

# **Post Graduate Govt.College for Girls,Sec-42,Chandigarh**

**Session: 2015-16**

**Dr. SUNITA KUMARI**

**Class: BIOTECH (HONS)-III YEAR**

**Subject: ANIMAL TISSUE CULTURE AND BIOTECHNOLOGY\***

<b>S. No</b>	<b>Date From</b>	<b>Date Upto</b>	<b>Topics to be covered</b>
Week 1	16 <sup>th</sup> july, 2015	18 <sup>th</sup> july, 2015	History of development of cell cultures, the natural surroundings for animal cells,
Week 2	20 <sup>th</sup> july, 2015	25 <sup>th</sup> july, 2015	stimulating natural conditions for animal cells metabolic capabilities of animal cells,
Week 3	27 <sup>th</sup> july, 2015	1 <sup>st</sup> Aug, 2015	Animal cell culture Techniques: Dispersion and disruption of tissues; ,
Week 4	3 <sup>th</sup> Aug, 2015	8 <sup>th</sup> Aug, 2015	Primary cultures, anchorage and non- anchorage dependent cells, secondary culture
Week 5	10 <sup>th</sup> Aug, 2015	15 <sup>th</sup> Aug, 2015	transformed animal cells, established/ continuous cell lines ,
Week 6	17 <sup>th</sup> Aug, 2015	22 <sup>nd</sup> Aug, 2015	measurement of growth and viability of cells in culture,
Week 7	24 <sup>st</sup> Aug, 2015	29 <sup>th</sup> Aug, 2015	tissue culture media: Components their importance serum free media, , organ culture
Week 8	31 <sup>st</sup> Aug, 2015	5 <sup>th</sup> Sept, 2015	Cell lines availability, commonly used animal cell lines, their origin and characteristic,
Week 9	7 <sup>th</sup> Sept, 2015	12 <sup>th</sup> Sept, 2015	growth kinetics of cells in culture, differentiation of cells

Week 10	14 <sup>th</sup> Sept, 2015	19 <sup>th</sup> Sept, 2015	Expressing cloned protein genes in animal cell cultures.,
Week 11	21 <sup>st</sup> Sept, 2015	26 <sup>th</sup> Oct, 2015	Cytotoxicity assays & their applications
Week 12	28 <sup>th</sup> Sept, 2015	3 <sup>rd</sup> Oct, 2015	Applications of animal cell culture: Cell fusion and production of monoclonal antibodies
Week 13	5 <sup>th</sup> Oct, 2015	10 <sup>th</sup> Oct, 2015	Scale up methods for propagation of anchorage dependent and suspension cell culture
Week 14	12 <sup>th</sup> Oct, 2015	17 <sup>th</sup> Oct, 2015	Bioreactors for large scale culture of cells
Week 15	19 <sup>th</sup> Oct, 2015	24 <sup>th</sup> Oct, 2015	Micro carrier culture

**\*4 classes per week**

**Class: BIOTECH (HONS)-III SEM**

**Subject: IMMUNOLOGY-I\***

S. No	Date From	Date Upto	Topics to be covered
Week 1	16 <sup>th</sup> july, 2015	18 <sup>th</sup> july, 2015	<b>Introduction</b> i) Overviews of immune system – Historical perspectives ii) Innate and acquired immunity
Week 2	20 <sup>th</sup> july, 2015	25 <sup>th</sup> july, 2015	Clonal nature of immune response. <b>Cells of the immune system</b> : Hematopoiesis and differentiation
Week 3	27 <sup>th</sup> july, 2015	1 <sup>st</sup> Aug, 2015	lymphocyte trafficking, B-lymphocytes, T-lymphocytes, macrophages, dendritic cells, Natural killer cells and lymphocyte activated killer cells, eosinophils, neutrophils & mast cells

Week 4	3 <sup>th</sup> Aug, 2015	8 <sup>th</sup> Aug, 2015	<b>Organs of the immune system :</b> Primary and secondary lymphoid organs,
Week 5	10 <sup>th</sup> Aug, 2015	15 <sup>th</sup> Aug, 2015	Systemic function of immune system <b>Lymphocyte Trafficking:</b> Cell surface proteins, Cell Adhesion molecules ( Integrin, Selectin, Cadherin family and Ig Superfamily).
Week 6	17 <sup>th</sup> Aug, 2015	22 <sup>nd</sup> Aug, 2015	<b>Antigen</b> – Immunogenicity Vs. antigenicity, factors effecting immunogeneticity, nature of immunogen,
Week 7	24 <sup>st</sup> Aug, 2015	29 <sup>th</sup> Aug, 2015	epitopes, heptans and antigenicity, pattern recognition receptors
Week 8	31 <sup>st</sup> Aug, 2015	5 <sup>th</sup> Sept, 2015	<b>Immunoglobulins:</b> Structure of antibody, antibody effector function
Week 9	7 <sup>th</sup> Sept, 2015	12 <sup>th</sup> Sept, 2015	antibody classes and biological activities, antigenic determinants on Immunoglobulins,
Week 10	14 <sup>th</sup> Sept, 2015	19 <sup>th</sup> Sept, 2015	Immunoglobulins superfamilies. <b>Major histocompatibility complex:</b> General organization and inheritance
Week 11	21 <sup>st</sup> Sept, 2015	26 <sup>th</sup> Oct, 2015	cellular distribution, regulation of MHC expression and disease susceptibility
Week 12	28 <sup>th</sup> Sept, 2015	3 <sup>rd</sup> Oct, 2015	antigen presentation
Week 13	5 <sup>th</sup> Oct, 2015	10 <sup>th</sup> Oct, 2015	<b>Hybridoma Technology:</b> Production of Monoclonal Antibodies
Week 14	12 <sup>th</sup> Oct, 2015	17 <sup>th</sup> Oct, 2015	Production of POLYclonal Antibodies.

Week 15	19 <sup>th</sup> Oct, 2015	24 <sup>th</sup> Oct, 2015	applications of polyclonal and monoclonal antibodies
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**\*4 classes per week**

**Class: BIOTECH (HONS)-III SEM**  
**Subject: ANIMAL CELL CULTURE \***

S. No	Date From	Date Upto	Topics to be covered
Week 1	16 <sup>th</sup> july, 2015	18 <sup>th</sup> july, 2015	History of development of cell cultures,
Week 2	20 <sup>th</sup> july, 2015	25 <sup>th</sup> july, 2015	natural surroundings for animal cells
Week 3	27 <sup>th</sup> july, 2015	1 <sup>st</sup> Aug, 2015	simulating natural conditions for animal cells, metabolic capabilities of animal cells
Week 4	3 <sup>th</sup> Aug, 2015	8 <sup>th</sup> Aug, 2015	Biology of cultured cells : The culture environment
Week 5	10 <sup>th</sup> Aug, 2015	15 <sup>th</sup> Aug, 2015	cell adhesion, proliferation,
Week 6	17 <sup>th</sup> Aug, 2015	22 <sup>nd</sup> Aug, 2015	differentiation,signaling, evolution of cell lines
Week 7	24 <sup>st</sup> Aug, 2015	29 <sup>th</sup> Aug, 2015	Equipments and materials for animal cell culture technology
Week 8	31 <sup>st</sup> Aug, 2015	5 <sup>th</sup> Sept, 2015	Animal cell culture Techniques: Dispersion and disruption of tissues
Week 9	7 <sup>th</sup> Sept, 2015	12 <sup>th</sup> Sept, 2015	Animal cell culture Techniques: Dispersion and disruption of tissues

Week 10	14 <sup>th</sup> Sept, 2015	19 <sup>th</sup> Sept, 2015	primary cultures, anchorage and non-anchorage dependent cells;
Week 11	21 <sup>st</sup> Sept, 2015	26 <sup>th</sup> Oct, 2015	secondary culture ,transformed animal cells
Week 12	28 <sup>th</sup> Sept, 2015	3 <sup>rd</sup> Oct, 2015	Established/continuous cell lines, commonly used animal cell lines
Week 13	5 <sup>th</sup> Oct, 2015	10 <sup>th</sup> Oct, 2015	Their origin and characteristics
Week 14	12 <sup>th</sup> Oct, 2015	17 <sup>th</sup> Oct, 2015	Maintenance and growth kinetics of cells in culture
Week 15	19 <sup>th</sup> Oct, 2015	24 <sup>th</sup> Oct, 2015	differentiation of cells,

**\*1 class per week**

**Class: M.Sc. MICROBIAL BIOTECHNOLOGY- SEM -I**

**Subject: Immunology and Immunotechnology\***

<b>S. No</b>	<b>Date From</b>	<b>Date Upto</b>	<b>Topics to be covered</b>
Week 1	16 <sup>th</sup> july, 2015	18 <sup>th</sup> july, 2015	Immune cells,
Week 2	20 <sup>th</sup> july, 2015	25 <sup>th</sup> july, 2015	immune organs
Week 3	27 <sup>th</sup> july, 2015	1 <sup>st</sup> Aug, 2015	adaptive and innate immunity
Week 4	3 <sup>th</sup> Aug, 2015	8 <sup>th</sup> Aug, 2015	B cell biology: Development, selection,
Week 5	10 <sup>th</sup> Aug, 2015	15 <sup>th</sup> Aug, 2015	B cells as central players of humoral

			immunity
Week 6	17 <sup>th</sup> Aug, 2015	22 <sup>nd</sup> Aug, 2015	T cell biology: Development, thymic education
Week 7	24 <sup>th</sup> Aug, 2015	29 <sup>th</sup> Aug, 2015	TCR rearrangement
Week 8	31 <sup>st</sup> Aug, 2015	5 <sup>th</sup> Sept, 2015	basic functions of cells during immune response
Week 9	7 <sup>th</sup> Sept, 2015	12 <sup>th</sup> Sept, 2015	T cells subsets
Week 10	14 <sup>th</sup> Sept, 2015	19 <sup>th</sup> Sept, 2015	Immunoglobulins: Structure and functions of Immunoglobulins
Week 11	21 <sup>st</sup> Sept, 2015	26 <sup>th</sup> Oct, 2015	Immunoglobulin rearrangement
Week 12	28 <sup>th</sup> Sept, 2015	3 <sup>rd</sup> Oct, 2015	molecular genetics of BCR generation
Week 13	5 <sup>th</sup> Oct, 2015	10 <sup>th</sup> Oct, 2015	Antigens, haptens, adjuvants
Week 14	12 <sup>th</sup> Oct, 2015	17 <sup>th</sup> Oct, 2015	Tolerance and autoimmunity
Week 15	19 <sup>th</sup> Oct, 2015	24 <sup>th</sup> Oct, 2015	allergy and hypersensitivity-mediated diseases.

**\*2 classes per week**

## DR. RACHANA RANA

**Class: B.Sc. BTH Sem III**

**Subject: Plant Tissue Culture**

S.No	Week (Start Date)	Topics to be covered during the week
Week 1	20 July, 2015 to 25 <sup>th</sup> July, 2015	Cellular totipotency and differentiation. Plant culture media and their composition
Week 2	27 <sup>th</sup> July, 2015 to 1 <sup>st</sup> Aug, 2015	Sterilization techniques for glassware and tissue culture media.
Week 3	3 <sup>rd</sup> Aug, 2015 to 8 <sup>th</sup> Aug, 2015	Micropropagation: Establishment of aseptic culture, various stages, advantages and disadvantages,
Week 4	10 <sup>th</sup> Aug 2015 to 15 <sup>th</sup> Aug, 2015	Somatic embryogenesis
Week 5	17 <sup>th</sup> Aug 2015 to 22 <sup>nd</sup> Aug, 2015	Somaclonal variation, its genetic basis and application in crop improvement.
Week 6	24 <sup>th</sup> Aug, 2015 to 29 <sup>th</sup> Aug, 2015	Cell/callus line selection for resistance to herbicide, stress and diseases.
Week 7	31 Aug, 2015 to 5 <sup>th</sup> Sept, 2015	Role of tissue culture in rapid clonal propagation
Week8	7 <sup>th</sup> Sept, 2015 to 12 <sup>th</sup> Sept, 2015	Production of pathogen - free plants and "synthetic seeds"
Week9	14 <sup>th</sup> Sept,2015 to 19 <sup>th</sup> Sept, 2015	Haploid and triploid plant production and their application
Week10	21 <sup>st</sup> Sept 2015 to 26 <sup>th</sup> Sept, 2015	Protoplast technology: Isolation, culture and plant regeneration, protoplast fusion,
Week11	28 <sup>th</sup> Sept 2015 to 3 <sup>rd</sup> Oct, 2015	Identification and characterization of somatic hybrids, applications of protoplast technology.
Week12	5 <sup>th</sup> Oct,2015 to 10 <sup>th</sup> Oct, 2015.	Secondary metabolites

Week 13	12 <sup>th</sup> Oct, 2015 to 17 <sup>th</sup> Oct, 2015.	Cryopreservation and conservation of plants
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**Class:** B.Sc. BTH III yr    **Subject:** Genomics & Proteomics

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S.No	Week (Start Date)	Topics to be covered during the week
Week 1	20 July, 2015 to 25 <sup>th</sup> July, 2015	Model organisms and genome size.
Week 2	27 <sup>th</sup> July, 2015 to 1 <sup>st</sup> Aug, 2015	Unicellular and multicellular genome: Lessons learned sequencing of genomes.
Week 3	3 <sup>rd</sup> Aug, 2015 to 8 <sup>th</sup> Aug, 2015	Evolution of genome..
Week 4	10 <sup>th</sup> Aug 2015 to 15 <sup>th</sup> Aug, 2015	Genome identification
Week 5	17 <sup>th</sup> Aug 2015 to 22 <sup>nd</sup> Aug, 2015	Mapping of genome
Week 6	24 <sup>th</sup> Aug, 2015 to 29 <sup>th</sup> Aug, 2015	Construction of genomic libraries, vectors
Week 7	31 Aug, 2015 to 5 <sup>th</sup> Sept, 2015	Mapping strategies - genetic maps, physical maps
Week 8	7 <sup>th</sup> Sept, 2015 to 12 <sup>th</sup> Sept, 2015	Cytological maps, comparative maps
Week 9	14 <sup>th</sup> Sept, 2015 to 19 <sup>th</sup> Sept, 2015	FISH, Radiation hybrid mapping, Finger printing
Week 10	21 <sup>st</sup> Sept 2015 to 26 <sup>th</sup> Sept, 2015	cDNA library construction and screening Methods development



Week11	28 <sup>th</sup> Sept 2015 to 3 <sup>rd</sup> Oct, 2015	Justification for subtraction, normalization and fingerprinting;
Week12	5 <sup>th</sup> Oct, 2015 to 10 <sup>th</sup> Oct, 2015.	Identification of cDNA's encoding rare messages
Week 13	12 <sup>th</sup> Oct, 2015 to 17 <sup>th</sup> Oct, 2015.	EST projects and their utility in research

\* Two lectures per week

**Class:** B.Sc. Biotech Elective I sem      **Subject:**      **Introduction to Biotechnology**

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S.No	Week (Start Date)	Topics to be covered during the week
Week 1	20 July, 2015 to 25 <sup>th</sup> July, 2015	<b>General Introduction:</b> Origin and Definition of biotechnology,
Week 2	27 <sup>th</sup> July, 2015 to 1 <sup>st</sup> Aug, 2015	History from Biology to Biotechnology.
Week 3	3 <sup>rd</sup> Aug, 2015 to 8 <sup>th</sup> Aug, 2015	<b>Scope and importance:</b> Emergence of Modern Biotechnology and its promises in agriculture, medicine and environmental sciences,
Week 4	10 <sup>th</sup> Aug 2015 to 15 <sup>th</sup> Aug, 2015	Genome identification Red, white, Green and Blue biotechnology.
Week 5	17 <sup>th</sup> Aug 2015 to 22 <sup>nd</sup> Aug, 2015	<b>Biotechnology in India:</b> Various Centres of Biotechnology in India, their objectives and achievements.
Week 6	24 <sup>th</sup> Aug, 2015 to 29 <sup>th</sup> Aug, 2015	<b>Regulatory issues in Biotechnology:</b> Biosafety in developed & developing countries
Week 7	31 Aug, 2015 to 5 <sup>th</sup> Sept, 2015	Biosafety levels, Protocols ,

Week8	7 <sup>th</sup> Sept, 2015 to 12 <sup>th</sup> Sept, 2015	Benefits and Risks, Risk assessment and regulatory mechanism.
Week9	14 <sup>th</sup> Sept,2015 to 19 <sup>th</sup> Sept, 2015	Good Laboratory Practices
Week10	21 <sup>st</sup> Sept 2015 to 26 <sup>th</sup> Sept, 2015	Basic Techniques in Biotechnology
Week11	28 <sup>th</sup> Sept 2015 to 3 <sup>rd</sup> Oct, 2015	Sterilization techniques used in Biotechnology, Sonication.
Week12	5 <sup>th</sup> Oct,2015 to 10 <sup>th</sup> Oct, 2015.	<b>Microscopy:</b> Principle, & working of various microscopes ---- bright field
Week 13	12 <sup>th</sup> Oct,2015 to 17 <sup>h</sup> Oct, 2015.	Phase contrast,fluorescent)

\* Two lectures per week

**Class:** M.Sc. Microbial Biotech

**Subject:** Genetics and r DNA Technology\*

S.No	Week (Start Date)	Topics to be covered during the week
Week 1	20 July, 2015 to 25 <sup>th</sup> July, 2015	Mendelian principles, Concept of allele, Multiple alleles
Week 2	27 <sup>th</sup> July, 2015 to 1 <sup>st</sup> Aug, 2015	Pseudoalleles, co-dominance, incomplete dominance
Week 3	3 <sup>rd</sup> Aug, 2015 to 8 <sup>th</sup> Aug, 2015	Gene interactions, pleiotropy, linkage, crossing over
Week 4	10 <sup>th</sup> Aug 2015 to 15 <sup>th</sup> Aug, 2015	Sex linkage, sex influenced characters.
Week 5	17 <sup>th</sup> Aug 2015 to 22 <sup>nd</sup> Aug, 2015	Significance of genetic recombination , Transformation
Week 6	24 <sup>th</sup> Aug, 2015 to 29 <sup>th</sup> Aug, 2015	Conjugation
Week 7	31 Aug, 2015 to 5 <sup>th</sup> Sept, 2015	Transduction

Week8	7 <sup>th</sup> Sept, 2015 to 12 <sup>th</sup> Sept, 2015	Heterologous genetic recombination (IS)
Week9	14 <sup>th</sup> Sept,2015 to 19 <sup>th</sup> Sept, 2015	Heterologous genetic recombination (IS,Tn)
Week10	21 <sup>st</sup> Sept 2015 to 26 <sup>th</sup> Sept, 2015	Heterologous genetic recombination (Tn)
Week11	28 <sup>th</sup> Sept 2015 to 3 <sup>rd</sup> Oct, 2015	Heterologous genetic recombination (Mu phage)
Week12	5 <sup>th</sup> Oct,2015 to 10 <sup>th</sup> Oct, 2015.	Mutations
Week 13	12 <sup>th</sup> Oct,2015 to 17 <sup>h</sup> Oct, 2015.	Fluctuation test, Replica plating

\* Two lectures per week

## DR. RUCHI SHARMA

**CLASS: BIOTECH (HONS)-I    SUBJECT: Introduction To Biotechnology\***

<b>S.No</b>	<b>Date From</b>	<b>Date Upto</b>	<b>Topics to be covered</b>
Week 1	16 July	18 July	Prokaryotic and Eukaryotic cells
Week 2	20 July	25 July	Structure and function of the cell: the basic unit of life
Week 3	27 July	1 August	Structure and function of the cell: the basic unit of life
Week 4	3 August	8 August	Structure and function of the cell: the basic unit of life
Week 5	10 August	15 August	Structure and function of the cell: the basic unit of life
Week 6	17 August	22 August	Structure and function of the cell: the basic unit of life

Week 7	24 August	29 August	Applications of biotechnology: today and tomorrow
Week 8	31 August	5 September	Basics of Biotechnology in fermentation and pharmaceutical processes.
Week 9	7 September	12 September	Green technology to control pollution.
Week 10	14 September	19 September	Role of biotechnology in diagnostics, introduction to gene therapy.
Week 11	21 September	26 September	Biotechnology and society: genetically modified organisms (GMOs) - transgenic plants and animals and their applications in biotechnology.
Week 12	28 September	3 October	Biotechnology and society: genetically modified organisms (GMOs) - transgenic plants and animals and their applications in biotechnology.
Week 13	5 October	10 October	Public concerns and risks associated with genetic engineering: Bioterrorism and biowarfare.
Week 14	12 October	17 October	Public concerns and risks associated with genetic engineering: Bioterrorism and biowarfare.
Week 15	19 October	21 October	Ethical, social and legal implications of biotechnology.

**\*2 classes per week**

**CLASS: BIOTECH (HONS)-II SUBJECT: Biochemistry\***

S.No	Date From	Date Upto	Topics to be covered
Week 1	16 July	18 July	Carbohydrate metabolism: Biosynthesis and degradation of glucose; feeder pathways of glycolysis
Week 2	20 July	25 July	Kreb cycle, amphibolic nature of the Kreb's cycle
Week 3	27 July	1 August	regulation of Krebs cycle, regulation of gluconeogenesis. Glycogen metabolism.

Week 4	3 August	8 August	Mitochondrial electron transport chain
Week 5	10 August	15 August	oxidative phosphorylation; regulation of ATP synthesis.
Week 6	17 August	22 August	Lipid Metabolism: Biosynthesis and degradation of fatty acids;
Week 7	24 August	29 August	$\beta$ oxidation of saturated, unsaturated and polyunsaturated fatty acids. Formation of ketone bodies, their function and physiological significance.
Week 8	31 August	5 September	Fatty acid synthesis: multifunctional enzyme complex in eukaryotes, function of citrate. Regulation of fatty acid metabolism.
Week 9	7 September	12 September	Cholesterol metabolism: Biosynthesis of cholesterol and its regulation.
Week 10	14 September	19 September	Amino acid metabolism: Biosynthesis of nutritionally non-essential amino acids
Week 11	21 September	26 September	catabolism of carbon skeleton of amino acids.
Week 12	28 September	3 October	Conversion of amino acids to specialized products; amino acids as precursors of porphyrins, bile pigments and biogenic amines.
Week 13	5 October	10 October	amino acids as precursors of porphyrins, bile pigments and biogenic amines
Week 14	12 October	17 October	Nucleic acid metabolism: Biosynthesis of purine and pyrimidine nucleotides; salvage reactions.
Week 15	19 October	21 October	Catabolism of purines and pyrimidines, urea cycle.

**\*4 classes per week**

**CLASS: BIOTECH (HONS)-III    SUBJECT: Food Biotechnology\***

S.No	Date From	Date Upto	Topics to be covered
Week 1	16 July	18 July	Composition of food, food as substrates for microbes

			(intrinsic and extrinsic factors)
Week 2	20 July	25 July	Composition of food, food as substrates for microbes (intrinsic and extrinsic factors)
Week 3	27 July	1 August	factors affecting growth of microorganisms
Week 4	3 August	8 August	role of microbes in the production of new proteins
Week 5	10 August	15 August	food SCP-mushroom, food yeast's, algal proteins
Week 6	17 August	22 August	applications of enzymes in food processing
Week 7	24 August	29 August	Fermented foods: Bread, cocoa, coffee, tea, cheese, yoghurt
Week 8	31 August	5 September	Fermented foods: meat
Week 9	7 September	12 September	Fermented foods: alcoholic beverages
Week 10	14 September	19 September	Biotechnology and future foods (Golden rice, potato)
Week 11	21 September	26 September	Probiotics, biofortified foods, fortified foods
Week 12	28 September	3 October	functional foods, nutraceuticals, organic foods
Week 13	5 October	10 October	Major food adulterants, types and their methods of assay
Week 14	12 October	17 October	food additives their function and uses, flavoring agents, coloring agents
Week 15	19 October	21 October	vitamins as food additives

**\*3 classes per week**

**CLASS: M.Sc MBT-I (semester –I) SUBJECT: Microbial Biochem & Enzymology\***

S.No	Date From	Date Upto	Topics to be covered
Week 1	16 July	18 July	Structure and functions of Carbohydrates
Week 2	20 July	25 July	Structure and functions of Proteins, Macromolecular interactions: van-der waal's, hydrogen bonding, ionic, hydrophobic, covalent etc.
Week 3	27 July	1 August	Conformation of proteins (secondary, tertiary and quaternary structure; domains; motifs and folds; Ramachandran plot)
Week 4	3 August	8 August	Structure and functions of Nucleotides, DNA, RNA
Week 5	10 August	15 August	Structure and functions of lipids

Week 6	17 August	22 August	Structure and functions of Vitamins
Week 7	24 August	29 August	Buffers and physiological buffers.
Week 8	31 August	5 September	Thermodynamics and Principles of thermodynamics, free energy, enthalpy and entropy
Week 9	7 September	12 September	Metabolism of protein
Week 10	14 September	19 September	Fate of carbon skeletons of amino acids
Week 11	21 September	26 September	Fate of carbon skeletons of amino acids
Week 12	28 September	3 October	Fate of carbon skeletons of amino acids
Week 13	5 October	10 October	Regulation of amino acid biosynthesis
Week 14	12 October	17 October	Digestion of proteins, General reactions of amino acids
Week 15	19 October	21 October	Digestion of proteins, General reactions of amino acids

**\*2 classes per week**

## **DR. VIKAS SHARMA**

**Subject: Intro to Genomics ,Proteomics & Genetic Engg , Immunotech**

**Class: BSc-BIF-3**

<b>S. No</b>	<b>Date From</b>	<b>Date Upto</b>	<b>Topics to be covered</b>
Week 1	20 <sup>th</sup> July	25 <sup>th</sup> July	Transformation , Transfection
Week 2	27 <sup>th</sup> July	1 <sup>st</sup> Aug	Preperation of Genomic Library, Screening of Gene Library
Week 3	3 <sup>rd</sup> Aug	8 <sup>th</sup> Aug	Non –Vectoral Transformation
Week 4	10 <sup>th</sup> Aug	15 <sup>th</sup> Aug	Scope of rDNA technology
Week 5	17 <sup>th</sup> Aug	22 <sup>nd</sup> Aug	Purification of DNA from bacterial, plant sources
Week 6	24 <sup>th</sup> Aug	29 <sup>th</sup> Aug	Cloning and Expression vectors
Week 7	31 <sup>st</sup> Aug	5 <sup>th</sup> Sept	DNA Sequencing methods

Week 8	7 <sup>th</sup> Sept	12 <sup>th</sup> Sept	HGP Annotation, Repeats, SNPs
Week 9	14 <sup>th</sup> Sept	19 <sup>th</sup> Sept	Proteins Chemical Properties
Week 10 (including mid term)	21 <sup>st</sup> Sept	3 <sup>rd</sup> Oct	Intro to Proteomics, 2D -PAGE
Week 11	5 <sup>th</sup> Oct	10 <sup>th</sup> Oct	Mass Spectrometry
Week 12	12 <sup>th</sup> Oct	21 <sup>st</sup> Oct	Mass Spectrometry

**Subject: Tools in Bioinformatics**

**Class: BSc-BTH-3**

S. No	Date From	Date Upto	Topics to be covered
Week 1	20 <sup>th</sup> July	25 <sup>th</sup> July	Introduction to Bioinformatics
Week 2	27 <sup>th</sup> July	1 <sup>st</sup> Aug	Bioinformatics Technology
Week 3	3 <sup>rd</sup> Aug	8 <sup>th</sup> Aug	SRS, Entrez
Week 4	10 <sup>th</sup> Aug	15 <sup>th</sup> Aug	PDB
Week 5	17 <sup>th</sup> Aug	22 <sup>nd</sup> Aug	Bioinformatics Databases
Week 6	24 <sup>th</sup> Aug	29 <sup>th</sup> Aug	BLAST Algorithm, NWA, SWA
Week 7	31 <sup>st</sup> Aug	5 <sup>th</sup> Sept	PAM , BLOSUM
Week 8	7 <sup>th</sup> Sept	12 <sup>th</sup> Sept	Consensus Sequences, Log Odd ratio
Week 9	14 <sup>th</sup> Sept	19 <sup>th</sup> Sept	Phylogenetic Analysis



Week 10 (including mid term)	21 <sup>st</sup> Sept	3 <sup>rd</sup> Oct	Phylogenetic Analysis
Week 11	5 <sup>th</sup> Oct	10 <sup>th</sup> Oct	Methods of Gene Identification, Genome Annotation
Week 12	12 <sup>th</sup> Oct	21 <sup>st</sup> Oct	Methods of Gene Identification, Genome Annotation

### **Subject: Sequence Analysis & Fundamental of Mol Bio-1**

#### **Class: BSc-BIF-3**

<b>S. No</b>	<b>Date From</b>	<b>Date Upto</b>	<b>Topics to be covered</b>
Week 1	20 <sup>th</sup> July	25 <sup>th</sup> July	Global and Local alignment
Week 2	27 <sup>th</sup> July	1 <sup>st</sup> Aug	Blast Algorithm , Clustal W
Week 3	3 <sup>rd</sup> Aug	8 <sup>th</sup> Aug	Gap Penalty , Extended Gap Penalty
Week 4	10 <sup>th</sup> Aug	15 <sup>th</sup> Aug	Phylogenetic analysis
Week 5	17 <sup>th</sup> Aug	22 <sup>nd</sup> Aug	Bootstrapping, Phylip
Week 6	24 <sup>th</sup> Aug	29 <sup>th</sup> Aug	Lac Operon, Trp Operon
Week 7	31 <sup>st</sup> Aug	5 <sup>th</sup> Sept	RNA Polymerases
Week 8	7 <sup>th</sup> Sept	12 <sup>th</sup> Sept	DNA Repair
Week 9	14 <sup>th</sup> Sept	19 <sup>th</sup> Sept	Properties of DNA polymerases
Week 10 (including mid term)	21 <sup>st</sup> Sept	3 <sup>rd</sup> Oct	Properties of DNA polymerases

Week 11	5 <sup>th</sup> Oct	10 <sup>th</sup> Oct	Eukaryotic Gene Expression
Week 12	12 <sup>th</sup> Oct	21 <sup>st</sup> Oct	Structure of Eukaryotic , Prokaryotic genes

## DR. SMITA

**Class: B.TH 1<sup>ST</sup> SEM    Subject: INTRO. TO BIOTECHNOLOGY**

S.No.	Date From	Date Up to	Topic to be covered
Week 1	22/07/15	2/07/15	Basics of biotechnology
Week 2	27/07/15	01/08/15	Restriction enzymes
Week 3	03/08/15	08/08/15	Vectors and its properties
Week 4	10/08/15	15/08/15	Introduction to genomics
Week 5	17/08/12	22/08/15	Comparative genomics and Model organisms: drosophila, C. elegans
Week 6	24/08/15	29/08/15	Danio rerio, musmusculus. Arabidopsis as model for plant genetics
Week 7	31/08/15	05/09/15	Transcriptomics
Week 8	07/09/15	12/09/15	Proteomics
Week 9	14/09/15	19/09/15	Metabolomics

Week 10	21/09/15	26/09/15	Bioinformatics and its role in biotechnology
Week11	27/09/15	03/10/15	Bioinformatics and its role in biotechnology
Week 12	05/10/15	10/10/15	Role of viruses and Bacteriophages in biotechnology
Week 15	12/10/15	17/10/15	Role of yeast and fungi in the biotechnology
Week 14	19/10/15	24/10/15	Bacteria as a workhorses of biotechnology; e.coli as a model bacterium

**Class: B.TH 3<sup>RD</sup> SEM      Subject: GENTICS**

S.No.	Date From	Date Up to	Topic to be covered
Week 1	22/07/15	2/07/15	Mendelian laws of inheritance
Week 2	27/07/15	01/08/15	Sex determination in drosophila, man and plants; Sex linkage; Sex linked inheritance;
Week 3	03/08/15	08/08/15	Gene interaction; crossing over : cytological proof
Week 4	10/08/15	15/08/15	Crossing over and its molecular mechanism,
Week 5	17/08/12	22/08/15	Gene mapping by three point test crosses
Week 6	24/08/15	29/08/15	Mapping by tetrad analysis; Somatic cell hybridization for gene linkage studies

Week 7	31/08/15	05/09/15	Hereditary defects; non disjunction as a proof of chromosomal theory of inheritance; numerical chromosome aberrations: polyploidy , aneuploidy
Week 8	07/09/15	12/09/15	Structural chromosome aberrations: duplication, inversion translocation ; position effects
Week 9	14/09/15	19/09/15	Mutations: types, mutagenic agents: physical chemical and radiation
Week 10	21/09/15	26/09/15	Molecular basis of mutations;
Week11	27/09/15	03/10/15	Mechanisms of repair systems;
Week 12	05/10/15	10/10/15	Mutation frequency and correlation between mutagenicity and carcinogenicity
Week 15	12/10/15	17/10/15	Pedigree analysis
Week 14	19/10/15	24/10/15	Population genetics:hardy Weinberg equilibrium , gene and genotypic frequencies, chi square , probability

**Class: B.TH 3<sup>RD</sup> Yr Subject: GENETIC ENGG. & RDNA TECHNOLOGY**

S.No.	Date From	Date Up to	Topic to be covered
Week 1	22/07/15	2/07/15	Introduction to gene cloning, Vectors: Cloning vectors for E. coli-
Week 2	27/07/15	01/08/15	DNA manipulative enzymes-Nucleases

Week 3	03/08/15	08/08/15	Ligases, polymerases, reverse transcriptase
Week 4	10/08/15	15/08/15	restriction enzymes and its nomenclature ; blunt and sticky ends,
Week 5	17/08/12	22/08/15	modifying enzymes , topoisomerases, linkers adapters, homopolymer tailing.
Week 6	24/08/15	29/08/15	plasmids- Basic features of plasmids, plasmid classification
Week 7	31/08/15	05/09/15	Nomenclature, pBR 322, pBR 327, pUC 8, pGEM3Z.
Week 8	07/09/15	12/09/15	Methods of identification of recombinants: Insertional inactivation, blue/white selection.
Week 9	14/09/15	19/09/15	Bacteriophages: Basic features, lytic & lysogeny, linear and circular forms of lambda vector,
Week 10	21/09/15	26/09/15	phage and its vector,insertion and replacement vectors; .
Week11	27/09/15	03/10/15	identification of recombinant phages, cosmid, phagemid
Week 12	05/10/15	10/10/15	Bacterial Artificial Chromosomes (BACs), shuttle vectors
Week 15	12/10/15	17/10/15	Cloning vectors for yeast and fungi, YE <sub>p</sub> , YI <sub>p</sub> , YR <sub>p</sub> ,
Week 14	19/10/15	24/10/15	artificial chromosomes, YAC, application of YAC, identification of a recombinants from a gene library,

## SUMIT DABHI

**Class: B.Sc. 3<sup>rd</sup> Year(E),    Subject: Biotechnology**

S.No.	Date From	Date Up to	Topics to be covered during the week
Week 1	20 July	25 July	Introduction & History of Plant tissue culture, Culture Media & its type.
Week 2	27 July	1 Aug.	Seed Culture, Endosperm Culture, Embryo Culture
Week 3	3 Aug.	8 Aug.	Micropropagation, somatic embryogenesis & organogenesis, Somaclonal variation
Week 4	10 Aug.	14Aug.	Haploid culture & its applications. Protoplast isolation, methods, testing their viability & regeneration, various methods of fusion: somatic hybridization & their applications.
Week 5	17 Aug.	22 Aug.	Direct and indirect transformation of plants. Tumor formation in plant using <i>Agrobacterium tumefaciens</i> .
Week 6	24 Aug.	29 Aug.	Mechanism of T-DNA transfer to plants, plasmid vectors for plant transformation.
Week 7	31Aug.	4 Sep.	Genetic manipulation of plants for virus resistance, pest resistance, herbicide tolerance, resistance to fungi and bacteria.
Week 8	7 Sept.	12 Sept.	Isolation and screening of microbes of industrial importance. Strain Improvement : mutations and genetic manipulations.
Week 9	14 Sept.	19 Sept.	Introduction to fermentation processes: Substrates for fermentation media.
Week 10	21 Sep.	26 Sep.	Fermentation equipment : Design of fermenters, tank construction materials, Control panels of fermenter

Week 11	28 Sept.	3 Oct.	Sterilization: Principles and practices; Inoculum development for industrial fermentation.
Week 12	5 Oct.	10 Oct.	Types of industrial fermentations: Submerged, surface, continuous, bubble, cap bed batch etc.
Week 13	12 Oct.	17 Oct.	Energetic of microbial growth in fermenters Immobilization of cells and enzymes.
Week 14	19 Oct.	21 Oct.	Upstream and downstream processing of industrial fermentations.

### **SIX LECTURE PER WEEK**

**Class: B.Sc. 2<sup>nd</sup> Year(E),      Subject: Biotechnology**

<b>S.No.</b>	<b>Date From</b>	<b>Date Up to</b>	<b>Topics to be covered during the week</b>
Week 1	20 July	25 July	Introduction: history and scope of r-DNA technology, Gene cloning and need to clone a gene.
Week 2	27 July	1 Aug.	DNA modifying enzyme, Restriction endonucleases, exonucleases, ligases, polymerase, kinase, alkaline phosphatase, topoisomerase etc.
Week 3	3 Aug.	8 Aug.	DNA modifying enzyme, Restriction endonucleases, exonucleases, ligases, polymerase, kinase, alkaline phosphatase, topoisomerase etc.
Week 4	10 Aug.	14 Aug.	Cloning and expression vectors
Week 5	17 Aug.	22 Aug.	Cloning vectors of E.coli

Week 6	24 Aug.	29 Aug.	Cloning vectors of E.coli
Week 7	31Aug.	4 Sep.	Cloning vectors of Yeast
Week 8	7 Sept.	12 Sept.	Cloning vectors of bacteriophage & cosmids
Week 9	14 Sept.	19 Sept.	Purification of DNA bacterial, plant and animal cells
Week 10	21 Sep.	26 Sep.	Purification of DNA bacterial, plant and animal cells
Week 11	28 Sept.	3 Oct.	Purification of DNA bacterial, plant and animal cells
Week 12	5 Oct.	10 Oct.	DNA cloning strategies: Preparation of genomic and cDNA libraries,
Week 13	12 Oct.	17 Oct.	Preparation of genomic and cDNA
Week 14	19 Oct.	21 Oct.	Transformation, transfection, electroporation

**TWO LECTURE PER WEEK**



**Class: B.Sc. 2<sup>nd</sup> Year(H), Subject: Animal cell culture**

<b>S.No.</b>	<b>Date From</b>	<b>Date Up to</b>	<b>Topics to be covered during the week</b>
Week 1	20 July	25 July	Introduction to Animal tissue culture media: serum media and serum free media
Week 2	27 July	1 Aug.	Introduction to balance salt solution and simple growth medium
Week 3	3 Aug.	8 Aug.	Brief discussion on the chemical, physical and metabolic functions of different constituents of culture medium
Week 4	10 Aug.	14Aug.	Brief discussion on the chemical, physical and metabolic functions of different constituents of culture medium
Week 5	17 Aug.	22 Aug.	Role of carbon dioxide, Role of serum and supplements
Week 6	24 Aug.	29 Aug.	Serum and protein free defined media and its application
Week 7	31Aug.	4 Sep.	Transformed animal cells & Transformation
Week 8	7 Sept.	12 Sept.	Transformed animal cells & Transformation
Week 9	14 Sept.	19 Sept.	Cryopreservation
Week 10	21 Sep.	26 Sep.	Immortalization
Week 11	28 Sept.	3 Oct.	Characterization of cell lines and their authentication

Week 12	5 Oct.	10 Oct.	Characterization of cell lines and their authentication
Week 13	12 Oct.	17 Oct.	Cell fusion and production of monoclonal antibodies
Week 14	19 Oct.	21 Oct.	Cell fusion and production of monoclonal antibodies

### **THREE LECTURE PER WEEK**

**Class M.Sc. 2<sup>nd</sup> Year(H), Subject: Bioprocess Engineering**

<b>S.No.</b>	<b>Date From</b>	<b>Date Up to</b>	<b>Topics to be covered during the week</b>
Week 1	20 July	25 July	History of Fermentation
Week 2	27 July	1 Aug.	Introduction of Fermentation processes
Week 3	3 Aug.	8 Aug.	Introduction to a bioreactor design.
Week 4	10 Aug.	14Aug.	Introduction to a bioreactor design.
Week 5	17 Aug.	22 Aug.	Introduction to a bioreactor design.
Week 6	24 Aug.	29 Aug.	Control panels of a bioreactor

Week 7	31 Aug.	4 Sep.	Control panels of a bioreactor
Week 8	7 Sept.	12 Sept.	Control panels of a bioreactor
Week 9	14 Sept.	19 Sept.	Types of bioreactors
Week 10	21 Sep.	26 Sep.	Types of bioreactors
Week 11	28 Sept.	3 Oct.	Kinetics of growth product formation and substrate utilization.
Week 12	5 Oct.	10 Oct.	Kinetics of growth product formation and substrate utilization.
Week 13	12 Oct.	17 Oct.	Fermentations and Fermentative processes like Submerged, Solid state, Batch, Fed Batch, Continuous system etc.
Week 14	19 Oct.	21 Oct.	Fermentations and Fermentative processes like Submerged, Solid state, Batch, Fed Batch, Continuous system etc.

**TWO LECTURE PER WEEK**

## SONIA CHAUHAN

**Class: B.Sc. (Hons) Biotechnology III yr      Sub: Bioprocess Engg. & Technology**

Week	Date: From	to	Topic
I	16 <sup>th</sup> July, 2015	18 <sup>th</sup> July, 2015	Fundamental principles of biochemical engineering
II	20 <sup>th</sup> July, 2015	25 <sup>th</sup> July, 2015	Sterilization of air and media sterilization,
III	27 <sup>th</sup> July, 2015	1 <sup>st</sup> Aug, 2015	design of batch sterilization process; class test
IV	3 <sup>rd</sup> Aug, 2015	8 <sup>th</sup> Aug, 2015	Del factor, sterilization cycle; class test
V	10 <sup>th</sup> Aug, 2015	15 <sup>th</sup> Aug, 2015	continuous sterilization process, sterilization of fermenters. Class test
VI	17 <sup>th</sup> Aug, 2015	22 <sup>nd</sup> Aug, 2015	Simple kinetics of microbial growth, yield coefficient, doubling time, specific growth rate.
VII	24 <sup>th</sup> Aug, 2015	29 <sup>th</sup> Aug, 2015	substrate inhibition kinetics, product inhibition kinetics; Class test
VIII	31 <sup>st</sup> Aug, 2015	5 <sup>th</sup> Sept, 2015	internal and external feed back systems,
IX	7 <sup>th</sup> Sept, 2015	12 <sup>th</sup> Sept, 2015	metabolic and Biomass productivities,
X	14 <sup>th</sup> Sept, 2015	19 <sup>th</sup> Sept, 2015	effect of temperature and pH on the product formation
XI	21 <sup>st</sup> Sept, 2015	26 <sup>th</sup> Sept, 2015	Introduction: Design of fermenter
XII	28 <sup>th</sup> Sept, 2015	3 <sup>rd</sup> Oct, 2015	Types of fermenters
XIII	5 <sup>th</sup> Oct, 2015	10 <sup>th</sup> Oct, 2015	Aseptic operation of fermenters
XIV	12 <sup>th</sup> Oct, 2015	17 <sup>th</sup> Oct, 2015	Control and measurement equipments of fermenters
XV	19 <sup>th</sup> Oct, 2015	21 <sup>st</sup> Oct, 2015	revision

**Class: M.Sc. Microbial Biotechnology I-sem      Sub: Bioprocess Engg.**

Week	Date: From	to	Topic
I	16 <sup>th</sup> July, 2015	18 <sup>th</sup> July, 2015	Introduction: USP
II	20 <sup>th</sup> July, 2015	25 <sup>th</sup> July, 2015	Inoculum development
III	27 <sup>th</sup> July, 2015	1 <sup>st</sup> Aug, 2015	Media composition

IV	3 <sup>rd</sup> Aug, 2015	8 <sup>th</sup> Aug, 2015	Sterilization
V	10 <sup>th</sup> Aug, 2015	15 <sup>th</sup> Aug, 2015	Sterilization contd.
VI	17 <sup>st</sup> Aug, 2015	22 <sup>nd</sup> Aug, 2015	Sterilization contd.
VII	24 <sup>th</sup> Aug, 2015	29 <sup>th</sup> Aug, 2015	sterilization
VIII	31 <sup>st</sup> Aug, 2015	5 <sup>th</sup> Sept, 2015	DSP: cell disruptions
IX	7 <sup>th</sup> Sept,2015	12 <sup>th</sup> Sept,2015	Flocculation, filtration,ultrafiltration
X	14 <sup>th</sup> Sept,2015	19 <sup>th</sup> Sept,2015	Centrifugation,ultracentrifugation
XI	21 <sup>st</sup> Sept,2015	26 <sup>th</sup> Sept,2015	Chromatographic methods
XII	28 <sup>th</sup> Sept,2015	3 <sup>rd</sup> Oct,2015	Two phase aqueous separations,solvent-solvent extractions
XIII	5 <sup>th</sup> Oct,2015	10 <sup>th</sup> Oct,2015	Pre-treatment, crystallization
XIV	12 <sup>th</sup> Oct,2015	17 <sup>th</sup> Oct,2015	Mass and heat transfer in bioreactors
XV	19 <sup>th</sup> Oct,2015	21 <sup>st</sup> Oct,2015	revision

**Class: M.Sc. Microbial Biotechnology III-sem      Sub: Bioinstruments & their applications**

Week	Date: From	to	Topic
I	16 <sup>th</sup> July, 2015	18 <sup>th</sup> July, 2015	Microscopy: LM,FM, phase contrast microscope,AAS
II	20 <sup>th</sup> July , 2015	25 <sup>th</sup> July, 2015	Microscopy:AFM, SCM,TEM & SEM, Tunnel microscope
III	27 <sup>th</sup> July,2015	1 <sup>st</sup> Aug, 2015	Spectrophotometer: UV and Vis
IV	3 <sup>rd</sup> Aug, 2015	8 <sup>th</sup> Aug, 2015	Mass Spectroscopy
V	10 <sup>th</sup> Aug, 2015	15 <sup>th</sup> Aug, 2015	Mass Spectroscopy
VI	17 <sup>st</sup> Aug, 2015	22 <sup>nd</sup> Aug, 2015	IR and Raman spectroscopy
VII	24 <sup>th</sup> Aug, 2015	29 <sup>th</sup> Aug, 2015	CD spectroscopy
VIII	31 <sup>st</sup> Aug, 2015	5 <sup>th</sup> Sept, 2015	NMR, ESR
IX	7 <sup>th</sup> Sept,2015	12 <sup>th</sup> Sept,2015	Chromatography: GC
X	14 <sup>th</sup> Sept,2015	19 <sup>th</sup> Sept,2015	Chromatography: Paper Ch., TLC,HPLC
XI	21 <sup>st</sup> Sept,2015	26 <sup>th</sup> Sept,2015	FPLC,GCMS,LCMS
XII	28 <sup>th</sup> Sept,2015	3 <sup>rd</sup> Oct,2015	Crystallography
XIII	5 <sup>th</sup> Oct,2015	10 <sup>th</sup> Oct,2015	X-ray Diffraction
XIV	12 <sup>th</sup> Oct,2015	17 <sup>th</sup> Oct,2015	Electron diffraction, neutron diffraction
XV	19 <sup>th</sup> Oct,2015	21 <sup>st</sup> Oct,2015	revision

## DR.HARDISH KAUR

Class: M Sc(MBT) IInd sem

Subject: Industrial Microbiology-II Paper: MBT-302

S.No	Week (Start Date)	Topics to be covered during the week
Week 1	22 <sup>nd</sup> July, 2013 to 27 <sup>th</sup> July, 2013	Waste water and effluent treatment,
Week 2	29 <sup>th</sup> Jul, 2013 to 3 <sup>rd</sup> Aug, 2013	Biodegradation of xenobiotics, Bioremediation, Biomining
Week 3	05 <sup>th</sup> Aug, 2013 to 10 <sup>th</sup> Aug, 2013	Biodegradable plastics
Week 4	12 <sup>th</sup> Aug 2013 to 17 <sup>th</sup> Aug, 2013	Bioinsecticides
Week 5	19 <sup>th</sup> Aug 2013 to 24 <sup>th</sup> Aug, 2013	Microbes as N and P Biofertilizers
Week 6	26 <sup>th</sup> Aug, 2013 to 31 <sup>st</sup> Aug, 2013	Manufacture of Baker's yeast
Week 7	2 <sup>nd</sup> Sept, 2013 to 7 <sup>th</sup> Sept, 2013	Single cell protein production especially <i>Spirulina</i>
Week8	9 <sup>th</sup> Sept, 2013 to 14 <sup>th</sup> Sept, 2013	Mushroom cultivation especially <i>Agaricus bisporus</i>
Week9	16 <sup>th</sup> Sept,2013 to 21 <sup>st</sup> Sept, 2013	Probiotics, Prebiotics, Synbiotics Biofuel production especially Ethanol
Week10	23 <sup>rd</sup> Sept 2013 to 28 <sup>th</sup> Sept, 2013	Biofuel production especially Butanol, Methane, Hydrogen, Electricity, Biodiesel
Week11	30 <sup>th</sup> Sept 2013 to 5 <sup>th</sup> Oct, 2013	Organic acids especially Amino acids (glutamic acid, lysine), Citric acid

Week12	7 <sup>th</sup> Oct,2013 to 11 <sup>th</sup> Oct, 2013.	Acetic acid, Lactic acid, Microbial exopolysaccharides
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**Class: M Sc(MBT) Ist sem**

**Subject: Microbial Biodiversity and Physiology**

**Paper: MBT-101**

S.No	Week (Start Date)	Topics to be covered during the week
Week 1	22 <sup>nd</sup> July, 2013 to 27 <sup>th</sup> July, 2013	Biodiversity of Archaea
Week 2	29 <sup>th</sup> Jul, 2013 to 3 <sup>rd</sup> Aug, 2013	Biodiversity of Bacteria and Fungi
Week 3	05 <sup>th</sup> Aug, 2013 to 10 <sup>th</sup> Aug, 2013	Biodiversity of Algae and viruses
Week 4	12 <sup>th</sup> Aug 2013 to 17 <sup>th</sup> Aug, 2013	Microbial ecology: Biogeochemical cycling
Week 5	19 <sup>th</sup> Aug 2013 to 24 <sup>th</sup> Aug, 2013	Microbes in marine & freshwater environments,
Week 6	26 <sup>th</sup> Aug, 2013 to 31 <sup>st</sup> Aug, 2013	Microbes in terrestrial environment, Microbial interactions.
Week 7	2 <sup>nd</sup> Sept, 2013 to 7 <sup>th</sup> Sept, 2013	Nutritional requirements of microbes
Week8	9 <sup>th</sup> Sept, 2013 to 14 <sup>th</sup> Sept, 2013	Bacterial growth and its kinetics
Week9	16 <sup>th</sup> Sept,2013 to 21 <sup>st</sup> Sept, 2013	.Chemostat, Turbidostat, Synchronous growth
Week10	23 <sup>rd</sup> Sept 2013 to 28 <sup>th</sup> Sept, 2013	Mechanisms involved in transport of nutrients in microbes Respiration

Week11	30 <sup>th</sup> Sept 2013 to 5 <sup>th</sup> Oct, 2013	Unique pathways of microbial metabolism: ED, PK pathways;
Week12	7 <sup>th</sup> Oct,2013 to 11 <sup>th</sup> Oct, 2013.	Fermentations; Amphibolic pathways; Anaplerotic reactions.

## DR. RAVNEET BOPARAI

**Class:** BSc Biotech (Elective) IInd year 3<sup>rd</sup> semester

**Subject:** Biotechnology

**Paper:** Introduction to Genetic engineering & immunotechnology

S.No	Week (Start Date)	Topics to be covered during the week
Week 1	July 20, 2015 to July 26, 2015	History & scope of recombinant DNA technology
Week 2	July 28, 2015 to August 1, 2015	Gene cloning & need to clone a gene
Week 3	August 3, 2015 to August 8, 2015	Immunotechnology- Basic immunology: types of immunity Innate & acquired
Week 4	August 10, 2015 to Aug. 14, 2015	Types of immunity- active and passive; Cells of immune system-lymphoid cells
Week 5	August 17, 2015 to Aug. 22, 2015	Cells of immune system- mononuclear cells; Tissues of immune system- Lymphoid organs
Week 6	August 24, 2015 to Aug. 29, 2015	Tissues of immune system- Lymphoid organs; Antigen
Week 7	August 31, 2015 to Sept.5, 2015	Immunogenicity, Chemical composition; immunogen dosage
Week8	Sept. 7, 2015 to Sept. 12, 2015	Haptens, Adjuvants; Antibody structure
Week9	Sept. 14, 2015 to Sept. 19, 2015	Antibody- function & types; Antibody diversity, Ig domains
Week10	Sept. 21, 2015 to Sept. 26, 2015	Ag-Ab interactions- Cross reactions, precipitation, agglutination



Week11	Sept. 28, 2015 to Oct. 3, 2015	Immunological techniques-Immunodiffusion, Immunoelectrophoresis
Week12	Oct. 5, 2015 to Oct. 10, 2015	Major histocompatibility complex (MHC) restriction, regulation
Week13	Oct. 12, 2015 to Oct. 17, 2015	Antigen presentation and processing- antigen presenting cells; cell mediated
Week14	Oct. 19, 2015 to Oct. 21, 2015	Subset of T-cells: cytotoxic, helper and suppressor cells

**Class:** BSc Bioinfo (Elective) IIIrd year

**Subject:** Biotechnology

**Paper:** Introduction to Genetic engineering & immunotechnology

S.No	Week (Start Date)	Topics to be covered during the week
Week 1	July 20, 2015 to July 26, 2015	Immunotechnology- Basic immunology: types of immunity Innate & acquired
Week 2	July 28, 2015 to August 1, 2015	Types of immunity- active and passive;
Week 3	August 3, 2015 to August 8, 2015	Cells of immune system- lymphoid cells, mononuclear cells
Week 4	August 10, 2015 to August 14, 2015	Cells of immune system- lymphoid cells, mononuclear cells; dendritic cells
Week 5	August 17, 2015 to August 22, 2015	Tissues of immune system- Lymphoid organs
Week 6	August 24, 2015 to August 29, 2015	Tissues of immune system- Lymphoid organs
Week 7	August 31, 2015 to Sept.5, 2015	Primary & secondary antigens- immunogenicity
Week8	Sept. 7, 2015 to Sept. 12, 2015	Chemical composition; Immunogen dosage;
Week9	Sept. 14, 2015 to Sept. 19, 2015	Haptens, Adjuvants
Week10	Sept. 21, 2015 to Sept. 26, 2015	Antibody- Antibody structure & types

Week11	Sept. 28, 2015 to Oct. 3, 2015	Antibody function & diversity
Week12	Oct. 5, 2015 to Oct. 10, 2015	Ig domains
Week13	Oct. 12, 2015 to Oct. 17, 2015	Ag-Ab interactions- Cross reaction
Week14	Oct. 19, 2015 to Oct. 21, 2015	Ag-Ab interactions- precipitation, agglutination

**Class:** Biotech (Hons) IIIrd year

**Subject:** Genomics & Proteomics

**Paper:**BIOT 304

S.No	Week (Start Date)	Topics to be covered during the week
Week 1	July 20, 2015 to July 26, 2015	Definition of proteome
Week 2	July 28, 2015 to August 1, 2015	Tools for proteomics: 2D electrophoresis
Week 3	August 3, 2015 to August 8, 2015	2D electrophoresis
Week 4	August 10, 2015 to August 14, 2015	High throughput techniques for proteome analysis (protein arrays)
Week 5	August 17, 2015 to August 22, 2015	Protein arrays
Week 6	August 24, 2015 to August 29, 2015	Applications of proteomics
Week 7	August 31, 2015 to Sept.5, 2015	Mapping protein interactions-Methods: two hybrid
Week8	Sept. 7, 2015 to Sept. 12, 2015	Two hybrid method
Week9	Sept. 14, 2015 to Sept. 19, 2015	Phage display
Week10	Sept. 21, 2015 to Sept. 26, 2015	Mass spectrometry

Week11	Sept. 28, 2015 to Oct. 3, 2015	Mass spectrometry
Week12	Oct. 5, 2015 to Oct. 10, 2015	The rise of Omics- Impact on other fields
Week13	Oct. 12, 2015 to Oct. 17, 2015	Toxicogenomics
Week14	Oct. 19, 2015 to Oct. 21, 2015	Pharmacogenomics

## SAKSHI KHANNA

**Class: M.Sc. Microbial Biotechnology Ist sem    Sub: Immunology & Immunotechnology**

<b>Week</b>	<b>Date: From</b>	<b>to</b>	<b>Topic</b>
I	16 <sup>th</sup> July, 2015	18 <sup>th</sup> July, 2015	Antigen- Antibody reactions
II	20 <sup>th</sup> July , 2015	25 <sup>th</sup> July, 2015	Precipitation and agglutination
III	27 <sup>th</sup> July,2015	1 <sup>st</sup> Aug, 2015	Radioimmunoassay, ELISA
IV	3 <sup>rd</sup> Aug, 2015	8 <sup>th</sup> Aug, 2015	Western Blotting
V	10 <sup>th</sup> Aug, 2015	15 <sup>th</sup> Aug, 2015	Cross reactions
VI	17 <sup>st</sup> Aug, 2015	22 <sup>nd</sup> Aug, 2015	Monoclonal Antibodies
VII	24 <sup>th</sup> Aug, 2015	29 <sup>th</sup> Aug, 2015	Recent advances in Immunological tools for disease diagnosis
VIII	31 <sup>st</sup> Aug, 2015	5 <sup>th</sup> Sept, 2015	Hybridomas
IX	7 <sup>th</sup> Sept,2015	12 <sup>th</sup> Sept,2015	Antigen presenting cells
X	14 <sup>th</sup> Sept,2015	19 <sup>th</sup> Sept,2015	Major Histocompatibility Complex (MHC)
XI	21 <sup>st</sup> Sept,2015	26 <sup>th</sup> Sept,2015	MHC- TCR interactions
XII	28 <sup>th</sup> Sept,2015	3 <sup>rd</sup> Oct,2015	Chemokines, cytokines and cell signaling
XIII	5 <sup>th</sup> Oct,2015	10 <sup>th</sup> Oct,2015	Nuclear receptors, T cell plasticity
XIV	12 <sup>th</sup> Oct,2015	17 <sup>th</sup> Oct,2015	Immune Homeostasis

XV	19 <sup>th</sup> Oct,2015	21 <sup>th</sup> Oct,2015	Revision
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**Class: M.Sc. Microbial Biotechnology I-sem      Sub: Microbial Biochemistry & Enzymology**

Week	Date: From	To	Topic
I	16 <sup>th</sup> July, 2015	18 <sup>th</sup> July, 2015	General features of enzymes
II	20 <sup>th</sup> July , 2015	25 <sup>th</sup> July, 2015	Enzyme nomenclature
III	27 <sup>th</sup> July,2015	1 <sup>st</sup> Aug, 2015	Industrial applications of enzymes
IV	3 <sup>rd</sup> Aug, 2015	8 <sup>th</sup> Aug, 2015	Enzyme Kinetics
V	10 <sup>th</sup> Aug, 2015	15 <sup>th</sup> Aug, 2015	Enzyme Inhibition
VI	17 <sup>st</sup> Aug, 2015	22 <sup>nd</sup> Aug, 2015	Allosteric Enzymes
VII	24 <sup>th</sup> Aug, 2015	29 <sup>th</sup> Aug, 2015	Multienzyme Complexes
VIII	31 <sup>st</sup> Aug, 2015	5 <sup>th</sup> Sept, 2015	Biocatalysis
IX	7 <sup>th</sup> Sept,2015	12 <sup>th</sup> Sept,2015	Metabolism of Carbohydrates- Introduction
X	14 <sup>th</sup> Sept,2015	19 <sup>th</sup> Sept,2015	Glycolysis, TCA
XI	21 <sup>st</sup> Sept,2015	26 <sup>th</sup> Sept,2015	HMP, Gluconeogenesis
XII	28 <sup>th</sup> Sept,2015	3 <sup>rd</sup> Oct,2015	Fatty acid metabolism
XIII	5 <sup>th</sup> Oct,2015	10 <sup>th</sup> Oct,2015	Phospholipid metabolism
XIV	12 <sup>th</sup> Oct,2015	17 <sup>th</sup> Oct,2015	Cholesterol Biosynthesis
XV	19 <sup>th</sup> Oct,2015	21 <sup>th</sup> Oct,2015	Revision

**Class: M.Sc. Microbial Biotechnology III sem      Sub: Advances in Microbial Biotechnology**

Week	Date: From	To	Topic
I	16 <sup>th</sup> July, 2015	18 <sup>th</sup> July, 2015	Techniques for metabolic engineering
II	20 <sup>th</sup> July , 2015	25 <sup>th</sup> July, 2015	Gene manipulation of useful microbes
III	27 <sup>th</sup> July,2015	1 <sup>st</sup> Aug, 2015	Production of valuable products by metabolic engineering, Applications of Metabolic

			Engineering
IV	3 <sup>rd</sup> Aug, 2015	8 <sup>th</sup> Aug, 2015	Strain Improvement by Metabolic Engineering
V	10 <sup>th</sup> Aug, 2015	15 <sup>th</sup> Aug, 2015	Introduction to Microbial Proteomics
VI	17 <sup>st</sup> Aug, 2015	22 <sup>nd</sup> Aug, 2015	2-D gel profile of microbes, proteomics of archaea
VII	24 <sup>th</sup> Aug, 2015	29 <sup>th</sup> Aug, 2015	Structural proteomics and computational analysis, pathogenesis at proteome level
VIII	31 <sup>st</sup> Aug, 2015	5 <sup>th</sup> Sept, 2015	Techniques for proteome research, HTS for novel enzymes
IX	7 <sup>th</sup> Sept,2015	12 <sup>th</sup> Sept,2015	Sequences as biological information
X	14 <sup>th</sup> Sept,2015	19 <sup>th</sup> Sept,2015	Evolution by genome expansion and reduction
XI	21 <sup>st</sup> Sept,2015	26 <sup>th</sup> Sept,2015	Metagenomics
XII	28 <sup>th</sup> Sept,2015	3 <sup>rd</sup> Oct,2015	Methods to compare genomes
XIII	5 <sup>th</sup> Oct,2015	10 <sup>th</sup> Oct,2015	Archaeal genomics, Microbial genome annotation
XIV	12 <sup>th</sup> Oct,2015	17 <sup>th</sup> Oct,2015	Genomics for pathogenic microbes
XV	19 <sup>th</sup> Oct,2015	21 <sup>th</sup> Oct,2015	Revision

### MS. NEELAM

**Class: B.Sc Biotechnology Elective (Sem I)      Subject: Introduction to Biotechnology**

**Paper: BIOT-Elect-Sem-I**

**No. of Lectures/Week – 3**

S.No	Week (Start Date)	Topics to be covered during the week
Week 1	20 <sup>th</sup> July, 2015 to 25 <sup>th</sup> July, 2015	Structure and function of prokaryotic and eukaryotic cells.
Week 2	27 <sup>th</sup> Jul, 2015 to 1 <sup>st</sup> Aug, 2015	Structure and function of eukaryotic cells.

Week 3	03 <sup>rd</sup> Aug, 2015 to 8 <sup>th</sup> Aug, 2015	Organisms used as model systems in biotechnology
Week 4	10 <sup>th</sup> Aug, 2015 to 15 <sup>th</sup> Aug, 2015	Role of viruses and bacteriophages in biotechnology
Week 5	17 <sup>th</sup> Aug, 2015 to 22 <sup>nd</sup> Aug, 2015	Fundamentals of rDNA Technology: definition, basic concepts, restriction enzymes, DNA ligases and other enzymes
Week 6	24 <sup>th</sup> Aug, 2015 to 29 <sup>th</sup> Aug, 2015	Choice of Host organism and vector, vectors for <i>E. coli</i> (pBR322, pUC8)
Week 7	31 <sup>st</sup> Aug, 2015 to 5 <sup>th</sup> Sept, 2015	Vectors for <i>E. coli</i> ( $\lambda$ phage vector, M13 phage vector, cosmid, phagemid,)
Week8	7 <sup>th</sup> Sept, 2015 to 12 <sup>th</sup> Sept, 2015	BAC, fosmid, Yeast vector system (YIp, YE <sub>p</sub> , YRp, YC <sub>p</sub> )
Week9	14 <sup>th</sup> Sept, 2015 to 19 <sup>th</sup> Sept, 2015	Yeast artificial chromosomes, Sterilization techniques in biotechnology: Physical agents to control microbes
Week10	21 <sup>st</sup> Sept, 2015 to 26 <sup>th</sup> Sept, 2015	Chemical agents to control microbes and sonication
Week11	28 <sup>th</sup> Sept, 2015 to 3 <sup>rd</sup> Oct, 2015	Microscopy: Principle and working of various microscopes (bright field and phase contrast microscopy)
Week12	5 <sup>th</sup> Oct, 2015 to 10 <sup>th</sup> Oct, 2015	Fluorescent microscopy, centrifugation: Theory, types of centrifugation and their application to biological systems.
Week13	12 <sup>th</sup> Oct, 2015 to 17 <sup>th</sup> Oct, 2015	Centrifugation: Theory, types of centrifugation and their application to biological systems.
Week 14	19 <sup>th</sup> Oct, 2015 to 21 <sup>th</sup> Oct, 2015	Centrifugation: Theory, types of centrifugation and their application to biological systems.

**Class: M.Sc. MBT (Sem I)**  
**Paper: MBT 101**

**Subject: Microbial Biodiversity and Physiology**  
**No. of Lectures/Week – 1**

S.No	Week (Start Date)	Topics to be covered during the week
Week 1	20 <sup>th</sup> July, 2015 to 25 <sup>th</sup> July, 2015	Relevance of microbiology as a field of Biotechnology
Week 2	27 <sup>th</sup> Jul, 2015 to 1 <sup>st</sup> Aug, 2015	Historical milestones in Microbiology and Biotechnology (Cell theory, spontaneous generation Vs biogenesis)
Week 3	03 <sup>rd</sup> Aug, 2015 to 8 <sup>th</sup> Aug, 2015	Historical milestones in Microbiology and Biotechnology (Golden age of microbiology, fermentation and pasteurization, germ theory)

Week 4	10 <sup>th</sup> Aug, 2015 to 15 <sup>th</sup> Aug, 2015	Historical milestones in Microbiology and Biotechnology ( birth of modern chemotherapy, rise of microbial diversity, modern era of microbiology)
Week 5	17 <sup>th</sup> Aug, 2015 to 22 <sup>nd</sup> Aug, 2015	Prokaryotic cell structure and function ( <i>E. coli</i> and <i>S. aureus</i> ) ( Size, shape and arrangement, Prokaryotic cell membranes)
Week 6	24 <sup>th</sup> Aug, 2015 to 29 <sup>th</sup> Aug, 2015	Prokaryotic cell structure and function ( <i>E.coli</i> and <i>S. aureus</i> ) (Prokaryotic cell membrane and cytoplasmic matrix)
Week 7	31 <sup>st</sup> Aug, 2015 to 5 <sup>th</sup> Sept, 2015	Prokaryotic cell structure and function ( <i>E.coli</i> and <i>S. aureus</i> ) (Cell wall structure and function )
Week8	7 <sup>th</sup> Sept, 2015 to 12 <sup>th</sup> Sept, 2015	Prokaryotic cell structure and function ( <i>E.coli</i> and <i>S. aureus</i> ) (Cell wall structure and function, components external to cell wall)
Week9	14 <sup>th</sup> Sept, 2015 to 19 <sup>th</sup> Sept, 2015	Prokaryotic cell structure and function ( <i>E.coli</i> ) ( Flagellar arrangements, ultrastructure and function)
Week10	21 <sup>st</sup> Sept, 2015 to 26 <sup>th</sup> Sept, 2015	Control of microbes by the use of physical agents (Physical methods: Moist heat sterilization, Dry heat sterilization)
Week11	28 <sup>th</sup> Sept, 2015 to 3 <sup>rd</sup> Oct, 2015	Control of microbes by the use of physical agents (Physical methods: filtration, low temperature, desiccation, osmotic pressure)
Week12	5 <sup>th</sup> Oct, 2015 to 10 <sup>th</sup> Oct, 2015	Control of microbes by the use of physical agents ( Radiation: ionizing and non-ionizing radiation, mode of action, advantage and disadvantage)
Week13	12 <sup>th</sup> Oct, 2015 to 17 <sup>th</sup> Oct, 2015	Control of microbes by the use of chemical agents (Conditions influencing the effectiveness of antimicrobial agent activity, chemical agents)
Week14	19 <sup>th</sup> Oct, 2015 to 21 <sup>th</sup> Oct, 2015	Control of microbes by the use of chemical agents (Conditions influencing the effectiveness of antimicrobial agent activity, chemical agents)

**Class: M.Sc. MBT (Sem I)**

**Subject: Genetics and rDNA Technology**

**Paper: MBT 103**

**No. of Lectures/Week – 2**

S.No	Week (Start Date)	Topics to be covered during the week
Week 1	20 <sup>th</sup> July, 2015 to 25 <sup>th</sup> July, 2015	Host restriction/modification, different types of Restriction enzymes and their properties, DNA ligases.

Week 2	27 <sup>th</sup> Jul, 2015 to 1 <sup>st</sup> Aug, 2015	Other enzymes involved in gene cloning
Week 3	03 <sup>rd</sup> Aug, 2015 to 8 <sup>th</sup> Aug, 2015	Natural plasmids and their types, role of plasmids in transfer of genes
Week 4	10 <sup>th</sup> Aug, 2015 to 15 <sup>th</sup> Aug, 2015	Plasmids as gene cloning vectors, commercial vectors
Week 5	17 <sup>th</sup> Aug, 2015 to 22 <sup>nd</sup> Aug, 2015	Commercial vectors
Week 6	24 <sup>th</sup> Aug, 2015 to 29 <sup>th</sup> Aug, 2015	Commercial vectors
Week 7	31 <sup>st</sup> Aug, 2015 to 5 <sup>th</sup> Sept, 2015	Construction of genomic library, Construction of cDNA library
Week8	7 <sup>th</sup> Sept, 2015 to 12 <sup>th</sup> Sept, 2015	Strategies involved in cloning of gene(s).
Week9	14 <sup>th</sup> Sept, 2015 to 19 <sup>th</sup> Sept, 2015	Strategies involved in cloning of gene(s), construction of meta-genomic libraries
Week10	21 <sup>st</sup> Sept, 2015 to 26 <sup>th</sup> Sept, 2015	PCR and its applications and modifications.
Week11	28 <sup>th</sup> Sept, 2015 to 3 <sup>rd</sup> Oct, 2015	PCR variants
Week12	5 <sup>th</sup> Oct, 2015 to 10 <sup>th</sup> Oct, 2015	DNA sequencing
Week13	12 <sup>th</sup> Oct, 2015 to 17 <sup>th</sup> Oct, 2015	DNA sequencing
Week14	19 <sup>th</sup> Oct, 2015 to 21 <sup>th</sup> Oct, 2015	DNA sequencing

**Class: B.Sc. Biotech (Honours) 3<sup>rd</sup> year**

**Subject: Food Biotechnology**

**Paper: BIOT- 306**

**No. of Lectures/Week – 1**

S. No	Week (Start Date)	Topics to be covered during the week
Week 1	20 <sup>th</sup> July, 2015 to 25 <sup>th</sup> July, 2015	Principles of food preservation: Physical methods of preservations (By Drying and Radiation)
Week 2	27 <sup>th</sup> Jul, 2015 to 1 <sup>st</sup> Aug, 2015	Physical Methods of preservations (by Radiations and low temperature treatment)
Week 3	03 <sup>rd</sup> Aug, 2015 to 8 <sup>th</sup> Aug, 2015	Physical Methods of preservations (by low temperature and high temperature treatment)



Week 4	10 <sup>th</sup> Aug, 2015 to 15 <sup>th</sup> Aug, 2015	Physical Methods of preservations (by high temperature and controlled and modified atmosphere storage)
Week 5	17 <sup>th</sup> Aug, 2015 to 22 <sup>nd</sup> Aug, 2015	Chemical methods of preservation of foods
Week 6	24 <sup>th</sup> Aug, 2015 to 29 <sup>th</sup> Aug, 2015	Chemical and biological methods of food preservations.
Week 7	31 <sup>st</sup> Aug, 2015 to 5 <sup>th</sup> Sept, 2015	Contamination , preservation and spoilage of different kind of foods: Milk
Week8	7 <sup>th</sup> Sept, 2015 to 12 <sup>th</sup> Sept, 2015	Contamination , preservation and spoilage of different kind of foods: Milk
Week9	14 <sup>th</sup> Sept, 2015 to 19 <sup>th</sup> Sept, 2015	Contamination , preservation and spoilage of different kind of foods: milk products
Week10	21 <sup>st</sup> Sept, 2015 to 26 <sup>th</sup> Sept, 2015	Contamination , preservation and spoilage of different kind of foods: milk products
Week11	28 <sup>th</sup> Sept, 2015 to 3 <sup>rd</sup> Oct, 2015	Contamination , preservation and spoilage of different kind of foods: milk products
Week12	5 <sup>th</sup> Oct, 2015 to 10 <sup>th</sup> Oct, 2015	Contamination , preservation and spoilage of different kind of foods: Beverages (alcohols)
Week13	12 <sup>th</sup> Oct, 2015 to 17 <sup>th</sup> Oct, 2015	Contamination , preservation and spoilage of different kind of foods: Beverages (alcohols)
Week14	19 <sup>th</sup> Oct, 2015 to 21 <sup>th</sup> Oct, 2015	Contamination , preservation and spoilage of different kind of foods: Beverages (alcohols)

## MS. NEETU

**Class: B.Sc. (Elec) Bioinformatics 1<sup>st</sup> yr      Sub: Intro to Bioinformatics and Cell biology and Biochemistry**

Week	Date: From	to	Topic
I	16 <sup>th</sup> July, 2015	18 <sup>th</sup> July, 2015	Introduction to bioinformatics
II	20 <sup>th</sup> July , 2015	25 <sup>th</sup> July, 2015	Roles and aims of bioinformatics
III	27 <sup>th</sup> July,2015	1 <sup>st</sup> Aug, 2015	Introduction to Databases and types of databases:primary and secondary databases
IV	3 <sup>rd</sup> Aug, 2015	8 <sup>th</sup> Aug, 2015	Full forms ,different types of databases with examples in detail
V	10 <sup>th</sup> Aug, 2015	15 <sup>th</sup> Aug, 2015	Locus link,Unigene,Entrez,Ensemble,NCBI

VI	17 <sup>st</sup> Aug, 2015	22 <sup>nd</sup> Aug, 2015	Expasy,Nucleotide sequence databases
VII	24 <sup>th</sup> Aug, 2015	29 <sup>th</sup> Aug, 2015	Contd. DDBJ,GenBank,EMBL,TEST,intro to Protein sequence databases
VIII	31 <sup>st</sup> Aug, 2015	5 <sup>th</sup> Sept, 2015	Introduction to Biochemistry and metabolic pathways,Carbohydrates , their structure and function
IX	7 <sup>th</sup> Sept,2015	12 <sup>th</sup> Sept,2015	Lipids and proteins structure and functions,nucleic acids
X	14 <sup>th</sup> Sept,2015	19 <sup>th</sup> Sept,2015	Enzymes- Classification,nomenclature,general properties
XI	21 <sup>st</sup> Sept,2015	26 <sup>th</sup> Sept,2015	Regulation of enzyme activity,steady state kinetics
XII	28 <sup>th</sup> Sept,2015	3 <sup>rd</sup> Oct,2015	Industrial Applications of enzymes, ELISA
XIII	5 <sup>th</sup> Oct,2015	10 <sup>th</sup> Oct,2015	Structures and functions of cell organelles
XIV	12 <sup>th</sup> Oct,2015	17 <sup>th</sup> Oct,2015	Cell motility, cell cycle, cell death
XV	19 <sup>th</sup> Oct,2015	21 <sup>th</sup> Oct,2015	Revision