratory equipment, media etc. primary and secondary culture  cell lines) Anchorage dependence and contact inhibition. |
| Week 9 | Sep 18, 2017 | Sep 23, 2017 | Introduction to animal cell cultures  Requirement (laboratory equipment, media etc. primary and secondary culture  cell lines) Anchorage dependence and contact inhibition. |
| Week 10 | Sep 25, 2017 | Sep 29, 2017 | Contamination & remedial measures. Monolayer and suspension cultures. Cryopreservation and germplasm storage. Establishment of gene banks |
| **Autumn Break (30 Sept2017-09 Oct 2017)**  **Mid Semester Exam (10 Oct 2017-17Oct 2017)** | | | |
| Week 11 | Oct 18, 2017 | Oct 21, 2017 | Cytodifferentiation culturing of differentiation cells and retention of properties |
| Week 12 | Oct 23, 2017 | Oct 28, 2017 | Large scale production of animal cell in culture. |
| Week 13 | Oct 30, 2017 | Nov 4, 2017 | Transformation of animal cells. Transgenesis, applications of transgenic  animals |
| Week 14 | Nov 6, 2017 | Nov 11, 2017 | Transformation of animal cells. Transgenesis, applications of transgenic  animals |
| Week 15 | Nov 13, 2017 | Nov 18, 2017 | Stem cells : Embryonic and adult stem cells ( types,sources and functions),  applications of stem cells in biology & medicine. |
| Week 16 | Nov 20, 2017 | Nov25, 2017 | Stem cells : Embryonic and adult stem cells ( types,sources and functions),  applications of stem cells in biology & medicine. |
| Week 16 | Nov 27, 2017 | Dec 1, 2017 | Cloning : Procedure, applications and ethical concerns |

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

**Teaching Plan Session Odd Semester**

**(2017-18)**

**Class: M.Sc. Microbial Biotech. 1st Sem. Name of the Teacher: SUMIT DABHI**

**Subject: r-DNA Technology Period : IV(MON TO THU)**

**Paper: Room No : 127**

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| **S. No** | **Date From** | **Date Upto** | **Topics to be covered** |
| Week 1 | July 24,2017 | July 29, 2017 | Mendelian principles, concept of allele, multiple alleles, pseudoallele, co-dominance,  incomplete dominance, gene interaction, pleiotropy, linkage, crossing over, sex  linkage, sex limited and s ex influenced characters. Significance of genetic recombination |
| Week 2 | July 31,2017 | Aug 5, 2017 | Homologous genetic recombination (Transformation, Transduction, Conjugation) and  heterologous genetic recombination (IS, Tn, Mu phage) |
| Week 3 | Aug 7, 2017 | Aug 12, 2017 | Homologous genetic recombination (Transformation, Transduction, Conjugation) and  heterologous genetic recombination (IS, Tn, Mu phage) |
| Week 4 | Aug 14, 2017 | Aug 19, 2017 | Gene mapping methods: Linkage maps, tetrad analysis, mapping with molecular markers,  mapping by using somatic cell hybrids |
| Week 5 | Aug 21, 2017 | Aug 26, 2017 | Mutations: Fluctuation test, Replica plating, Physical and chemical mutagens |
| Week 6 | Aug 28, 2017 | Sep 2, 2017 | Types of mutations  DNA Repair mechanisms |
| Week 7 | Sep 4, 2017 | Sep 9, 2017 | Host restriction/modification, Enzymes involved in gene cloning |
| Week 8 | Sep 11, 2017 | Sep 16, 2017 | Natural Plasmids and their types, Role of plasmids in transfer of genes |
| Week 9 | Sep 18, 2017 | Sep 23, 2017 | Plasmids as gene cloning vectors, Commercial vectors |
| Week 10 | Sep 25, 2017 | Sep 29, 2017 | Plasmids as gene cloning vectors, Commercial vectors |
| **Autumn Break (30 Sept2017-09 Oct 2017)**  **Mid Semester Exam (10 Oct 2017-17Oct 2017)** | | | |
| Week 11 | Oct 18, 2017 | Oct 21, 2017 | Strategies involved in cloning of gene(s). |
| Week 12 | Oct 23, 2017 | Oct 28, 2017 | Construction of genomic, cDNA and meta-genomic libraries |
| Week 13 | Oct 30, 2017 | Nov 4, 2017 | DNA sequencing |
| Week 14 | Nov 6, 2017 | Nov 11, 2017 | PCR and its applications and modifications |
| Week 15 | Nov 13, 2017 | Nov 18, 2017 | Phage display technology and its applications. |
| Week 16 | Nov 20, 2017 | Nov25, 2017 | Yeast two-hybrid system, Combinatorial library |
| Week 17 | Nov 27, 2017 | Dec 1, 2017 | Revision & Class test |

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

**Teaching Plan Session Even Semester**

**(2017-18)**

**Class: B.Sc. Biotech. (Hons.) 4th Sem. Name of the Teacher: SUMIT DABHI**

**Subject: Agro & Period : I(WED) IV(MON, TUE) & III(FRI)**

**Industrial Biotechnology Room No : 111 & 122**

**Paper:**

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| **S. No** | **Date From** | **Date Upto** | | **Topics to be covered** |
| Week 1 | Jan 08,2018 | Jan 13, 2018 | | Basic concept of agriculture as industry: Industrially important microbes, its screening, selection and identification. |
| Week 2 | Jan 15,2018 | Jan 20,2018 | | Maintenance and preservation of industrially important microbial cultures. |
| Week 3 | Jan 22,2018 | Jan 27,2018 | | Differences between microbial industrial process and chemical industrial process |
| Week 4 | Jan 29,2018 | Feb 03,2018 | | Improvement programme of industrial microbes, mutational programme of penicillin producing microorganisms. |
| Week 5 | Feb 5, 2018 | Feb 10, 2018 | | selection pressure in maintaining the hyper producer, lowering of production due to reversal of mutations |
| Week 6 | Feb 12, 2018 | Feb 18, 2018 | | media formulation and process optimization of industrial and agro  industrial microbes. |
| Week 7 | Feb 19, 2018 | Feb 24, 2018 | | media formulation and process optimization of industrial and agro  industrial microbes. |
| Week 8 | Feb 26, 2018 | Mar 03, 2018 | | Microbes in agro industries and industrial biotechnology: Introduction of primary and secondary metabolites, production of vitamin B12,  antibiotics (penicillin), |
| **2nd Week March (Mid Semester Exam)** | | | | |
| Week 9 | March 12, 2018 | | March 17, 2018 | alcohol, wine, beer, cheese, |
| Week 10 | March19, 2018 | | March 24, 2018 | bread, citric acid, gluconic  acid, |
| Week 11 | March 26, 2018 | | March 31, 2018 | enzymes (amylases, cellulases, lipases and proteases) and their  industrial applications. |
| Week 12 | April 2 ,2018 | | April 7 , 2018 | Emerging technologies in agro industries: production of vermiculture, composting, herbicides and biopesticides, production of biofertilizers: |
| Week 13 | April 9 ,2018 | | April 14 , 2018 | Emerging technologies in agro industries: production of vermiculture, composting, |
| Week 14 | April 16 ,2018 | | April 21 , 2018 | herbicides and biopesticides, production of biofertilizers: |
| Week 15 | April 23 ,2018 | | April 28 , 2018 | Blue green algae, azolla, fungi, mycorrhiza (VAM), bacteria – *Azospirrilum*, microbial biotransformations, |
| Week 16 | April 30 ,2018 | | May 5, 2018 | single cell proteins (bacterial,  fungal and algal). |

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

**Teaching Plan Session Even Semester**

**(2017-18)**

**Class: B.Sc. Biotech. (Elective) 6th Sem. Name of the Teacher: SUMIT DABHI**

**Subject: Biotechnology Period : I (MON TO SAT)**

**Paper: Environmental & Fermentation Room No : 222**

**Biotechnology**

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| **S. No** | **Date From** | **Date Upto** | **Topics to be covered** |
| Week 1 | Jan 08,2018 | Jan 13, 2018 | Isolation and screening of microbes of industrial importance, Preservation of  Microbes. |
| Week 2 | Jan 15,2018 | Jan 20,2018 | Strain Improvement : mutations and genetic manipulations. Metabolites: Primary and secondary metabolic designs (expansion of substrate  spectrum, product yield). |
| Week 3 | Jan 22,2018 | Jan 27,2018 | Introduction to fermentation processes: Inoculum development for industrialfermentation. |
| Week 4 | Jan 29,2018 | Feb 03,2018 | Substrates for fermentation media.  Sterilization: Principles and practices; |
| Week 5 | Feb 5, 2018 | Feb 10, 2018 | fermenters and their accessories,  Types of industrial fermentations: Submerged, surface, continuous, bubble,cap bed batch etc. |
| Week 6 | Feb 12, 2018 | Feb 18, 2018 | Fermentation equipment: Design of fermenters, tank construction materials, control panels, Antifoams, autoclaving. |
| Week 7 | Feb 19, 2018 | Feb 24, 2018 | Energetics of microbial growth in fermenters: Reaction rates, heat and mass transfer, transport phenomenon in reactors, macroscopic balances of energy and energy flow. |
| Week 8 | Feb 26, 2018 | Mar 03, 2018 | Upstream and downstream processing of industrial fermentations: Cell  disruption, centrifugation, flocculation, filtration, ultrafiltration, ultra- centrifugation,gel filtration, chromatographic methods, and two phase aqueous separations. |
| **2nd Week March (Mid Semester Exam)** | | | |
| Week 9 | March 12, 2018 | March 17, 2018 | Immobilization of cells and enzymes.  Hygeine and safety in fermentation laboratory. |
| Week 10 | March19, 2018 | March 24, 2018 | Introduction to Environment.  Renewable and Non Renewable resources. Conventional Fuels and their  Environmental Impacts. Modern Fuels and their Environmental Impacts. |
| Week 11 | March 26, 2018 | March 31, 2018 | Methanogenic bacteria and biogas, microbial hydrogen production, conversion of sugars to ethanol. |
| Week 12 | April 2 ,2018 | April 7 , 2018 | The gasohol experiment, solar energy, converters – Hopes from the  Photosynthetic pigments. |
| Week 13 | April 9 ,2018 | April 14 , 2018 | Treatment of municipal waste and industrial effluents. |
| Week 14 | April 16 ,2018 | April 21 , 2018 | Degradation of pesticides and toxic organic compounds by microorganism.  BT toxin as a natural pesticide. |
| Week 15 | April 23 ,2018 | April 28 , 2018 | Biological control of other insects swarming the agricultural fields.  Enrichment of ores by microorganisms. |
| Week 16 | April 30 ,2018 | May 5, 2018 | Biofertilizers – Nitrogen fixing micro- organisms (types and mode of action) |