RATHNAVEL SUBRAMANIAM COLLEGE OF ARTS & SCIENCE (Autonomous)
Sulur, Coimbatore – 641 402

SCHEME OF EXAMINATIONS – CBCS PATTERN

PROGRAMME: B.Sc (Biochemistry)

Syllabus effective for the students admitted during the academic Year 2016 Batch & onwards

(2016 – 2019)

HOD **PRINCIPAL** **COE**

RVS COLLEGE OF ARTS AND SCIENCE (AUTONOMOUS)

SCHEME OF EXAMINATIONS

BSC BIOCHEMISTRY

2016 BATCH

Semester	Paper Type	Type	Title Of the Paper	Hours of Instruction / Week	Credits	Duration Of Examination In Hours	Marks		
							CIA	EOS	Total
1	III	M -I BIOMOLECULES		5	4	3	25	75	100
III	M -II	CELLULAR BIOCHEMISTRY	5	4	3	25	75	100	
III	MP -I	MAJOR BIOCHEMISTRY PRACTICAL I	3	-	3	40	60	100	
V	COP -I	INTRODUCTION TO BIOINFORMATICS	1	4	3	25	75	100	
III	A -I	ALLIED CHEMISTRY THEORY	5	4	3	25	75	100	
IV	FCA -I	FOUNDATION COURSE A - VALUE EDUCATION - ENVIRONMENTAL STUDIES (SELF STUDY)	-	2	3	50	-	50	
I	L -I	MALAYALAM - I	6	4	3	25	75	100	
I	L -I	HINDI - I	6	4	3	25	75	100	
I	L -I	TAMIL - I	6	4	3	25	75	100	
I	L -I	FRENCH - I	6	4	3	25	75	100	
I	L -I	ARABIC - I	6	4	3	25	75	100	
II	E -I	ENGLISH I - GRAMMAR AND USAGE	6	4	3	25	75	100	
Total :	**42**	--	--	--	**1150**				
2	II	E -II ENGLISH II- COMMUNICATIVE ENGLISH		6	4	3	25	75	100
III	MP -III	MAJOR BIOCHEMISTRY PRACTICAL I	5	5	3	40	60	100	
III	AP -II	OFFICE AUTOMATION AND MULTIMEDIA PRACTICAL	5	4	3	25	75	100	
III	M -III	INSTRUMENTATION TECHNIQUES	5	4	3	25	75	100	
III	M -IV	ENZYMOLOGY	3	3	3	25	75	100	
V	COP -II	BASICS OF BIOINFORMATICS PRACTICAL	1	1	3	25	75	100	
IV	FCB -I	FOUNDATION COURSE -B(GENERAL AWARENESS -SELF STUDY)	-	-	3	-	50	50	
I	L -II	HINDI II	6	4	3	25	75	100	
I	L -II	TAMIL - II	6	4	3	25	75	100	
I	L -II	ARABIC II	6	4	3	25	75	100	
Total :	**33**	--	--	--	**950**				
3	II	E -III ENGLISH III- POETRY AND DRAMA		4	4	3	25	75	100
I	L -III	TAMIL - III	4	4	3	25	75	100	

Semester	Paper Type	Type	Title Of the Paper	Hours of Instruction / Week	Credits	Duration Of Examination In Hours	Marks		
							CIA	EOS	Total
3	III	AP -I LAB IN CHEMISTRY AND BIOCHEMISTRY		5	4	3	40	60	100
III	MP -I	MAJOR BIOCHEMISTRY PRACTICAL II	4	-	6	40	60	100	
V	COP -I	BIOLOGICAL DATABASES AND ANALYSIS	1	4	3	25	75	100	
III	M -V	MOLECULAR BIOLOGY	5	4	3	25	75	100	
III	M -VI	HUMAN PHYSIOLOGY	5	4	3	25	75	100	
III	MP -IV	LAB IN MLT	3	3	3	40	60	100	
-	CE -V	CAREER SKILLS I	2	-	3	25	25	50	
I	L -III	HINDI III	4	4	3	25	75	100	
Total :	**31**	--	--	--	**950**				
4	III	EL -II ELECTIVE I - STEM CELLS AND CANCER BIOLOGY		5	4	3	25	75	100
V	COP -I	COP - BIOLOGICAL DATABASES AND BIOMOLECULAR STRUCTURE AND DYNAMICS	1	4	3	25	75	100	
III	MP -IV	MAJOR BIOCHEMISTRY PRACTICAL II	4	4	6	40	60	100	
III	M -VII	INTERMEDIARY METABOLISM	5	4	3	25	75	100	
III	A -II	BASIC MATHEMATICS	5	4	3	25	75	100	
IV	SBC -I	APTITUDE SKILLS	3	3	3	100	-	100	
I	L -IV	TAMIL - IV	4	4	3	25	75	100	
I	L -III	HINDI - IV	4	4	3	25	75	100	
II	E -IV	ENGLISH IV - PROSE AND SHORT STORY	4	4	3	25	75	100	
-	CE -IV	CAREER SKILLS II	2	-	3	25	75	100	
V	NSS/S-I	NSS/SPORTS/GAMES/NCC	-	-	3	100	-	100	
Total :	**35**	--	--	--	**1100**				
5	-	CAREER SKILLS III		1	-	3	25	25	50
III	M -VI	BIOCHEMICAL PHARMACOLOGY	6	5	3	25	75	100	
III	M -VII	IMMUNOLOGY	6	4	3	25	75	100	
III	MP -V	MAJOR BIOCHEMISTRY PRACTICAL III	6	-	6	40	60	100	
III	MP -VI	MAJOR BIOCHEMISTRY PRACTICAL IV	5	-	5	40	60	100	

IV	SBC -I	MICROBIAL PHYSIOLOGY	4	3	3	25	75	100	
V	COP -II	MOLECULAR MODELLING AND COMPUTER AIDED DRUG DESIGNING	1	4	3	25	75	100	

Semester	**Paper Type**	**Type**	**Title Of the Paper**	**Hours of Instruction / Week**	**Credits**	**Duration Of Examination In Hours**	**Marks**		
							CIA	**EOS**	**Total**
5	III	EL -II ELECTIVE II - EDC: HEALTH MANAGEMENT		3	3	3	25	75	100
Total :	**19**	--	--	--	**750**				

SEMESTER - I MAJOR-THEORY

BIOMOLECULES

OBJECTIVES :

To give basic knowledge about various biomolecules of our body .

To make the students understand the importance of biomolecules in life .

HOURS / WEEK - 5		
HOURS / SEMESTER - 75		
CIA	**CO-CURRICULAR ACTIVITIES**	**LECTURE**
10	**5**	**60**

UNIT - I (LECTURE HOURS: 14)

Water

Introduction - Structure of water

Physical properties of water - Hydrogen bonding of water, solvent properties of water, hydrophobic interactions.

Carbohydrates

Monosaccharides - Classification, Sterochemistry, Cyclic structure & Anomeric forms Haworth projection formula. **Reactions of monosaccharaides** - Characteristics of aldehyde & ketone groups. Action of acids & alkalis on sugars.Reactions of sugars due to hydroxyl groups.

Disaccharides - Introduction & Classification.Chemistry structure & functions of Sucrose maltose & lactose.

Polysaccharides - Introduction & Classification

Storage polysaccharides - Structure & functions of starch & glycogen

Normal values - Glucose and other Carbohydrates in blood and its associated disorders (Specify only name and function)

Activity

Give a report on how Glucose water boosts the energy level. - Give a report on how Glucose water boosts the energy level.

Chart work on molecular structures of sugars - Chart work on molecular structures of sugars

UNIT - II (LECTURE HOURS: 12)

Lipids

Introduction - Definition & Classification.

Simple lipids - Fats, oils & waxes.

Physical properties - Solubility, specific gravity, melting point, color&odour.

Chemical properties of fats - Hydrolysis,saponification ,iodine,RM ,acid numbers and rancidity of fats.

Compound lipids - Structure &functions of phospholipids glycolipids lipoproteins.

Derived lipids - Saturated, Unsaturated fatty acids & Essential fatty acids.

Steroids - Cholesterol and its structure

Normal value - Normal values of cholesterols, triglycerides and lipoproteins in blood.

Activity

Group discussion on the various sources of saturated and unsaturated fatty acids - Group discussion on the various sources of saturated and unsaturated fatty acids

Debate on health benefits and adverse effects of fatty acids - Debate on health benefits and adverse effects of fatty acids

UNIT - III (LECTURE HOURS: 14)

Amino acids

Introduction - Definition & structure

Classification - Based on functional groups,amino acids as ampholytes.

Chemical reactions - Based on carboxyl & aminogroups

Peptide bond - Structure & properties,identification of N&C terminal residues

Proteins

Introduction - Classification & properties.

Structure of proteins - Strong & weak bonds.Primary,secondary tertiary & quarternary structures.

Denaturation& Renaturation of proteins - Physical& chemical agents,coagulation,refolding.

SEMESTER - I MAJOR-THEORY

BIOMOLECULES

Normal value - Normal values of Proteins in Blood

Activity

Team work on Essential aminoacids and non essential aminoacids - Team work on Essential aminoacids and non essential aminoacids

Chart work on structure of proteins - Chart work on structure of proteins

UNIT - IV (LECTURE HOURS: 10)

Nucleic acids

Introduction - Definition & Types

Purines - Structure of adenine, guanine, Xanthine and hypoxanthine

Pyrimidines - Structure of Thymine, uracil & cytosine

Nucleotides& nucleotides - Structures & modified nitrogenous bases

DNA

DNA double helix and types of DNA - Watson &Crick model,Chargaffs rule. Types - A,B & Z form

Denaturation & renaturation - Hyperchromism, Effect of pH& temperature on DNA.Nucleation & zippering reaction.

RNA

Types - mRNA,rRNA & tRNA –Structures and their biological roles. **Hereditary disease** - Hereditary disease- Sickle cell anaemia **Activity**

Make a paper model for the Structure of DNA - Make a paper model for the Structure of DNA

Collection of newspaper articles / journals related to DNA Hybrid/ Cloning - Collection of newspaper articles / journals related to DNA Hybrid/ Cloning

UNIT - V (LECTURE HOURS: 10)

Vitamins

Introduction - Definition &classification.

Fat soluble vitamins - Sources & physiological functions of vitamin A, D, E, K.

Water soluble vitamins - Sources & physiological functions of vitamin B complex and vitamin C

Vitamin deficiency - Deficiency symptoms of vitamins.

Minerals

Introduction - Definition &classification. Mineral requirement.

Essential macro minerals - Sources & functions of calcium, chloride, magnesium, phosphorus, Potassium, sodium & sulphur.

Essential micro minerals - Sources & functions of boron, chromium, cobalt, copper, iodine, iron,manganese, molybdenum and zinc.

Activity

Exhibiting the collected sources of Vitamins and Minerals - Exhibiting the collected sources of Vitamins and Minerals

Quiz on the deficiency symptoms of Vitamins and Minerals - Quiz on the deficiency symptoms of Vitamins and Minerals

Text Books :

T 1- Fundamentals of Biochemistry | Edition:1 | S.Chand & Company | J.L.JAIN-(2005)

T 2- Essentials of Biochemistry | Edition:2 | Books and Allied (P) Ltd | U.SATHYANARAYANA U. CHAKRAPANI(2008) T3 - Biochemistry | Edition:5 | W.H.Freeman & Company,New York | LUBERT STRYER(2005)

Reference Books :

R 1- Lehninger Principles of Biochemistry | Edition:3 | Mac millan Worth Publishers USA | DAVID L NELSON MICHAEL M.COX(2003) R 2 - Fundamentals of Biochemistry | Edition:1 | John Wiley & Sons Inc USA | DONALD VOET JUDITH G. VOET(1999)

SEMESTER - I MAJOR-THEORY

CELLULAR BIOCHEMISTRY

OBJECTIVES :

To give basic knowledge on the types of cells and various cellular functions To make them aware of cells ,its structure and its application in research

.

HOURS / WEEK - 5		
HOURS / SEMESTER - 75		
CIA	**CO-CURRICULAR ACTIVITIES**	**LECTURE**
10	**5**	**60**

UNIT - I (LECTURE HOURS: 12)

OVERVIEW OF CELLS

Origin & Evoluation of cell - History of cell,& discovery **Cell theory Protoplasmic theory** - Protoplasmic theory
CLASSIFICATION OF CELLS

Prokaryotic cell - Introduction, cell components of Prokaryotic cell

Eukaryotic cell - Introduction, Cell components of Eukaryotic cell

Comparision between two different cells - Nucleus, cell membrane and cell organelles

MOLECULAR COMPOSITION OF CELLS

Composition of cells components - Carbohydrate, lipids-Glycolipids,Nucleic Acids, Proteins

Activity

Preparing a cell model which represent the cell types and its function by using LED - Preparing a cell model which represent the cell types and its function by using LED

UNIT - II (LECTURE HOURS: 12)

CELL MEMBRANE

Membrane proteins - Composition, Structure, Glycoprotein and lipoproteins

Membrane carbohydrate - Types Composition and Structure

TRANSPORT MECHANISM

Diffusion - Definition, Mechanism & functions **Active Transport** - Definition & Mechanism **Passive transport** - Definition & Mechanism **Activity**

Understanding the transport mechanism through the cell membrane by using cellophane sheet - Understanding the transport mechanism through the cell membrane by using cellophane sheet

UNIT - III (LECTURE HOURS: 12)

Endoplamic reticulum

Endomembrane components - Definition ,Structure & Functions

Types of ER - RER & SER. **Ribosomes & lysosomes Introduction** - Definition

Structure - Composition and Functions

PEROXISOMES &GLYOXYSOMES

Introduction , Morphology - Definition Compositions & Functions. Definition Compositions & Functions. definition, composition and function

Activity

Understanding the Protein Synthesis mechanism by using electro magnet and sieve - Understanding the Protein Synthesis mechanism by using electro magnet and sieve

UNIT - IV (LECTURE HOURS: 12)

MITOCHONDRIA

Introduction and Structure - Definition, Discovery, Components-Finger like projections-Cristae, Matrix,F I Particles

Chemistry - Components, Power house of the cell-functions

SEMESTER - I MAJOR-THEORY

CELLULAR BIOCHEMISTRY

CYTOSKELETON

Introduction - Definition
chemistry - Structure &
functions **MICROTUBLES**

Introduction ,Cilia & Flagella - Components, Microtubulin and its functions,Structure, composition and function - Transport

RIBOSOMES

Introduction - Cell Organelles, Protein Factory **Structure** - Components, Svedberg unit Functions **Types** - Prokaryotic & Eukaryotic subunits & function **Activity**

Understanding the cytoskeleton and its function by using clay - Understanding the cytoskeleton and its function by using clay

NUCLEUS

Introduction - Discovery, control unit, nuclear membrane, nucleoplasm and Nucleic acids Chromosomes - Structure of chromatin, nucleosomes & histones - Introduction - Discovery, control unit, nuclear membrane, nucleoplasm and Nucleic acids Chromosomes - Structure of chromatin, nucleosomes & histones

UNIT - V (LECTURE HOURS: 12)

CELL CYCLE

Phases of cell cycle - Prophase, metaphase, anaphase, telophase and other phases.karyokinesis

Meiotic cell division - Cell division,reduced chromosome number

CANCER

Abnormal Cell growth in cancer - Definition, stages – Benign, malignant

Regulation - Mechanism -apoptosis

Activity

Giving a model based on Anti-microbial plates to understand the different phases of cell cycle - Giving a model based on Anti-microbial plates to understand the different phases of cell cycle

Text Books :

T1-Cell Biology | Edition:1 | S.Chand and Sons(New Delhi) | VERMA AGARWAL(1993) T3-Cell and Molecular Biology | Edition:3 | John Wiley and Sons | GERALD KARP.(2002)

Reference Books :

R1- Principles of Biochemistry | Edition:2 | CAS | ALBERT.L.LEHNINGER.(1993) R2- Molecular cell biology | Edition:5 | Freeman and company | LODISH, H..(2004)

SEMESTER - I MAJOR-PRACTICAL

MAJOR BIOCHEMISTRY PRACTICAL I

OBJECTIVES :

To give basic knowledge on various practical qualitative identifications of biomolecules of our body.

HOURS / WEEK - 3		
HOURS / SEMESTER - 45		
CIA	**CO-CURRICULAR ACTIVITIES**	**LECTURE**
6	**3**	**36**

UNIT - I (LECTURE HOURS: 36)

Analysis of Carbohydrates - Monosaccharides - Pentose Analysis of Carbohydrates - Monosaccharides - Pentose - **Monocsaccharide - Glucose**

Monocsaccharide - Glucose - **Monocsaccharide - Fructose Monocsaccharide - Fructose** - **Monocsaccharide - Galactose Monocsaccharide - Galactose** - **Monocsaccharide - Mannose Monocsaccharide - Mannose** - **Disaccharide - sucrose Disaccharide - sucrose** - **Disaccharide - Maltose Disaccharide - Maltose** - **Disaccharide - Lactose Disaccharide - Lactose** - **Polysaccharide - starch Polysaccharide - starch** - **polysaccaride - Dextrin polysaccaride - Dextrin** -

Water analysis

Salinity & hardness of water - Salinity & hardness of water

Adulteration of Milk

Quality check - Quality check

Text Books :

Laboratory manual for practical Biochemistry | Edition:1 | - | A.HEMAVATHI. AND M.K.GANESH. AND SANKARASHIVRARAJA(2008)

SEMESTER - I

CAREER ORIENTED PROGRAMME-THEORY INTRODUCTION TO BIOINFORMATICS

OBJECTIVES :

To give basic knowledge on bioinformatics a new field of advaced applications of Biochemistry and make them aware of its signifiance.

HOURS / WEEK - 1		
HOURS / SEMESTER - 15		
CIA	**CO-CURRICULAR ACTIVITIES**	**LECTURE**
2	**1**	**12**

UNIT I (LECTURE HOURS: 2)

Introduction, historical overview, definition and objectives of bioinformatics. Introduction history, objectives of bioinformatics - -

Applications of Bioinformatics Applications of bioinformatics - -

UNIT II (LECTURE HOURS: 2)

Tools of Bioinformatics Kinds of Data used in Bioinformatics Multiplicity of data and Data redundancy Toolsand data used - -

Major data bases in bioinformatics -NCBI, ENTREZ, DDBJ, EMBL. NCBI,ENTREZ,DDBJ,EMBL - -

UNIT III (LECTURE HOURS: 2)

Protein databases, Structural databases, Nucleotide and Genome sequences Protein ,structural,nucleotide sequencee - -

DNA micro array data and Other databases. Data integration and data analysis. DNA Microarray and other databases,Integration and dataanalysis - -

UNIT IV (LECTURE HOURS: 3)

Information technology and Bioinformatics-Computer architecture-(CPU, Input, Output devices) IT and Bioinformatics,CPU input output devices - -

Operating systems (DOS Windows, UNIX, LINUX) DOS,Windows,UNIX,LINUX - -

Networking basis (LAN, WAN, TCP/IP). LAN,WAN,TCP,IP - -

UNIT V (LECTURE HOURS: 3)

Internet basics (http, ftp, Browser, URL, Search engines, E- mail, Virtual libraries) http,FIP,browserURL,SEarch enginees etc. - -

Information search and Data retrieval. Information search and data retreval - -

Accessing biological data though internet. Careers in bioinformatics. Biological datathrough internet,Careers in bioinformatics - -

Reference Books :

Bioinformatics Methods and Aplications | Edition:2 | CBS Publishers,New Delhi | SC RastogiNamita Mendiretta(2003)

SEMESTER - I ALLIED-THEORY

ALLIED CHEMISTRY

OBJECTIVES :

To enable the students to understand basic concepts of chemical bonding structure and chemistry of compounds

HOURS / WEEK - 5		
HOURS / SEMESTER - 75		
CIA	**CO-CURRICULAR ACTIVITIES**	**LECTURE**
10	**5**	**60**

UNIT-I (LECTURE HOURS: 12)

Thermodynamics

Introduction - Definition , Energy changes, flow of heat, Importance of thermodynamics

Types of system

Open, closed, isolated - Open, closed, isolated

Types of process

Reversible and irreversible; Isothermal and adiabatic - Reversible and irreversible; Isothermal and adiabatic

Laws of Thermodynamics

First Law, Internal energy, Second Law Carnot cycle - Four strokes , Kelvin's statement of second law of thermodynamics - First Law, Internal energy, Second Law Carnot cycle - Four strokes , Kelvin's statement of second law of thermodynamics

Enthalpy and Entropy

Definition, Enthalpy of vapourisation, Enthalpy of fusion and Entropy change - Definition, Enthalpy of vapourisation, Enthalpy of fusion and Entropy change

Bond energy and Free energy

Definition, Calculation of bond energy & Free energy and spontaneity, Gibbs free energy - Definition, Calculation of bond energy & Free energy and spontaneity, Gibbs free energy

UNIT-II (LECTURE HOURS: 12)

Covalent Bond

Characteristics of covalent bond - Bond length, bond angle, bond strength

Hydrogen bonding

Introduction, types and applications of hydrogen bonding - Introduction, types and applications of hydrogen bonding

Hybridization

Introduction, Salient features hybridization, Shapes of hybrid orbitals - Introduction, Salient features hybridization, Shapes of hybrid orbitals

Orbital overlap

Coupling of electrons with opposite spins, Unpaired electrons overlap - Formation of H2,F2,O2,N2

Ionic Bond

Characteristics of ionic bond - Covalent character of ionic bond. Decrease in energy in the formation of NaCl.

Factors influencing the formation of ionic bond. - Factors influencing the formation of ionic bond.

Geometry of molecules

Shape of CCl4, Shape of H2O. Shape of NH3 - Shape of CCl4, Shape of H2O. Shape of NH3

UNIT-III (LECTURE HOURS: 12)

Organic chemistry

Introduction - Definition and Application of organic compounds in everyday life - Introduction - Definition and Application of organic compounds in everyday life

IUPAC system

Nomenclature of organic molecules and its structural formula - Nomenclature of organic molecules and its structural formula

Isomers

Types and Molecular formula - Types and Molecular formula

Enantiomers

Types and Molecular formula - Types and Molecular formula

SEMESTER - I ALLIED-THEORY

ALLIED CHEMISTRY

Cyclic and acyclic compounds

Introduction, classification and structure of Homocyclic, Acyclic and Heterocyclic compounds. - Introduction, classification and structure of Homocyclic, Acyclic and Heterocyclic compounds.

Organic reactions

Addition & Elimination - - Definition, Reaction of ethylene with bromine, propylene, HI, Propyl-bromide and alcoholic KOH

Substitution - Definition, Replacement reaction of methane with chlorine

UNIT-IV (LECTURE HOURS: 12)

Concepts of Volumetric analysis

Introduction, Analyte, titrant, Standard solutions - Primary and secondary standards. Normality, molality, molarity and related problems

Methods of quantitative analysis

Methods of quantitative analysis - Methods of quantitative analysis

Principles of acid base titration

Introduction - Acids, Alkalies, Indicators, Buffers

Titrations

Strong acid Vs strong base, weak acid Vs strong base, Weak base Vs strong acid. - Strong acid Vs strong base, weak acid Vs strong base, Weak base Vs strong acid.

EDTA titrations

Introduction, indicators for EDTA titrations. - Introduction, indicators for EDTA titrations.

Determination of hardness of water

Determination of hardness of water - Determination of hardness of water

UNIT-V (LECTURE HOURS: 12)

Biogas

Production - Biogas production **Applications** - Applications **Fertilizers**

Introduction - Essential nutrients for plants, functions

Potash fertilizer - Potash fertilizer

Mixed fertilizers - NPK fertilizers.

Text Books :

Principles of Organic Chemistry | Edition:2 | S. Nagin | M. K JAIN(1978)

SEMESTER - II MAJOR-PRACTICAL

MAJOR BIOCHEMISTRY PRACTICAL I

OBJECTIVES :

To make students to understand about importance of aminoacids analysis and Lipid analysis

HOURS / WEEK - 5		
HOURS / SEMESTER - 75		
CIA	**CO-CURRICULAR ACTIVITIES**	**LECTURE**
10	**5**	**60**

UNIT II (LECTURE HOURS: 60)

Reactions of methionine Reactions of methionine - **Reactions of Arginine Reactions of Arginine** - **Reactions of Cystine Reactions of Cystine** - **Reactions of Histidine Reactions of Histidine** - **Reactions of Tyrosine Reactions of Tyrosine** - **Reactions of Tryptophan Reactions of Tryptophan** -

Lipid analsysis-Iodine Number of oil Lipid analsysis-Iodine Number of oil - **Lipid analysis- RM number**

Lipid analysis- RM number -

Separation of Sugars-chromatography Separation of Sugars-chromatography - **separation of serum proteins separation of serum proteins** -

Text Books :

Biochemical Methods | Edition:2 | New age international publisher | S SadasivamA Manickam(1996)

Reference Books :

Essentials of Practical Biochemistry | Edition:1 | CBS Publishers | M. Srivatsava AND Nibhriti Das(2002)

SEMESTER - II ALLIED-PRACTICAL

OFFICE AUTOMATION AND MULTIMEDIA PRACTICAL

OBJECTIVES :

-

HOURS / WEEK - 5		
HOURS / SEMESTER - 75		
CIA	**CO-CURRICULAR ACTIVITIES**	**LECTURE**
10	**5**	**60**

UNIT - I (LECTURE HOURS: 24)

Basics of Computer: - Introduction

Basics of Computer: - Introduction - Aim, algorithm, execution

Word Processing using MS Word: Starting Up

Word Processing using MS Word: Starting Up - Aim, algorithm, execution

Saving – Opening your document

Saving – Opening your document - Aim, algorithm, execution

Copying and pasting – Using various fonts

Copying and pasting – Using various fonts - Aim, algorithm, execution

Creating tables

Creating tables - Aim, algorithm, execution

Mail merge.

Mail merge. - Aim, algorithm, execution

MS-EXCEL - Worksheets

MS-EXCEL - Worksheets - Aim, algorithm, execution

UNIT - II (LECTURE HOURS: 36)

Entering text – Performing mathematical calculations

Entering text – Performing mathematical calculations - Aim, algorithm, execution

Creating a formula – printing

Creating a formula – printing - Aim, algorithm, execution

Income tax calculation

Income tax calculation - Aim, algorithm, execution

Mark sheet preparation

Mark sheet preparation - Aim, algorithm, execution

Employees salary list preparation

Employees salary list preparation - Aim, algorithm, execution

Chart creation

Chart creation - Aim, algorithm, execution

Draw graphs to illustrate the class performance

Draw graphs to illustrate the class performance - Aim, algorithm, execution

MS-POWERPOINT - Organization chart creation

MS-POWERPOINT - Organization chart creation - Aim, algorithm, execution

Draw a flow chart using power point to find the sum of 50.

Draw a flow chart using power point to find the sum of 50. - Aim, algorithm, execution

Presentation to demonstration of as product

Presentation to demonstration of as product - Aim, algorithm, execution

Design a effective advertisement copy for a product of your choice

Design a effective advertisement copy for a product of your choice - Aim, algorithm, execution

Adding picture from clip gallery – making slide show.

Adding picture from clip gallery – making slide show. - Aim, algorithm, execution

MS Access: Creating table

MS Access: Creating table - Aim, algorithm, execution

MS Access: Adding fields

SEMESTER - II ALLIED-PRACTICAL

OFFICE AUTOMATION AND MULTIMEDIA PRACTICAL

MS Access: Adding fields - Aim, algorithm, execution

MS Access: Entering values

MS Access: Entering values - Aim, algorithm, execution

MS Access: storing tables

MS Access: storing tables - Aim, algorithm, execution

Text Books :

Multimedia making it work | Edition:1 | - | TayVaughen(2004)

SEMESTER - II MAJOR-THEORY

INSTRUMENTATION TECHNIQUES

OBJECTIVES :

To give basic knowledge about various biochemical techniques , its principle, procedure and applications To make them aware of its usage in biochemical research .

HOURS / WEEK - 5		
HOURS / SEMESTER - 75		
CIA	**CO-CURRICULAR ACTIVITIES**	**LECTURE**
10	**5**	**60**

UNIT-I (LECTURE HOURS: 12)

pH

Introduction - Definition, Determination of pH using indicators and pH meter

Electrode - Types- calomel electrode, silver-silver chloride electrode and standard hydrogen electrode

Henderson's Hasselbach equation - Relationship between pKa & pH

Buffer

Buffer solutions - Acids and bases

Buffer systems of Blood - Bicarbonate buffer system, Protein buffer system - Bohr's theory

Activity

1 - Determine the pH of 0.01N HCl and 0.01N NaOH using pH indicator paper

2 - Make a Model/Chart work for pH meter set up.

UNIT-II (LECTURE HOURS: 12)

CHROMATOGRAPHY AND ITS TYPES

Paper Chromatography - Principle, Technique & applications.

Thin Layer chromatography & Gas Liquid chromatography - Principle, Technique & applications.

Ion exchange & Affinity chromatography - Principle, Technique and Applications

Molecular sieve - Principle, technique and applications

HPLC - Principle, technique and applications

Activity

1 - Group discussion on working principle of different types of chromatography

2 - Identify different types of resins used for ion exchange chromatography with their chemical and trade name in internet

UNIT-III (LECTURE HOURS: 12)

ELECTROPHORESIS

Introduction - Definition, factors affecting electrophoretic mobility.

Agarose gel electrophoresis, SDS-PAGE - Principle, technique and applications **Immunoelectrophoresis** - Counter - current and Rocket electrophoresis **Isoelectric focusing** - Principle, technique and applications

Centrifugation

Introduction & rotor types - Basic principles of centrifugation-Relative centrifugal force & types of rotor.

Ultra centrifuge - Working & Applications.

Preparative centrifugation - Differential centrifugation

Analytical centrifugation - - Basic principles of sedimentation, sedimentation coefficient, applications.

Density Gradient centrifugation - Principle, Instrumentation and applications

Activity

1 - Chart work to differentiate Agarose and SDS-PAGE electrophoresis

2 - Quiz on types of centrifugation

UNIT-IV (LECTURE HOURS: 12)

COLORIMETRY

Color and absorption spectrum - Color and absorption spectrum

Beer-Lambert's law - Principle and laws

Measurement of extinction - Extinction coefficient

Working of a single cell photoelectric colorimeter - Principle instrumentation & applications

SEMESTER - II MAJOR-THEORY

INSTRUMENTATION TECHNIQUES

SPECTROPHOTOMETRY

SPECTROPHOTOMETRY - Principle, Components of the instrument and applications

FLUORIMETRY

FLUORIMETRY - Principle, instrumentation and applications **Flourimetric analysis** - Flourimetric analysis of thiamine and riboflavin **Flame photometer** - Principle, instrumentation and applications **Activity**

1 - Types of colorimeter and spectrophotometer- Demonstration

2 - Perform internet search on application of flame photometer

UNIT-V (LECTURE HOURS: 12)

ISOTOPES AND RADIOACTIVITY

Introduction - Definition, -Negatron, Positron, Alpha emission, Electron capture, Gamma rays. **Tracer techniques** - Radioactive decay and units of radio activity - Curie, Bequerel, specific activity **Detection and measurement of radio activity** - GM counter, Scintillation counting, Autoradiography **Applications of radioisotopes** - Biological and Medical sciences

Activity

1 - Quiz on Radioactive isotopes- merits and demerits

2 - Chart work to differentiate GM counter and scintillation counter

Text Books :

T1 Biophysical chemistry | Edition:1 | Himalaya publishing House | AVINASH UPADHYAY AND KAKOLI UPADHAYAY (2006)

T2 Principles and Techniques of Biochemistry and Molecular Biology | Edition:1 | Cambridge University Press London | WILSON K WALKER (2008)

T3 Analytical Biochemistry | Edition: | Chinna publication | ASHOKAN.P(2005)

T4 Analytical techniques in Biochemistry and Molecular Biology | Edition:1 | Springer Publications | RAJAN KATOCH(2005)

Reference Books :

R1 Introduction to Practical Biochemistry | Edition:3 | McGraw-Hill Publishers | DAVID .TPLUMMER(1998) R2 Modern Experimental Biochemistry | Edition:3 | Pearson Publishers | Rodney.FBoyer (2010)

SEMESTER - II MAJOR-THEORY

ENZYMOLOGY

OBJECTIVES :

To give Basic knowledge on Enzymology and various techniques on Enzymatic analysis . To make them aware of its application in industries .

HOURS / WEEK - 3		
HOURS / SEMESTER - 45		
CIA	**CO-CURRICULAR ACTIVITIES**	**LECTURE**
6	**3**	**36**

UNIT-1 (LECTURE HOURS: 8)

ENZYME

Introduction & Nomenclature - According to IUB system. Digit number, Suffix “ase”

Classification - Six main classes, Definition & suitable examples

ACTIVE SITE

Introduction & Mode of action - Sailent features of active site residues. Binding sites and catalytic sites

Lock and Key model - Definition, mechanism & diagram

Induced fit model - Definition, mechanism & diagram

UNIT-2 (LECTURE HOURS: 8)

ENZYME KINETICS

Steady state theory - Rate of formation of ES, Graph, Michaelis-Menton equation, Km - Michaelis constant

LB Plot - LB Plot Graph

Hanes plot - Based on the MM equation

ENZYME INHIBITION & FACTORS AFFECTING ENZYME ACTIVITY

Introduction - Reversible inhibitors, Irreversible inhibitors

Competitive, Non competitive & Uncompetitive inhibition - Mechanism with examples

Effect of various factors affecting enzyme activity - Vital role in metabolic regulation. Substrate, enzyme, temperature & PH, Saturation point, Vmax, Km, Optimum PH & Temperature

UNIT-3 (LECTURE HOURS: 8)

COENZYME

Introduction &Nicotinamide coenzymes - NAD+ and NADP+

Flavin nucleotides - FMN and FAD

Thiamine pyrophosphate - Definition,Structure & functions

ISOENZYMES

Multienzyme complex - Definition & examples

Pyruvate dehydrogenase - Mechanism & reactions

UNIT-4 (LECTURE HOURS: 6)

ENZYME IMMOBILIZATION

Introduction - Definition

Methods of immobilization - Encapsulation, Entrapment, Binding, Cross linking

Applications of immobilized enzymes - Components of analytical systems, continuously operated process

UNIT-5 (LECTURE HOURS: 6)

ENZYME BIOSENSOR

Introduction - Definition and Principle

Types and Applications - Colorimetric,Optical & immunosensor

ENZYME IN MEDICINE, FOOD & TEXITILE INDUSTRY

Role of enzyme in medicine - Treatment of various diseases

Food and drink industries - Baking of bread, brewing industries

Other industries - Washing powders, Immobilized glutamate dehydrogenase linked to alcohol dehydrogenase

SEMESTER - II MAJOR-THEORY

ENZYMOLOGY

Text Books :

T1- Fundamental of Enzymology | Edition:1 | Oxford science publications | Lewis Stevens AND Nicholas C Prince (1989) T2- Enzymes - Biochemistry, Biotechnology, Clinical chemistry | Edition:1 | Eastwest Press Pvt Ltd | Trevor Palmer(2004)

Reference Books :

R1- Principles of Biochemistry | Edition:1 | CBS publishers and Distributors | Albert Lehninger(1993)

R2 - Harper's Illustrated Biochemistry | Edition:2 | McGraw Hill Publications | Dary K Granner AND Robert K Murray (2003)

OBJECTIVES :

-

HOURS / WEEK -	**1**	
HOURS / SEMESTER -	**15**	
CIA	**CO-CURRICULAR ACTIVITIES**	**LECTURE**
2	**1**	**12**

UNIT I (LECTURE HOURS: 12)

Internet for biologist , internet surfing , e mail Internet surfing and e mail -

Information Search and data retrieval google and other search engines - **Crystallography structural database Structural databases** -

Major data bases

NCBI, Pubmed, DDBJ, EMBL -

Databases for biochemistry KEGG, PDB -

Accessing e library e library -

Text Books :

Bioinformatics - Practical Approach | Edition:1 | - | ManiVijayaraj(2006)

SEMESTER - III ALLIED-PRACTICAL

LAB IN CHEMISTRY AND BIOCHEMISTRY

OBJECTIVES :

To give wide knowledge on chemical properties of commonly used chemicals.

HOURS / WEEK - 5		
HOURS / SEMESTER - 75		
CIA	**CO-CURRICULAR ACTIVITIES**	**LECTURE**
10	**5**	**60**

UNIT I (LECTURE HOURS: 20)

Titrimetric Analysis

Estimation of sodium hydroxide using sodium carbonate - **Estimation of ferrous sulphate using standard Mohr salt solution** - **Estimation of oxalic acid using standard ferrous sulphate** - **Estimation of Total hardness of water using EDTA** -

UNIT II (LECTURE HOURS: 20)

Volumetric Analysis

Detection of elements (N, S, Halogens) -

Identification of Aliphatic, Aromatic, Saturated and Unsaturated compounds -

Functional group test for Phenols, Acids, Aromatic primary amines, Amide, Diamide, Dextrose - **Systematic analysis of organic compounds containing one functional group and characterisation by confirmatory test** -

UNIT III (LECTURE HOURS: 10)

Standardisation of Solution

Preparation of standard solutions(1N Sulphuric acid, 2N sodium hydroxide, 5N potassium permanganate, 2N oxalic acid) -

UNIT IV (LECTURE HOURS: 10)

Demonstration Experiment

Separation of sugars by paper chromatography -

Separation of aminoacids by Paper chromatography -

Text Books :

Laboratory manual in Biochemistry | Edition:1 | New Age International Limited, New Delhi | J Jayaraman-(1996)

Reference Books :

Practical chemistry | Edition:8 | Ratan Prakashan Mandir Educational and University | S K Agarwal- AND S K Wadhwa-(1996)

SEMESTER - III MAJOR-PRACTICAL

MAJOR BIOCHEMISTRY PRACTICAL II

OBJECTIVES :

To give wide knowledge on quantitative estimations using titrimetry , colorimetry Andrews Kinetic studies of enzymes

HOURS / WEEK - 4		
HOURS / SEMESTER - 60		
CIA	**CO-CURRICULAR ACTIVITIES**	**LECTURE**
8	**4**	**48**

UNIT I (LECTURE HOURS: 48)

DETERMINATION OF CATALASE ACTIVITY

Effect of pH on Catalase Activity -

Effect of Temperature on Catalase Activity -

Effect of substrate concentration on Catalase Activity -

DETERMINATION OF SALIVARY AMYLASE ACTIVITY

Effect of pH on Salivary Amylase activity -

Effect of Temperature on Salivary Amylase Activity -

Effect of substrate concentration on Salivary Amylase acitivity -

DETERMINATION OF ACID PHOSPHATASE ACTIVITY

Effect of pH on Acid Phosphatase activity -

Effect of Temperature on Acid Phosphatase activity -

Effect of Substrate concentration on Acid phosphatase activity -

ESTIMATION OF ENZYMES

Estimation of SGOT in serum -

Estimation of SGPT in serum -

Estimation of Acid phosphatase in serum -

Estimation of Alkaline phosphatase in serum -

Text Books :

Principles and techniques of Practical Biochemistry | Edition:4 | Cambridge University Press | Keith wilsonJohn M. Walker(2000)

Reference Books :

Biochemical Methods | Edition:2 | New age international publisher | S. SadasivamA. Manickam(1996)

SEMESTER - III

CAREER ORIENTED PROGRAMME-THEORY BIOLOGICAL DATABASES AND ANALYSIS

OBJECTIVES :

To understand the genomic database acuquisition and analysis comparitive and predictive analysis of DNA and Protein sequence, phylogenetic inference etc.

HOURS / WEEK - 1		
HOURS / SEMESTER - 15		
CIA	**CO-CURRICULAR ACTIVITIES**	**LECTURE**
2	**1**	**12**

UNIT I (LECTURE HOURS: 3)

Biological database- PIR, NRDB, PRINTS, SCOP, UniGene, SGD. PIR,NRDB,PRINTS,SCOP,Unigene,SGD - -

Understanding and using of biological database- Relational and Flat file database, Hypertext database, NCBI stru Relational and flatfile database,hypertext,,NCBI structural database - -

MMDB. Database search for homologous sequence: FASTA and BLAST. MMDB,BLAST and FASTA - -

UNIT II (LECTURE HOURS: 2)

Genome annotations and Genome analysis: Prokaryotic and Eukaryotic genomes, Genome annotations and analysis. - -

Data analysis, Proteome analysis, Sequence analysis.

Prokaryotic and eukaryotic genome, data,proteome and sequence analysis - -

UNIT III (LECTURE HOURS: 3)

Evolutionary analysis: Definition and description of phylogenetic tree and various types of trees. Phylogenetic trees-Types definiton and description. - -

Tree building- Neighbour joining, Minimum evolution Neighbour joining,Minimum evolution - -

Maximum parsimony, and Maximum likelihood. Maximum parsimony and maximum likelihood - -

UNIT IV (LECTURE HOURS: 2)

Analysis packages- Introduction- Comprehensive packages Analysis and comprehensive packages. - -

Intranet packages, Internet packages. Intranet and internet packages - -

UNIT V (LECTURE HOURS: 2)

HTML, Web browsers, Board coverage of bioinformatics, HTML and Web browsers - -

Components of bioinformatics. Components of bioinformatics - -

Text Books :

BIO INFORMATICS METHODS AND APLLICATIONS | Edition:2 | PRENTICE HALL OF INDIA PVT LTD | S C RASTOGI(2007)

SEMESTER - III MAJOR-THEORY

MOLECULAR BIOLOGY

OBJECTIVES :

To give wide knowledge on molecular level understanding of life .

To make students aware of the central dogma to apply in genetic research .

HOURS / WEEK - 5		
HOURS / SEMESTER - 75		
CIA	**CO-CURRICULAR ACTIVITIES**	**LECTURE**
10	**5**	**60**

UNIT-1 (LECTURE HOURS: 12)

ORGANIZATION OF GENETIC MATERIAL

Introduction - Central Dogma, Nucleosides, Nucleotides, DNA & RNA, Gene

Structure, composition and types of DNA - Watson and Crick model, A, B and Z form of DNA

Prokayotic Chromosomes - Organisation of Bacterial chromosome, Supercoiling **Eukaryotic Chromosomes** - Structure of Chromatin, Histones and Nucleosomes **EVIDENCES FOR DNA AS THE GENETIC MATERIAL**

Experimental Proof - Griffith experiment, Hershey-Chase experiment and Avery-MacLeod-McCarty experiment

GENE TRANSFER IN BACTERIA

Transformation - Definition, Mechanism **Transduction** - specialized and generalized **Conjugation** - Definition, Mechanism **ACTIVITY**

1 - Chart work on Watson and Crick model of DNA

2 - Quiz on structural features of DNA and RNA

UNIT-2 (LECTURE HOURS: 12)

DNA REPLICATION

Introduction - Definition

Mode of DNA Replication - Conservative, Semiconservative and Dispersive mechanism

Experimental Proof for Semiconservative mechanism - Messelson and Stahl Experiment, Taylor's Experiment **Basic Requirement of DNA Replication** - Parental DNA, dATP, dCTP, dTTP, dGTP, Enzymes and Proteins **Steps involved in Replication** - Intitiation, Elongation and Termination

Initiation - Origin of Replication, Replication fork, Replication bubble

Elongation - Leading and Lagging strand synthesis

Termination - Tus protein binding at termination site in E.coli, Telomere synthesis in Eukaryotes

Enzymology of DNA replication - Types of DNA polymerases in, Role of Topoisomerases, DNA ligases, Helicases, SSB proteins, Primases, RNAase H and Telomerase

ACTIVITY

1 - Group Discussion on differences between prokaryotic and eukaryotic DNA Replication

2 - Animation on E.coli DNA replication

UNIT-3 (LECTURE HOURS: 12)

TRANSCRIPTION

Introduction - Definition, Basic features, Types of RNA molecules- Messenger RNA (mRNA), Transfer RNA (tRNA), Ribosomal RNA (rRNA) and Other types of RNA

PROKARYOTIC TRANSCRIPTION

RNA Polymerase - Structure and function

Steps in RNA synthesis - Initiation, Elongation and Termination **Promoter regions in prokaryotes** - Pribnow box, -35 sequence **Termination** - Rho dependent and Rho independent **EUKARYOTIC TRANSCRIPTION**

Eukaryotic RNA Polymerase - RNA Polymerase I, II and III

Process of Transcription in Eukaryotes - Initiation, elongation and termination

SEMESTER - III MAJOR-THEORY

MOLECULAR BIOLOGY

Promoter regions in Eukaryotes - TATA box, CAAT box, GC box **Transcriptional factors and Enhancers** - types and function **Processing of mRNA** - Capping, tailing and RNA splicing **ACTIVITY**

1 - Group Discussion on Prokaryotic Transcription

2 - A report between the differences seen in Prokaryotic and Eukaryotic transcription

UNIT-4 (LECTURE HOURS: 12)

THE GENETIC CODE

Genetic Code - Salient features, Genetic code table, Wobble hypothesis

Codons - Definition, Start codons, stop codons and sense codons

Translation - Composition of ribosomes, Aminoacyl-tRNA synthetases, Activation of aminoacid

TRANSLATION IN PROKARYOTES

Steps involved in Translation - Initiation, chain elongation and termination

TRANSLATION IN EUKARYOTES

Process of Translation - Initiation, chain elongation and termination

Differences between Prokaryotic and Eukaryotic translation - Initiator tRNA, translational factors **Post-translational modifications** - deformylation ,Acetylation, glycosylation, hydroxylation **Inhibitors of Translation** - Streptomycin, Neomycin, Tetracycline

ACTIVITY

1 - Quiz on Translation

2 - Animation on Post translational modification

UNIT-5 (LECTURE HOURS: 12)

REGULATION OF GENE EXPRESSION

Introduction - Constitutive and Inducible gene expression

Terminologies in Regulation of Gene expression - Structural genes, Cistron, Controlling sites, Regulatory proteins

Controlling sites - Promoters, Operators, Initiators, Attenuators **Regulatory proteins** - Activators, Terminators, Repressors **OPERON**

Introduction - Definition

Operon models - Postive and Negative control of Lac operon and Trp operon

MUTATION

Introduction - Definition of Mutation and Mutagen

Types of mutation - Classfication based on origin, size, types of nucleotide changes, effect on gene product and function

Types of mutagens - Physical, chemical and Biological mutagens **DNA Repair mechanisms** - Excision Repair, Photoreactivation **ACTIVITY**

1 - Chart work on Lac and Trp operon

2 - Powerpoint presentation on types of mutation

Text Books :

Essentials of molecular biology | Edition:1 | Narosa publishing house, New Delhi | DavidFreifelder(1995) Molecular biology | Edition:1 | Mc Graw Hill publishers, USA | Robert F Weaver(1999)

Reference Books :

Genetics | Edition:3 | WMC Brown Publishers | Weaver F Robert(1997) Molecular biology | Edition:1 | MJP Publishers, India | Jeyanthi G.P(2000)

SEMESTER - III MAJOR-THEORY

HUMAN PHYSIOLOGY

OBJECTIVES :

To understand fundamental mechanisms underlying normal function of cells , tissues, organs, and organ systems of the human body

HOURS / WEEK - 5		
HOURS / SEMESTER - 75		
CIA	**CO-CURRICULAR ACTIVITIES**	**LECTURE**
10	**5**	**60**

UNIT-1 (LECTURE HOURS: 12)

DIGESTIVE SYSTEM

ANATOMY OF THE DIGESTIVE SYSTEM - Structural features of Intestinal organs, Parts of the digestive system **SALIVARY, GASTRIC AND BILIARY SECRETIONS** - Composition, properties, Mechanism and functions **MECHANISM OF HCl SECRETIONS** - Secretion of pepsinogen and HCl

INTESTINAL HORMONES - Gastro Intestinal hormones and its secretions

DIGESTION , SECRETION, AND ABSORPTION IN THE SMALL INTESTINE - Digestion and absorption of

carbohydrates, lipids and proteins.

ACTIVITY

1 - 1. Make a chart preparation on Digestive system of human.

2 - Animation on the anatomy of Digestive System

UNIT-2 (LECTURE HOURS: 12)

BODY FLUIDS

EXTRACELLULAR FLUID-PLASMA - Definition ,composition and function **EXTRACELLULAR FLUID-BLOOD** - Definition ,composition and functions **OSMOLARITY OF THE BODY FLUIDS** - Ionic composition, electrolytes, body buffers. **BLOOD CELLS - WBC, RBC AND PLATELETS** - Introduction and functions

BLOOD GROUPS AND BLOOD COAGULATION - ABO & Rh factor - Mechanism of blood coagulation

INTERSTITIAL FLUID AND TRANSCELLULAR FLUID - Lymph and its fuction

ACTIVITY

1 - Blood - Separation of plasma & serum.

2 - Microscopic observation- WBC, RBC, Platelets.

UNIT-3 (LECTURE HOURS: 12)

CIRCULATORY & RESPIRATORY SYSTEM

CIRCULATION - Structure of Heart and Blood vessels

CARDIAC CYCLES - Cardiac factors controlling Blood pressure, electrocardiogram

FUNCTIONS OF HEART - Functions of heart in Blood circulation

RESPIRATION - Anatomy, and physiology of Respiration, pulmonary surfactant

EXCHANGE OF GASES - Exchange of between lung and blood and between blood and tissues

FUNCTION OF LUNG - Role of lung in acid-base balance.

ACTIVITY

1 - Make a chart preparation on Respiratory system

2 - Display a model of Heart

UNIT-4 (LECTURE HOURS: 12)

NERVOUS SYSTEM

CENTRAL NERVOUS SYSTEM - General organization **FUNCTIONAL UNITS- NEURON** - Structure and its function **RESTING AND ACTION POTENTIAL** - Conduction of nerve impulses **SYNAPTIC TRANSMISSION.** -

BRAIN - Chemical composition, metabolism, metabolic adaptation

NEUROTRANSMITTERS - Introduction, types and functions

SEMESTER - III MAJOR-THEORY

HUMAN PHYSIOLOGY

BIOCHEMICAL ASPECTS - Learning and memory

ENKEPHALINS AND ENDORPHINS - Introduction, Receptor mechanism and functions

ACTIVITY

1 - Animation on the Nerve transmission - Mechanism.

2 - Chart preparation on Neurotransmitters

UNIT-5 (LECTURE HOURS: 12)

EXCRETORY SYSTEM

KIDNEY - Structure and functions of kidney

NEPHRON - Structure & composition

MECHANISM OF URINE FORMATION - Glomerular filteration **RENAL FUNCTION** - Tubular reabsorption and tubular secretions **MICTURITION** - Urinary Infection

RENAL REGULATION - Acid - Base Balance

MUSCLE - Structure & Functions

MUSCLE CONTRACTION - Mechanism and theories

ACTIVITY

1 - Structure of Nephron - chart preparation

2 - Display a model of Kidney

Text Books :

HUMAN PHYSIOLOGY | Edition:10 | Central Book Agency | Chandi Charan Chatterjee(2002)

TEXTBOOK OF HUMAN PHYSIOLOGY | Edition:2 | S Chand & Company Pvt Ltd | Sarada Subrahmanyam(1985)

Reference Books :

HUMAN PHYSIOLOGY: FOUNDATIONS AND FRONTIERS | Edition:2 | Mosby Publishers | DAVID E MOFFETT(1993)

SEMESTER - III MAJOR-PRACTICAL

LAB IN MLT

OBJECTIVES :

To give basic knowledge on Haematology and Clinical Pathology

HOURS / WEEK - 3		
HOURS / SEMESTER - 45		
CIA	**CO-CURRICULAR ACTIVITIES**	**LECTURE**
6	**3**	**36**

UNIT-1 (LECTURE HOURS: 36)

Haematology

Collection of Blood - Separation of Serum and Plasma

Preparation of anticoagulant bottles - **Estimation of Hemoglobin** - **Enumeration of RBC and WBC cells** - **Bleeding time** -

Clotting time -

Clinical Pathology

Collection of urine and its preservation - **24 hour urine collection for protein** - **Sugar test by Benedict's method** - **Immunohaematology**

ABO grouping - Cell and serum grouping

Rh grouping -

Text Books :

Biochemical methods | Edition:1 | New Age International | S.Sadasivam, A.Manickam(1995)

Reference Books :

Principles and techniques of Practical Biochemistry | Edition:5 | Cambridge University press | Keith Wilson, John Walker(2005)

SEMESTER - IV ELECTIVE-THEORY

ELECTIVE I - STEM CELLS AND CANCER BIOLOGY

OBJECTIVES :

To give basic knowledge on types of stem cells and make them aware of cancer and its pathology.

HOURS / WEEK - 5		
HOURS / SEMESTER - 75		
CIA	**CO-CURRICULAR ACTIVITIES**	**LECTURE**
10	**5**	**60**

UNIT I (LECTURE HOURS: 12)

STEM CELLS

Stem cells - Introduction, Definition and history

Types - Oligopotent, Totipotent, Pluripotent

Properties - Specialized, unspecialized (differentiation) **Embryonic stem cells** - Introduction, Generation and culturing **Adult stem cells** - Introduction, Generation and culturing **Hematopoietic stem cells** - Introduction, Generation and culturing **Stem cell in aging** - potency and future of stem cells

UNIT II (LECTURE HOURS: 12)

Leukemia and cancer stem cells Leukemia - Introduction, history and causes

Cancer stem cells - Origin, Metastasis, implications

Neural stem cells - Differentiation, implications

Neurodegenerative diseases - Introduction, Alzheimer's disease, Parkinson's disease

Derived stem cells

Differentiation - Early and later development

Types - Ectoderm, Endoderm and mesoderm derived stem cell

Fate mapping of stem cells Introduction - - Experimental system

UNIT III (LECTURE HOURS: 12)

Stem cell therapies

Applications of stem cell - In the treatment for major diseases in reparative medicine

Hematopoietic Stem Cell - transplantation

Skin replacement therapy - Introduction and treatment using stem cells

Brain cell Transplantation - Introduction and therapy using stem cells

Autoimmune diseases, Grave's disease, Diabetes - Introduction and therapy using stem cells

Heart failure - Introduction and therapy using stem cells

Future challenges and ethical issues

Challenges in stem cell usage - Introduction and its applications

Issues related to stem cells - Ethical and legal issuses

UNIT IV (LECTURE HOURS: 12)

Cell cycle and cancer

Introduction of cell phases - Mitotic phase, interphase, centromere, chromatids

Cancer biology and carcinogenic agents - Introduction, neoplasia, anaplasia, metaplasia and hyperplasia

Cancer cells

Cancer stem cells - Introduction and its nature

Characteristics of cancer cells - changes in cell membrane structure and functions, tumor angiogenesis **Carcinogenic agents** - Physical, chemical and biological agents in carcinogenesis. Historical highlights **Types of chemical carcinogens** - direct acting, pro-carcinogens, co-carcinogens, mechanism of their action. **Viral carcinogenesis** - Role of viruses in causation of human cancer; Tobacco and diet related cancers

SEMESTER - IV ELECTIVE-THEORY

ELECTIVE I - STEM CELLS AND CANCER BIOLOGY

UNIT V (LECTURE HOURS: 12)

Causes, Types of cancer

Causes of cancer - Physical and Biological factors, radition exposure, Tumor promoters

Types of cancer - Benign, malignant, metastatic cancers. Carcinomas, sarcomas, adenomas, haemopoetic cancers
Cancer screening and early detection - Detection using biochemical assays, Tumor markers, Molecular tools for early diagnosis of cancer

Detection , Treatment and Therapies of cancer

Detection of cancers - Prediction of aggressiveness of cancer

Different forms of cancer therapy - Chemotherapy, Radiation therapy, targeted cancer therapy and Immunotherapy

Advances in cancer detection -

Use of signal targets towards therapy of cancer, Gene therapy. -

Text Books :

T1- Molecular Cell Biology | Edition:5 | Freeman and company | LODISH H ET AL.(2004)

T2- Text Book of Molecular Biotechnology | Edition:1 | IK International Publishers | ASHO K CHAUHAN(2009)

T3-Leninger Principles of Biochemistry | Edition:3 | Mac Millan Worth Publishers | DAVID NELSON . AND MICHAEL M.COX .(2003) T4 Molecular Cell Biology | Edition:4 | Freeman and company | LODISH H ET AL .(2002)

T5 Understanding Stem cells | Edition:1 | National Academy Of Sciences | THOMAS P ZWAKA.(2010)

T6 The Cell and molecular approach | Edition:4 | Hausman | GEOFFREY COOPER . AND ROBERT E.(2007) T7 Cell and Molecular Biology | Edition:3 | John Wiley And sons | PHILIP SHEELER .(1987)

Reference Books :

R1 Molecular Biology of gene | Edition:4 | cumin publishers | BENJAMIN . AND WATSON.(2004)

SEMESTER - IV

CAREER ORIENTED PROGRAMME-PRACTICAL

COP - BIOLOGICAL DATABASES AND BIOMOLECULAR STRUCTURE AND DYNAMICS

OBJECTIVES :

TO GAIN THE PRACTICAL KNOWLEDGE

HOURS / WEEK - 1		
HOURS / SEMESTER - 15		
CIA	**CO-CURRICULAR ACTIVITIES**	**LECTURE**
2	**1**	**12**

UNIT - 1 (LECTURE HOURS: 12)

Biological databases dna database -

Data retrieval tools and methods data retrieval -

Database file formats Data file format - **Molecular visualisation Molecular visualisation** -

Gene stucture and function prediction using Genscan, Genmark Gene structure -

Sequence similarity search (NCBI BLAST) BLAST -

Protein sequence analysis (ExPASy proteomics tools) ExPASY -

Multiple sequence alignment (Clustal) CLUSTAL -

Molecular phylogeny (PHYLIP) PHYLIP -

Getting 3D structure of protein 3D STRUCTURE -

Text Books :

bioinformatics: sequen&genome analysis | Edition:1 | cold spring harbour laboratory | mountd(2004)

Reference Books :

computaional molecular biology | Edition:1 | prentice hall of india | pevznerp.a(2004)

SEMESTER - IV MAJOR-PRACTICAL

MAJOR BIOCHEMISTRY PRACTICAL II

OBJECTIVES :

To make the students practically learn the concepts pertaining to Titrimetry and Separation techniques.

HOURS / WEEK - 4		
HOURS / SEMESTER - 60		
CIA	**CO-CURRICULAR ACTIVITIES**	**LECTURE**
8	**4**	**48**

UNIT-1 (LECTURE HOURS: 48)

TITRIMETRY

Estimation of Reducing sugar - Benedict's method **Estimation of Ascorbic acid** - Dye method **Estimation of Chloride** - Vanslyke's method **Estimation of DNA** - DNPH method

Estimation of RNA - Orcinol method

SEPARATION TECHNIQUES

Separation of lipids by TLC - Demonstration **Separation of proteins by SDS-PAGE** - Demonstration **Agarose gel Electrophoresis of DNA** - Demonstration

Text Books :

Essentials Of Practical Biochemistry | Edition:1 | CBS Publishers and Distributors | Srivastava(2000) Principles and Techniques of Practical Biochemistry | Edition:4` | - | , Keith Wilson John Walker.(2004)

SEMESTER - IV MAJOR-THEORY

INTERMEDIARY METABOLISM

OBJECTIVES :

To give basic knowledge on different metabolic pathways.

HOURS / WEEK - 5		
HOURS / SEMESTER - 75		
CIA	**CO-CURRICULAR ACTIVITIES**	**LECTURE**
10	**5**	**60**

UNIT-I (LECTURE HOURS: 12)

Bio energetics

Free energy change, endergonic and exergonic reactions - Definition ,laws of Thermodynamics, Gibbs free energy

Metabolism

Basic metabolic pathways Basic metabolic pathways Basic metabolic pathways - anabolic, catabolic and amphibolic pathways

Carbohydrate metabolism

Fate of absorbed carbohydrates - Glycolysis: pathway and energetics

Oxidation of pyruvate to acetyl - CoA - Pyruvate dehydrogenase complex, Stages1 to4

TCA cycle: pathway and energetics - Reactions of Citric Acid cycle

Anaplerotic reactions - Filling up reactions or replenishment of TCA cycle intermediates

Gluconeogenesis - Transamination,deamination,propionate metabolism

Glycogenesis - Reactions of glucokinase,formation of UDPG glucose,Glycogen synthase reaction

Glycogenolysis - Reactions of Glycogen phosphorylase,glucan transferase and glucose phosphatase, Regulation of Glycogen metabolism by cAMP cascade.

Activity

1 - Group Discussion on anabolic, catabolic and amphibolic pathways

2 - Chart work on glycogen storage diseases

UNIT-II (LECTURE HOURS: 12)

Pentose phosphate pathway

HMP shunt - Oxidative and non oxidative phase reactions

Glyoxylate cycle - Conversion of acetyl CoA to succinate &Glyoxylate

Biological Oxidation

Oxidation Reduction reactions - Electron transfer,hydrogen ions,hydride ions transfer reactions

Enzymes and Coenzymes involved in oxidation and reduction - NADH,NADH,Ubiquinone,Cytochromes etc

Electron Transport Chain - Complexs I to IV

Mechanism of oxidative phosphorylation - Chemical coupling, conformational coupling and chemiosmotic coupling hypothesis.

Uncouplers of Oxidative Phosphorylation - 2,4-DNP, dicoumarol, Respiratory control.

Activity

1 - Quiz on enzymes and coenzymes like NADH, NADPH, Ubiquinone and cytochromes

2 - Model work on Electron transport chain

UNIT-III (LECTURE HOURS: 12)

Lipid Metabolism

Dietary lipids - Introduction & breakdown of lipids to fatty acids & tri acyl glycerol

Oxidation of fatty acids - Carnitine cycle, beta - oxidation

alpha - Oxidation and Omega- Oxidation - Metabolism of phytanicacid,oxidation of alkanesin bacteria & animal systems

Metabolism of propionyl CoA - Conversion of propionic acid to acetylCoA. **Biosynthesis of saturated fatty acids** - Cytoplasmic synthesis of fatty acids. **Biosynthesis of phospholipids** - phosphotidyl choline, ethanolamine and serine

Biosynthesis of Cholesterol - Conversion of acetate to mevalonate to isoprene to squalene to cholesterol.

SEMESTER - IV MAJOR-THEORY

INTERMEDIARY METABOLISM

Activity

1 - Collection of newspapers articles related to hazards of fast food

2 - Debate on comparison of fatty acid synthesis and oxidation.

UNIT-IV (LECTURE HOURS: 12)

Protein Metabolism

Fate of dietary proteins - Proteins are degraded to aminoacids-metabolic nitrogen pool

Catabolism of amino acid - Deamination, transamination, decarboxylation **Aminoacid degradation** - Glucogenic and ketogenic aminoacids **Catabolism of Glycine** - Metabolic fates of glycine

Urea cycle - Reactions and intermediates of urea cycle

Catabolism of Phenylalanine and Tyrosine - Conversion of Phenylalanine and Tyrosine to acetoacetyl CoA

Interrelation between carbohydrate, fat and protein metabolism

Integration of Metabolism - Inter connected pathways,Key junctions,metabolic interchanges between muscle and liver.Interrelation between Carbohydrate, fat and protein metabolism

Activity

1 - Group discussion on metabolic defects of urea cycle

2 - Quiz on the inborn errors of amino acid metabolism

UNIT-V (LECTURE HOURS: 12)

Nucleic acids

Introduction - Nucleosides & Nucleotides

Metabolism of Purines

Biosynthesis of purine nucleotides Denovo synthesis - Synthesis of purines AMP & GMP from ribose 5 phosphate **Biosynthesis of purine nucleotides salvage pathways** - Conversion of purines their nucleosides & their deoxyribonucleotides into mononucleotides

catabolism of purines - Conversion of purines to uric acid.

Metabolism of pyrimidines

Biosynthesis of pyrimidine nucleotides- salvage pathways - Deoxyribonucleosides of uracil & cytosine are salvaged.

Catabolism of pyrimidines. - Conversion of pyrimidines to beta alanine & beta amino isobutyrate.

Biosynthesis of pyrimidine nucleotides - Denovo synthesis and salvage

Activity

1 - Chart work on purine and pyrimidine nucleotides.

2 - Group discussion on the disorders of purine and pyrimidine metabolism.

Text Books :

Harpers illustrated Biochemistry | Edition:26 | McGraw Hill publication | Robert .K Murray(2003) Biochemistry | Edition:5 | W.H.Freeman & company,New York. | Lubert Stryer, Jeremy M Berg (2003) Fundamentals of Biochemistry | Edition:6 | S.Chand & Company,New Delhi. | J.L .Jain Sunjay Jain(2005)

Reference Books :

Biochemistry | Edition:2 | John wiley & sons | VoetVoet(1995)

SEMESTER - IV ALLIED-THEORY

BASIC MATHEMATICS

HOURS / WEEK - 5		
HOURS / SEMESTER - 75		
CIA	**CO-CURRICULAR ACTIVITIES**	**LECTURE**
10	**5**	**60**

UNIT I (LECTURE HOURS: 12)

Matrix algebra

Types of matrix - Basic concept

matrix addition, subtraction - Related Problems **multiplication of two matrices** - Related Problems **transpose of the matrix** - Related Problems

singular and non-singular matrices - Related Problems

orthogonal matrix - Related Problems

inverse of the matrix - Related Problems

simultaneous linear equations - Related Problems

UNIT II (LECTURE HOURS: 12)

Differentiation

Introduction - Basic concept

limits - Related Problems

limit of a function - Related Problems

properties of limits - Basic concept

differentiation of xn, ex, log ex - Related Problems **logerithmic differentiation** - Related Problems **parametric differentiation** - Related Problems

UNIT III (LECTURE HOURS: 12)

Integration

Arbitrary constant - Related Problems

some standard results - Formula & Related Problems

integration by substitution-I - Formula & Related Problems **integration by partial fractions** - Basic concept & Related Problems **integration by parts** - Formula & Related Problems

UNIT IV (LECTURE HOURS: 12)

Measures of central tendency and Measures of dispersion mean - Formula & Related Problems

median - Formula & Related Problems **mode** - Formula & Related Problems **Range** - Formula & Related Problems

quartile deviation - Formula & Related Problems

standard deviation - Formula & Related Problems

UNIT V (LECTURE HOURS: 12)

Correlation

Positive correlation - Explanation **negative correlation** - Explanation **no correlation** - Explanation **simple correlation** - Explanation **scatter diagram** - Explanation

correlation coefficient - Formula & Related Problems

rank correlation - Formula & Related Problems

SEMESTER - IV ALLIED-THEORY

BASIC MATHEMATICS

Text Books :

Business mathematics and statistics | Edition:5 | Margam publications | Dr.P.R.Vittal(2001)

Reference Books :

Business Mathematics and Statistics | Edition: | Jai Publishers | PA.Navnitham(2009)

SEMESTER - V MAJOR-THEORY

BIOCHEMICAL PHARMACOLOGY

OBJECTIVES :

To give basic knowledge on various errors in the metabolism of various biomolecules of our body , the pathological condition, symptoms caused by the change in their levels. To make them aware of the various metabolic disorders .

HOURS / WEEK - 6		
HOURS / SEMESTER - 90		
CIA	**CO-CURRICULAR ACTIVITIES**	**LECTURE**
12	**6**	**72**

UINT I (LECTURE HOURS: 14)

DRUGS

Introduction to drugs - The nature and sources of drugs

Routes of drug administration - Oral, Injections, Transcutaneous, Transmucosal

ADME

Absorption - Passive Diffusion, Acitve transport, pinocytosis

Distribution - Plasma, Interstitial dluid compartment, transcellular fluid compartment, cellular fluid compartment.

DRUG RECEPTORS

Cell surface receptors - Ion channels, G protein coupled receptors, Tyrosine kinases **Drug receptor interaction** - Agonist, antagonist, Inverse agonist, partial agonist **ACTIVITY**

1. **Powerpoint presentation on different source of drugs** -
2. **Model/Chart work on different types of drug receptors.** -

UNIT II (LECTURE HOURS: 14)

DRUG METABOLISM

Introduction - Biotransformation of xenobiotics .

Phase I - Oxidation, reduction and hydrolysis

Mixed function oxidases - Epoxidation, hydroxylation, O,N and S-Dealkylation, N-Dealkylation

Non-microsomal Oxidation - Alcohol dehydrogenase, Aldehyde dehydrogenase, diamineoxidases, polyamine oxidases

Phase II - Sulphation, methylation, aminoacid conjugation and glutathione conjugation.

DRUG ELIMINATION

Renal system - Passive glomerular filteration, Active Tubular secretion, passive diffusion across the tubules.

ACTIVITY

1. **Download animation on ADME mechanism** -
2. **Group Discussion on difference between Phase I and Phase II metabolism** -

UNIT III (LECTURE HOURS: 14)

CHEMOTHERAPY

Introduction - Definition and history

Antibacterial - Sulphonamides, Penicillin, Streptomycin, tetracycline.

Antiviral - Idoxuridine and Acyclovir.

Antimalarial - Quinine and chloroquine

Anti Tuberculosis - Isonicotinic acid hydrazide and Rifampicin.

Anticancer - Cyclophosphamide and methotrexate

ACTIVITY

1. **Quiz on Chemotherapy** -
2. **Group Discussion on mode of action of drugs in disease.** -

UNIT IV (LECTURE HOURS: 15)

DRUGS ACTING ON VARIOUS DISEASE

Central nervous system - Introduction, Structure and mode of action of barbiturates and salicylates. **Cardiovascular system** - Introduction, Structure and mode of action of Cardiac glycosides **Parkinson's Diseases** - Introduction, Monoamine oxidase inhibitors.

ACTIVITY

SEMESTER - V MAJOR-THEORY

BIOCHEMICAL PHARMACOLOGY

1. **Powerpoint presentation on drugs acting on CNS.** -
2. **Collection and Dicussion of Journal/ Articles related to Neurodegenerative diseases.** -

UNIT V (LECTURE HOURS: 15)

DRUGS OF PLANT ORIGIN

Primary and Secondary metabolites - Primary and Secondary metabolites

Drugs used for Renal Diseases - Mode of action of drugs **Drugs used for Hepatic Diseases** - Mode of action of drugs
DRUG DEPENDENCE AND ABUSE

Types - Psychic dependence nad physical dependence

Factors which facilitate abuse - Availability of drugs, peer group pressure, socioculture.

Principles of Treatment - Hospitalization, drug therapy, substitution therapy.

ACTIVITY

1. **Quiz on Drugs of plant origin.** -
2. **Group Discussion on Drug dependence and Abuse** -

Text Books :

PHARMACOLOGY AND PHARMACOTHERAPEUTICS | Edition:17 | Popular Prakashan Pvt Ltd | SATOSKAR RS BHANDARKAR SD (2001)

TEXTBOOK OF TOXICOLOGY | Edition:1 | I.K International publishing house Pvt Ltd | BALARAM PANI (2010)

Reference Books :

BIOPHARMACEUTICALS BIOCHMEISTRY AND BIOTECHNOLOGY | Edition:2 | wiley india Pvt.Ltd | GARYWALSH(2000)

SEMESTER - V MAJOR-THEORY

IMMUNOLOGY

OBJECTIVES :

To enable students to give basic knowledge on immune system of our body , various cells in WBC and to make an awareness about the immune system working against the antigens at various levels.

HOURS / WEEK - 6		
HOURS / SEMESTER - 90		
CIA	**CO-CURRICULAR ACTIVITIES**	**LECTURE**
12	**6**	**72**

UNIT I (LECTURE HOURS: 15)

IMMUNOLOGY

Introduction to Immunology - Definition and general principles of Immunology

TYPES OF IMMUNITY

Innate immunity - Physiological, genetic, anatomic and inflammatory **Acquired immunity** - Live and attenuated vaccines, Active and Passive **IMMUNE RESPONSE**

Antibody mediated immune response - Primary and secondary immune response

Cell mediated immune response - Lymphocytes and concept of grafting

ORGANISATION AND STRUCTURE OF LYMPHOID ORGANS

Primary lymphoid organs - Thymus and Bone Marrow

Secondary lymphoid organs - Spleen, Lymph node, Peyers Patches, CALT & MALT

COMPONENTS OF THE IMMUNE SYSTEM

Neutrophils, eosinophils and basophils - Structure and function **Macrophages and phagocytes** - Structure and function **ACTIVITY**

1. **Making clay models on Phagocytic action of Macrophages** -
2. **Exhibiting cartoon way of representing cells of Immune system** -

UNIT II (LECTURE HOURS: 15)

ANTIGEN

Introduction - Definition and Types

Properties - Specificity, cross reactivity, antigenicity, immunogenecity **Chemical nature** - Epitope, haptens, adjuvant, super antigen **ANTIBODY**

Introduction - Definition and properties

structure and function - Light Chain, Heavy Chain, Hinge region, Disulphide bonds

Class and subclass - Ig G, Ig A, Ig M, Ig E & Ig D **Clonal selection theory** - Response of B cells to antigen **ANTIGEN-ANTIBODY REACTIONS**

Primary, Secondary and Tertiary - Precipitation and agglutination experiments, Fluorescence test

COMPLEMENT SYSTEM

Introduction - Definition and mechanism of formation **Complement pathway** - Components and pathway **ACTIVITY**

1. **Antigen and Antibody reactions in the Spotlight: Students color and label images on a worksheet in highlighting the reactions of Antigen and Antibody** -
2. **To download animations illustrating working of complement system** -

UNIT III (LECTURE HOURS: 15)

MEASUREMENT OF ANTIGEN AND ANTIBODY COMBINATION

Introduction - Introduction of diffusion and agglutination methods

IMMUNO DIFFUSION

SEMESTER - V MAJOR-THEORY

IMMUNOLOGY

Immunodiffusion- Types - Radial immuno diffusion, double immuno diffusion (ouchterlony procedure) and electrodiffusion

Immuno electrophoresis - Principles and techniques

AGGLUTINATION

Types - Slide and Table agglutination **Widal test** - Method **IMMUNOLOGICAL TEST**

Application - RIA, ELISA, fluorescent antibody technique, monoclonal antibodies

ACTIVITY

1. **Article collection of recent immunological research from journals** -
2. **Making chart work to explain the immunodiffusion process** -

UNIT IV (LECTURE HOURS: 13)

ALLERGY AND HYPERSENSITIVITY

Types I & II - Mechanism and clinical manifestation **Types III & IV** - Mechanism and clinical manifestation
IMMUNOLOGICAL DISORDERS

Autoimmune diseases - Rheumatoid Arthritis and Myasthenia Gravis

Immuno-deficiency disease - AIDS virus and disease

Biomedical research - Abnormality of cells, disease, diagnosis and prevention

ACTIVITY

1. **Following were the disease given. Point out the type of hypersensitivity and give reason.** -
2. **Using the Internet (go for a list of useful websites), science articles and other publication from the national foundation for Autoimmune disease, make an oral presentation and provide a written report of your group's findings.** -

UNIT V (LECTURE HOURS: 14)

TRANSPLANTATION IMMUNOLOGY

Introduction - Allograft rejection and Graft vs Host diseases

Allograft rejection - Mechanism of graft rejection

Rejection to tumors - NK cells, tumor immunotherapy and lymphoid tumors

VACCINATION

Types of immunization - Active and Passive immunization **Types of vaccines** - DNA vaccines and Recombinant vaccines **Effects** - Benefits and adverse effects of vaccination **ACTIVITY**

1. **Kidney transplantation was performed using a kidney from a donor who was matched to the recipient by serologic tissue typing. However, within a few months the kidney was rejected. Assuming no technical problems with the surgical procedure, Give one reason for the rejection** -
2. **Examine the following : I. Virus: Poliovirus, Influenza virus, Rabies virus, Hepatitis B virus, Rubella virus & HIV II. Disease III. Method of Vaccination** -

Text Books :

Immunology - An Introduction | Edition:4 | Saunders College of publishing | Ian R. Tizard(1994) Kuby IMMUNOLOGY | Edition:6 | W. H. Freeman and Company | Kindt Goldsby (2007)

Reference Books :

Immunology | Edition:1 | Mosby – Elsevier, London | Male & et al(2006)

SEMESTER - V MAJOR-PRACTICAL

MAJOR BIOCHEMISTRY PRACTICAL III

OBJECTIVES :

To give wide knowledge on quantitative estimations of normal constituents of urine and blood.

HOURS / WEEK - 6		
HOURS / SEMESTER - 90		
CIA	**CO-CURRICULAR ACTIVITIES**	**LECTURE**
12	**6**	**72**

UNIT - I (LECTURE HOURS: 72)

COLLECTION OF URINE & BLOOD SAMPLES

Collection of urine - Random, 12 hours, 24 hours, Preservatives for urine

Collection of blood - Fingertip and Venipuncture

Separation of serum and plasma -

ROUTINE ANALYSIS OF URINE (QUALITATIVE)

Colour, Appearance, pH, Specific gravity, Normal constituents and Microscopic analysis -

CLINICAL ESTIMATIONS IN URINE

Estimation of Glucose - Ortho Toluidine method **Estimation of Phosphorous** - Fiske Subbarow method **Estimation of calcium** - Permanganate method **Estimation of creatinine** - Caraway method **Estimation of Titrable acidity of urine** -

CLINICAL ESTIMATIONS IN BLOOD/ SERUM

Estimation of Urea - DAM TSC method **Estimation of protein** - Lowry's method **Estimation of Uric acid** - Caraway method

Estimation of creatinine and creatine - Alkaline picrate method

Estimation of Iron - Wong's method

Text Books :

Biochemical methods | Edition:2 | New age international publishers | Manickam.A AND Sadasivam.S(1997)

Reference Books :

PRACTICAL CLINICAL BIOCHEMISTRY: METHODS AND INTERPRETATION | Edition:1 | Jaypee Brothers Medical Publishers | RANJNA CHAWLA (1995)

SEMESTER - V MAJOR-PRACTICAL

MAJOR BIOCHEMISTRY PRACTICAL IV

OBJECTIVES :

To give wide knowledge on physiology, microbiology and immunologic tests.

HOURS / WEEK - 5		
HOURS / SEMESTER - 75		
CIA	**CO-CURRICULAR ACTIVITIES**	**LECTURE**
10	**5**	**60**

UNIT-I (LECTURE HOURS: 60)

HEMATOLOGY

Enumeration of RBC & WBC -

Determination of blood group -

Bleeding time and Clotting time determination -

MICROBIOLOGY

Students Microscopic - parts -

Hanging drop techniques. -

Simple staining, Gram staining and Endospore Staining -

Negative staining; Fungal staining - **Preparation of media, Sterilization** - **Pour plate, Streak plate** -

Growth curve of E.Coli. -

PHYTOCHEMISTRY

Preparation of plant extracts - Soxhlet Extraction method

Phytochemical analysis of secondary metabolites - Alkaloids, Flavanoids, Terpenoids, Saponins, Tannins, Phenols.,etc

Text Books :

Biochemical methods | Edition:2 | New age international publishers | Manickam.A AND Sadasivam.S(1997)

Reference Books :

AN INTRODUCTION TO PRACTICAL BIOCHEMISTRY | Edition:3 | Tata McGraw Hill Publishing Company | DAVID T PLUMMER (1998)

SEMESTER - V

SKILL BASED COURSE-THEORY MICROBIAL PHYSIOLOGY

OBJECTIVES :

To give basic knowledge on microorganism and their morphology.To make them aware of its significance.

HOURS / WEEK - 4		
HOURS / SEMESTER - 60		
CIA	**CO-CURRICULAR ACTIVITIES**	**LECTURE**
8	**4**	**48**

UNIT-I (LECTURE HOURS: 10)

MICROSCOPY

Principle and uses of light microscope and electron microscope. - Origin of Leeuwenhoek s animalcules,magnification,principles,diagram& uses of light and electron microscope.

Sterlization techniques - Pure Culture Culture media Selective & Enrichment media

Staining - Simple,gram and acid fast staining

Growth curve,generation time and microbial nutrition - Bacterial growth curve,time & nutritional requirement for micro organism.

UNIT-II (LECTURE HOURS: 10)

BACTERIA

Morphology,component parts and cell wall structure - Size,shape,arrangement of bacterial. Components-prokaryotic cell organelles. Cellwall -Pepitido glycon and muco peptide.Structurs external to the cell wall-Flagella & motility.

Photosynthetic bacteria-Cyano bacteria. - Introduction-Green or purple photosynthetic bacteria.-able to carry out oxygenic photosynthesis.Pigment-bacteriochlorophyll.Cyanobacteria-definition,interior parts and function.

ALGAE

Importance of algae and Morphological characteristics of algae - Introduction, Algae-primary producer,algae as food-Red & brown algae-porphyra.chondrus-red algae-food.

FUNGI

Morphological characteristics of fungi - Fungi-Size ,shape and arrangement of fungi

Importance of fungi - Uses of fungi- food industry

UNIT-III (LECTURE HOURS: 10)

VIRUSES

Structure and life cycle of virus. - Morphology of virus,structure-interior components,coat layer-capsid,capsomere units.and life cycle-stages.

Phages-T4 Stages in life cycle - Phages-virus killing bacteria.,phage structure

Normal human microflora - Origin of normal flora,normal flora and the human host-charecteristics of normal flora

LAMBDA LIFE CYCLE.

Lytic Cycle - Introduction,stages- adsorption,penetration,Replication & assembly,lysis and release **Lysogenic Cycle** - Introduction,stages-adsorption,penetration.prophage formation,integral part of chromosome-lysogency

UNIT-IV (LECTURE HOURS: 10)

MICROBIAL DISEASES

Food and water borne diseases - Contaminated or expired meat.egg,milk and other foods

Typhoid - Etiology,pathogenesis-causative agent-Salmonella typhi,symptoms,diagnosis,treatment and prvention of typhoid.

Cholera - Etiology,pathogenesis-causative agent-Vibrio cholorae ,symptoms,diagnosis,treatment and prvention of cholera.

Bacillary dysentery - Etiology,pathogenesis-causative agent,symptoms,diagnosis,treatment and prvention of Dysentery

AIR BORNE DISEASES

TB & Diphtheria - Etiology,pathogenesis-causative agent- Mycobacterun tuberculae, & Cornibacteriun diptheriae,symptoms,diagnosis,treatment and prvention of TB & Diphtheria.

SEMESTER - V

SKILL BASED COURSE-THEORY MICROBIAL PHYSIOLOGY

UNIT-V (LECTURE HOURS: 8)

WATER MICROBIOLOGY

Microbes in water & bacteriological examination of water - Micro flora in water-bacteria and virus in aquatic environment.Analysis and detect the population of bacteria in water,and BOD-Biological Oxygen Demand **Role of microbes in sewage treatement** - Waste water treatement process-Single Dwelling units- Septic tank.Municipal treatement process-Primary,secondary,advanced,final,solids processing

SOIL MICROBIOLOGY

Rhizosphere and Mycorrhiza - Symbiosis,Neutral association-neutralism.Positive association & negative association **Symbiotic & Nonsymbiotic organisms** - Symbiosis- positive association-Mutualism,commensalism,Nagative association-Antagonism.Nitrogen fixing microorganism.noodule formation.

Text Books :

Microbiology | Edition:1 | McGraw Hill Book company | Pelczar J Rkrieg R(1986)

Reference Books :

Prescott's Microbiology | Edition:7 | ?McGraw-Hill | Joanne Willey(2013)

SEMESTER - V

CAREER ORIENTED PROGRAMME-THEORY MOLECULAR MODELLING AND COMPUTER AIDED DRUG DESIGNING

OBJECTIVES :

To understand the basic concepts of Drug discovery and computer aided drug design

HOURS / WEEK - 1		
HOURS / SEMESTER - 15		
CIA	**CO-CURRICULAR ACTIVITIES**	**LECTURE**
2	**1**	**12**

UNIT I (LECTURE HOURS: 3)

Recent advances in drug designing methodologies Methods of drug design -

Biomolecular structure, structure activity relationship Recent advances in drug designing - -

Pharmacokinetics pharmacokinetics - -

UNIT II (LECTURE HOURS: 3)

General aspects of drug desisgning, introduction and history Drug Designing. types, drug discovery -

Drug Definition and types of Drugs Types of Drug - -

Areas influencing drug discovery CADD -

UNIT III (LECTURE HOURS: 2)

Pharmacogenetics application Pharmacgenetics and drug designing - - **Important parameters of Drug designing Parameters for drug discovery** - -

UNIT IV (LECTURE HOURS: 2)

Drug discovery technologies in drug discovery, Target drug discovery stratergy Drug discovery Technologies - -

Target validation, prediction of drug quality, Docking Target Validation - -

UNIT V (LECTURE HOURS: 2)

Computer aided drug designing methods Computer Aided Drug Designing -

ADME - TOX properties Pharmacokinetics -

Text Books :

BIO INFORMATICS METHODS AND APPLICATIONS | Edition:2 | PRENTICE HALL OF INDIA PVT LTD | S C RASTOGI(2007)

SEMESTER - V ELECTIVE-THEORY

ELECTIVE II - EDC: HEALTH MANAGEMENT

OBJECTIVES :

To enable students to have an awareness on health .To make them aware of the health oriented diseases , its prevention and management

HOURS / WEEK - 3		
HOURS / SEMESTER - 45		
CIA	**CO-CURRICULAR ACTIVITIES**	**LECTURE**
6	**3**	**36**

UNIT 1 (LECTURE HOURS: 6)

Health

Concept of health - Definition, Quality of life, and Hygiene. **Food factors** - For human being and their requirements **Calorific value of food** - Values of different nutrients.

Obesity related diseases - Definition and classification, genetic and environmental factor leading to obesity & Management of obesity

UNIT II (LECTURE HOURS: 6)

Diabetes

Diabetes - Definition,Types of diabetes - IDDM, NIDDM, Gestational Diabetes and blood sugar level

Insulin and glucagon - Definition, effect of hormone level's in diabetes **Etiology and pathogenecity** - Occurance and symptoms **Management of diabetes** - Diet and medicine

UNIT III (LECTURE HOURS: 8)

Cardiovascular disease

Cardiovascular disease - Normal level of cholesterol and lipoprotein

Cardiac arrest and myocardial infraction - Signs, symptoms and risk factors

Management of heart disease - Diet, medicine and excersice

UNIT IV (LECTURE HOURS: 8)

Kidney stones

Kidney stones - Diet and prevention

Cancer - Definition and types

Food habits - food habits and preventive measures

UNIT V (LECTURE HOURS: 8)

Health Insurance

Health Insurance - Individual mediclaim policy **Domicilary hospitalization** - Procedures **Cancer** - Cancer insurance

Group mediclaim policy - Rules and regulations of family mediclaim policy

Text Books :

Practical clinical biochemistry | Edition:- | - | H.Varley-(-)

Reference Books :

Clinical chemistry-Principles and techniques | Edition:- | - | Henry-(-) Clinical laboratory diagnosis | Edition:- | - | Grandwon-(-)

SEMESTER - VI MAJOR-THEORY

PLANT BIOCHEMISTRY

OBJECTIVES :

To give wide knowledge on pathways and biochemical processes involved at various levels of development of plants. To make them aware of its significance.

HOURS / WEEK - 5		
HOURS / SEMESTER - 75		
CIA	**CO-CURRICULAR ACTIVITIES**	**LECTURE**
10	**5**	**60**

UNIT I (LECTURE HOURS: 12)

Plant cell

Cell wall. - structure and function of cell wall

chloroplast - Structure and function

vacoules. - Structure and function of vacoules.

Absorption and translocation of water: - Active absorption, Passive absorption

Mechanisms - active and passive - Active absorption of water -Osmotic absorption Non osmotic absorption. Passive absorption

Ascent of sap: Mechanism and theories. - Three theories

Transpiration - Water evaporation, Factors affecting Transpiration- Temperature Light, Available soil water wind

mechanism of stomatal opening; - Mechanism

factors affecting transpiration - Temperature Light Available soil water wind

guttation. - Watery solution oozes out from uninjured margin

Activity

1 - Prepare chart for opening and closed stomata

2 - Prepare an animation model for cell structure

UNIT II (LECTURE HOURS: 12)

Photosynthesis

Photosynthetic pigments: Photosynthetic apparatus- chlorophyll - chlorophyll phycobillins carotenoid

carotenoid and phycobillin; - Yellow or orange pigment, Red and blue pigment

Light reactions - two kinds of chemical system - photosystem-1 - Two phytochemical process 1 & 2 680mu **Light absorbtion. and 2-evidences in support of light reaction.** - Two phytochemical process 1 & 2 700mu **Hills reaction** - Absorption of light energy Activation of chlorophyll

cyclic and non-cyclic phosphorylation - Z - scheme Electron transport chain **Dark reaction: Calvin's cycle (C3 plants),** - Carboxylation Reduction, formation **Hatch-slack cycle (C4 plants)** - C4 dicarboxylation pathway

Factors affecting photosynthesis. - Internal, External factors

Activity

1 - Download the animation for photosynthetic pigments and make a copy in CD

2 - Make a chart for carotenoids and phycobilin

UNIT III (LECTURE HOURS: 12)

Cycles of element

nitrogen cycle - Soil, Air, Plant **ammonification, nitrification** - ammonification **reduction and denitrification** - Introduction

Nitrogen fixation: - symbiotic and non-symbiotic nitrogen fixation. nitrate release of sulfur from organic compounds

Sulfur cycle: - oxidation of sulfur compounds; reduction of sulfate.

Plant nutrition:

Macronutrients - Carbon, Hydrogen, oxygen, nitrogen, sulphur, phosphorus, calcium, potassium, magnesium and iron

Micronutritients - manganese, boron, copper, zinc, molybdenum and chlorine.

Activty

1 - Prepare a PowerPoint presentation for nitrogen fixation

SEMESTER - VI MAJOR-THEORY

PLANT BIOCHEMISTRY

2 - Select a plant and identify the micronutrients present in it.

UNIT IV (LECTURE HOURS: 12)

auxins: - biosynthesis, mode of action And applications. Synthetic auxins. **Gibberellins:** - biosynthesis and mechanism of action, applications **Cytokinins** - mode of action and physiological role.

Abscicic acid - physiological role and mode of action.

Ethylene: - physiological role and mode of action. **Biochemistry of fruit ripening** - Fruit ripening **Activity**

1 - Collect the plants having the auxins level

2 - Prepare a chart for the mechanism of fruit ripening

UNIT V (LECTURE HOURS: 12)

Plant Tissue culture

Biochemistry of seed germination. - Physiology of seed germination

Totipotency -

Media - MS media : composition and preparation **Callus culture** - Undifferetiated masses of cells **Micropropagation** - Applications.

Biochemical changes during senescence. - Introduction

Protoplast fusion - Polyethylene glycol

Activty

1 - Make a chart for preparation of agar medium

2 - Collect the procedure for callus culturing

Text Books :

Fundametals of plant physiology | Edition:11th edition | S.Chand & Company Ltd | V.K.Jain(2004)

Reference Books :

Plant biochemistry and molecular biology | Edition:1 | ohm wiley and sons | Lea AND Leawood(2000)

SEMESTER - VI MAJOR-THEORY

CLINICAL BIOCHEMISTRY

OBJECTIVES :

To enable students to give indepth knowledge on various errors in the metabolism of various biomolecules of our body, the pathological condition, symptoms caused by the change in their levels. To make them aware of the various metabolic disorders.

HOURS / WEEK - 5		
HOURS / SEMESTER - 75		
CIA	**CO-CURRICULAR ACTIVITIES**	**LECTURE**
10	**5**	**60**

UNIT I (LECTURE HOURS: 12)

Disorders of Carbohydrate

Normal sugar level in blood, renal threshold and regulation of blood glucose concentration - Hypoglycemia and hyperglycemia

Diabetes mellitus - Introduction, etiology, types of diabetes mellitus,

clinical pathology and diagnosis - Urine testing , random blood sugar and GTT

Glycosuria - Differential diagnosis of glycosuria

Complication of Diabetes Mellitus - Diabetic keto acidosis and Diabetic coma, Glycogen storage diseases

Activity

1 - Exhibiting cartoon way of representing insulin action in humans.

2 - Making a chart specifying the normal values of sugar.

UNIT II (LECTURE HOURS: 12)

Disorders of Lipid Metabolism

Plasma lipids and lipoprotein abnormalities - Introduction - Lipoproteins are complex with Lipids and proteins.

Hyper-lipoproteinemia - Type I, II, III, IV and V and Alpha-lipoproteinemia

Hypo-lipoproteinemia - a-beta-lipoproteinemia, Hypo-beta-lipoproteinemia, Tangiers disease and LCAT (Lecithin-Cholesterol Acyl Transferase) deficiency

Atherosclerosis - Biochemical changes, Symptoms and Diagnosis

Fatty liver and Hyperlipidemia - Biochemical changes, Symptoms and Diagnosis

Hypercholesterolemia - Biochemical changes, Symptoms and Diagnosis

Taysach's disease - Tay-Sachs disease - also known as GM2 gangliosidosis or hexosaminidase A deficiency : rare autosomal recessive

Niemann - Pickk diseases, - Niemann - Pickk disease is in form of sphingolipidosis, as it involves dysfunctional metabolism of sphingolipid which are fats found in cell membranes.

Activity

1 - Making clay models on fatty liver.

2 - To download animations illustrating Atherosclerosis and biochemical changes .

UNIT III (LECTURE HOURS: 12)

Disorders Of Amino Acid Metabolism

Cysteinuria - Introduction, Biochemical changes, Symptoms and Diagnosis

Phenylketonuria - Phenylalanine hydroxylase deficiency

Maple syrup urine disease - An inherited disorder of branched chain amino acids, absence of alpha ketoacid decarboxylase

Alkaptonuria - Hereditary defect in metabolism of phenylalanine and tyrosine

Albinism & Hartnup disease - Biochemical changes, Symptoms and Diagnosis

Disorder of purine metabolism - Normal level of uric acid in blood and urine. Hyperuricemia and Gout, Hypouriecemia Xanthinuria

Disorders of pyrimidine metabolism - Biochemical changes, Symptoms and Diagnosis, Orotic acid uria

Activity

1 - Disorders of amino acidmetabolism in the spot light: Students colour and label images on a worksheet in highlighting any one of the disorders of amino acid metabolism.

SEMESTER - VI MAJOR-THEORY

CLINICAL BIOCHEMISTRY

2 - Article collection of recent research in disorders of purine and pyrimidine metabolism

UNIT IV (LECTURE HOURS: 12)

Gastric, pancreatic and Intestinal functions

Gastric function test. - The Insulin Stimulation test. Determination of Gastrin in serum and Tubeless gastric analysis . **Pancreatic function tests** - serum amylase and lipase, Direct stimulation test, secretion, CCK - Pz test, indirect stimulation test, Lundh test. Intestinal function tests.

Tests used in the diagnosis of malabsorption - determination of total faecal fat (fat balance test), test of monosaccharide absorption (xylose excretion test) and determination of total protein (Lowry's method). **Activity**

1 - Using internet (go for list or useful website science articles and publications from the pubmed) make a oral presentation and give a return report of four findings on pancreatic and international functional test.

2 - Examine a patient report from clinical labs based on malabsorption.

UNIT V (LECTURE HOURS: 12)

Liver disease and liver function tests

Bilirubin metabolism and jaundice, - Introduction, liver function tests, Estimation of conjugated and total bilirubin in serum (Diazo method detection of bilirubin and bile salts in urine (Fouchet's test and Hay's sulphur Transaminases (SGPT & SGOT) and Lactate dehydrogenase (LDH).

Kidney function test - Physical examination of urine, Clearance tests - Insulin clearance, Creatinine clearance and urea clearance tests.

Activity

1 - Prediction of jaundice from patient clinical records.

2 - Collect articles from Science index journal based on liver disease.

Text Books :

Text book of Medical Biochemistry | Edition:fifth edition | Jaypee Brothers medical publishers | Chatterjee(1994)

Reference Books :

Tietz text book of clinical chemistry | Edition:2 nd edition | W, B. Saunders Company | 1.Lurtis A AND Carl AND Edward RAshwood(2 nd)

SEMESTER - VI ELECTIVE-THEORY

ELECTIVE -III -R- DNA TECHNOLOGY

OBJECTIVES :

To give wide knowledge on recombinant techniques and their applications in science . To make them aware of its significance

HOURS / WEEK - 5		
HOURS / SEMESTER - 75		
CIA	**CO-CURRICULAR ACTIVITIES**	**LECTURE**
10	**5**	**60**

UNIT - 1 (LECTURE HOURS: 12)

Enzymes in genetic engineering

· **DNA polymerase Polynuceotide kinase** - Making copies of molecules, adding phosphate groups

Ligase- T4 DNA ligase - Joining DNA molecules

· **Nick translation system Terminal deoxynucleotidyl I transferase** - Adding deoxy ribonucleic acid to 3" termini **Reverse transcriptase, Topoisomerase** - Synthesizing cDNA, Conformational change of circular DNA **Restriction endonucleases Type I and II** - Exo nuclease and endo nuclease

Basic molecular biology techniques

DNA isolation - genomic and plasmid DNA isolation

DNA digestion, restriction fragment analysis and sequencing by chemical, enzymatic, big-bye terminator methods - Digesting DNA with enzymes and sequencing

UNIT - 2 (LECTURE HOURS: 12)

Types of cloning vectors

Plasmids - Structural and Functional Organization of Plasmids,

Cosmids - Cosmid principle and cloning

ssDNA phages - Phage M13 as suitable vectors

yeast cloning vectors - YAC, YEP

Animal viruses, - SV 40

Cauliflower Mosaic Virus - Plant viral vector, application

Lambda Phage as a natural in vivo vector - in vitro construction of lambda vector, Classes of vectors and their use.

Reporter genes and selectable marker genes. - Neomycin , hygromycin, green fluorescence protein

UNIT - 3 (LECTURE HOURS: 12)

CLONING AND SUBCLONING STRATEGRY

Natural genetic engineering by Agrobaterium grown gall. - Ti plasmid, binary vectors, agrobacterium tumefacien

Preparation of competent cell-Transformation - Transformation in animal cells

Transfection - Recombinant selection and screening - DNA, RNA incorporated to lipid vesicle

Construction of recombinant DNA: Genomic DNA library - Genomic DNA library

cDNA synthesis strategies - Linkers - Adapters - Homopolymer tailing;

genomic and cDNA libraries in plasmids and phages - Lamda phage vectors and replacement vectors

Product cloning strategies in yeast, E. coli and B. subtilis - Cloning the foreign gene in bacteria and yeast

UNIT - 4 (LECTURE HOURS: 12)

gene transfer to bacteria ,plant and animal cells

· **Transformation Calcium mediated transfect ion** - Transformation of DNA to bacterial, plant and animal cells

microinjection - Gene transfer to animal cell, plant cell

lipofection, - Gene transfer toAnimal cell

electroporation - Gene transfer to animal cell, plant cell , bacteria **nuclear transplantation** - Transferring DNA to sheep **Homologous recombination**

recombinant viruses - Recombinant virus

Gene knock-outs and homologous recombination - Plasmid construction by homologous recombination in yeast

UNIT - 5 (LECTURE HOURS: 12)

SEMESTER - VI ELECTIVE-THEORY

ELECTIVE -III -R- DNA TECHNOLOGY

Blotting techniques

DNA hybridization - DNA, RNA hybridization

Southern, Northern, Western blotting blots - Identification of RNA, DNA and proteins

immunological techniques - ELISA

PCR - Making multiple copies of DNA

DNA Finger printing, DNA foot printing - Digesting the DNA and mapping , application, forensic science

Chromosome walking and jumping - Identification of neighboring sequences

DNA sequencing, - Building a DNA sequence

HRT, HART, - Hybrid arrested translation

Hazards of RDNA technology and regulations - Rules and regulation to control the hazards of genetically modified organisms

RFLP, RAPD - Restriction fragment length polypmorphirn, randomly amplied polymorphic DNA

Text Books :

Principles of Gene Manipulation | Edition:3 | Blackwell Scientific Publication | R.W.Old AND S.B.Primrose ( )

OBJECTIVES :

To give wide knowledge on quantitative estimations of normal constituents of urine and blood.

HOURS / WEEK - 5		
HOURS / SEMESTER - 75		
CIA	CO-CURRICULAR ACTIVITIES	LECTURE
10	5	60

UNIT - 1 (LECTURE HOURS: 60)

CLINICAL ESTIMATIONS IN BLOOD/SERUM

Estimation of phosphorus - Fiske Subbarrow method

Estimation of Iron - Wong's Thiocyanate method

Estimation of Serum Phospholipids - Connerty, Briggs and Eaton method

Estimation of Blood Sugar - Ortho toludine method **Estimation of Total Cholesterol** - Zak's method **Estimation of HDL and LDL method** - Zak' method **Estimation of Bilirubin** - Malloy and Evelyn method **Estimation of Fibrinogen** - Biuret method

GROUP EXPERIMENT

Estimation of Haemoglobin - Kit method

DEMONSTRATION

Column Chromatography - Separation of Plant Pigments

High Performance Liquid Chromatography (HPLC) - Separation of chemical constituents in plant sample

Text Books :

Biochemical methods | Edition:2 | New age international publishers | Sadasivam. S(2001) Practical Biochemistry | Edition:1 | Jay pee publishers | K Geetha Damodaran(2001)

Reference Books :

Consise text book of basic Biochemistry | Edition:3 | New age publishers | T.N. Pattabiraman(2001)

SEMESTER - VI MAJOR-PRACTICAL

MAJOR BIOCHEMISTRY PRACTICAL IV

OBJECTIVES :

To give wide knowledge on physiology, microbiology and immunologic tests.

HOURS / WEEK - 5		
HOURS / SEMESTER - 75		
CIA	**CO-CURRICULAR ACTIVITIES**	**LECTURE**
10	**5**	**60**

UNIT - 1 (LECTURE HOURS: 60)

CELL & MOLECULAR BIOLOGY

Cell Fractionation - **Isolation of genomic DNA** - **Isolation of plasmid DNA** - **IMMUNOLOGY**

Pregnancy test - Gravintex

Widal test -

VDRL test -

C-Reactive protein -

ASO titre -

RA test -

PLANT PHYSIOLOGY

Estimation of chlorophyll content in plants 5 Estimation of chlorophyll content in plants -

Determination of starch in plants -

Solvent extraction of plant materials using Soxhlet apparatus -

MICROBIOLOGY

Antimicrobial activity from leaf extract -

Text Books :

Text Book Of Biochemistry With Clinical Correlations | Edition:1 | New age publishers | Thomas M. Devlin(1997)

Reference Books :

Essentials Of Practical Biochemistry | Edition:Edition:1 | CBS Publishers and Distributors | Srivastava (2000)

SEMESTER - VI

CAREER ORIENTED PROGRAMME-PROJECT COP- PROJECT AND VIVA VOCE

OBJECTIVES :

-

HOURS / WEEK - 1		
HOURS / SEMESTER - 15		
CIA	**CO-CURRICULAR ACTIVITIES**	**LECTURE**
2	**1**	**12**

UNIT -I (LECTURE HOURS: 12)

Project Discussion

Project discussion - Project discussion

Literature review Literature - review **Field work**

Field work - Field work

Result analysis

Result analysis - Result analysis **Discussion of results Discussion** - Discussion

Text Books :

Bioinfornatics - A Practical Approach | Edition:1 | - | ManiVijayaraj(2006)

SEMESTER - VI

MINI PROJECT VIVA-PROJECT MINI PROJECT

OBJECTIVES :

-

HOURS / WEEK - 5		
HOURS / SEMESTER - 75		
CIA	**CO-CURRICULAR ACTIVITIES**	**LECTURE**
10	**5**	**60**

UNIT - I (LECTURE HOURS: 12)

Review I - Writing Introduction Part Writing Introduction - Writing Introduction **Review II - Review of Methodology Review** - Review

Review III - Methodology methods - methods

Review IV - Results and Discussion

Results and Discussion - Results and Discussion

Review V - Summary and Conclusion Summary - Conclusion

UNIT - II (LECTURE HOURS: 12)

Review I - Writing Introduction Part Introduction - Introduction

Review II - Review of literature Review - Review

Review III - Methodology Methodology - Methodology

Review IV - Results and Discussion Results - Discussion

Review V - Summary and conclusion Summary - Conclusion

UNIT - III (LECTURE HOURS: 12)

Review I - Introduction Introduction - Introduction **Review II - Review of Literature Review** - Review

Review III - Methodology Methodology - Methodology

Review IV - Results and Discussion Results - Discussion

Review V - Summary and conclusion Summary - Conclusion

UNIT - IV (LECTURE HOURS: 12)

Review-I -Introduction Introduction - Introduction **Review-II Review of literature Review** - Literature

Review III Methodology Methodology - Methodology **Review IV -Results and discussion Result** - Discussion

SEMESTER - VI

MINI PROJECT VIVA-PROJECT MINI PROJECT

Review V -Summary and conclusion

Summary - Conclusion

UNIT-V (LECTURE HOURS: 12)

Results and Discussion

Results and discussion - Results and discussion

Summary and conclusion

summary and conclusion - summary and conclusion

Scope of the study

Scope of the study - Scope of the study

Text Books :

Biochemical methods | Edition:2 | New Age Publications | ManickamSadhasivam(2005)