



# **St. PETER'S UNIVERSITY**

**St. Peter's Institute of Higher Education and Research**

**(Declared Under Section 3 of the UGC Act, 1956)**

**AVADI, CHENNAI – 600 054**

**TAMIL NADU**

**M.Sc. (BIOCHEMISTRY)**

**Code No. - 420**

**(Effective From 2009 – 2010)**

**(Distance Education)**

**Regulations and Syllabi**

**(I & II Year)**

**St. PETER'S INSTITUTE OF DISTANCE EDUCATION**

**Recognized by Distance Education Council and**

**Joint Committee of UGC – AICTE - DEC, New Delhi**

**(Ref. F. No. DEC/SPU/CHN/TN/Recog/09/14 dated 02.04.2009 and**

**Ref.F.No.DEC/Recog/2009/3169 dated 09.09.2009)**

**St. PETER'S UNIVERSITY**  
**St. PETER'S INSTITUTE OF DISTANCE EDUCATION**  
Chennai – 600 054.

**Code No. – 420**  
**M.Sc. (BIOCHEMISTRY)**  
(Distance Education)

**Regulations and Syllabi**  
(Effective from 2009 – 2010)

- 1. Eligibility:** A Candidate who has passed B.Sc. (Biochemistry or chemistry) and with any one of the allied courses (Physics, Botany, Zoology, Nutrition, Mathematics, Biochemistry and chemistry) are eligible for admission to Two Year M.Sc. Programme in Biochemistry
- 2. Duration:** Two Years.
- 3. Medium:** English is the medium of instruction and Examination.
- 4. Methodology:** The methodology of distance education includes the supply of self-instructional study materials in print format and in CD, face-to-face instruction for theory and practicals for a limited period during week ends and on holidays, provision of virtual class in phased manner, dissemination of information over e-mail, Student – Support Service at various Centres of the University, Continuous Assessment and End Assessment conducted by the University at various parts of India.
- 5. Weightage for Continuous and End Assessment:** There is no weightage for Continuous Assessment unless the ratio is specifically mentioned in the scheme of Examinations. The End Assessment (EA) has 100% weightage.
- 6. Credit System:** Credit system be followed with 36 credits for each Year and each credit is equivalent to 25 hours of effective study provided in the Time Table of the formal system.

## 7. Scheme of Examination

### First Year

Code No.	Course Title	Credit	Marks	
			EA	Total
<b>Theory</b>				
109PBYT01	Enzymology and Enzyme Technology	5	100	100
109PBYT02	Bio-Instrumentation	5	100	100
109PBYT03	Biomolecules and Stridulation Biology	6	100	100
109PBYT04	Genetics Molecular Biology	6	100	100
109PBYT05	Immunology of pneumology	6	100	100
109PBYP01	Practical – I Record	4	90 10	100
109PBYP02	Practical – II Record	4	90 10	100
	<b>TOTAL</b>	<b>36</b>	<b>700</b>	<b>700</b>

### Second Year

Code No.	Course Title	Credit	Marks	
			EA	Total
<b>Theory</b>				
209PBYT01	Clinical and Plant Biochemistry	5	100	100
209PBYT02	Biotechnology	5	100	100
209PBYT03	Bio-Information Bio statics	6	100	100
209PBYT04	Physiology of Nutritional Biochemistry	6	100	100
209PBYP01	Practical – III Record	4	90 10	100
209PBYP02	Practical – IV Record	4	90 10	100
209PBYP03	Project	6	100	100
	<b>TOTAL</b>	<b>36</b>	<b>700</b>	<b>700</b>

**8. Passing Requirements:** The minimum pass mark (raw score) be 50% in End Assessment.

**9. Grading System:** Grading System on a 10 Point Scale be followed with 1 mark = 0.1 and the conversion of the Grade point as given below.

$$\begin{aligned} \text{Overall Grade Point Average (OGPA)} &= \frac{\text{Sum of Weighted Grade Points}}{\text{Total Credits}} \\ &= \frac{\sum (EA)C}{\sum C} \end{aligned}$$

**10. The Overall Grade:** The Overall Grade and Classification of all successful candidates be arrived at from the Overall Grade Point Average as stipulated in the following conversion Table.

Grade	Over all Grade Point Average(OGPA)	Over all weighted Average marks	Classification
0	9.0 to 10.0	90 to 100	First Class
A	8.0 to 8.9	80 to 89	First Class
B	7.0 to 7.9	70 to 79	First Class
C	6.0 to 6.9	60 to 69	First Class
D	5.0 to 5.9	50 to 59	Second Class
<b>F</b>	0.0 to 4.9	0 to 49	<b>Reappearance</b>

The Grade Sheets of successful candidates provide particulars such as (1) Overall weighted Average Marks and (2) Overall Grade.

**11. Pattern of the Question Paper:** The question paper for the End Assessment will be set for three hours and for a maximum of 100 marks with following divisions and details.

**Part A:** 10 questions (with equal distribution to all the units in the syllabus). Each question carries 2 marks.

**Part B:** 5 questions with either or type (with equal distribution to all the units in the syllabus). Each question carries 16 marks.

The total marks scored by the candidates will be calculated to the maximum prescribed in the Regulations.

## 12. Syllabus

# **109PBYT01 – ENZYMOLOGY AND ENZYME TECHNOLOGY**

## **UNIT – 01**

ENZYME TECHNIQUES - ACTIVITY OF ENZYMES - HANDLING OF ENZYMES – ENZYME ASSAYS - ANALYSIS OF ENZYMES ACTIVITY (METHODS) - EXPRESSION OF THE ACTIVITY COUPLED REACTIONS.

## **UNIT – 02**

DNA TECHNOLOGY 2 - R-DNA TECHNOLOGY - ISOLATION AND PURIFICATION OF ENZYMES - IMPORTANCE OF PURE ENZYMES - SEPARATION OF ISOENZYMES.

## **UNIT – 03**

ENZYME KINETICS 1 - VELOCITY OF A REACTION - ORDER OF A REACTION – PROGRESS CURVE FOR ENZYME CATALYZED REACTIONS - FACTORS INFLUENCING VELOCITY OF ENZYME CATALYZED REACTION.

## **UNIT – 04**

ENZYME KINETICS 2 - MICHAELIS MENTEN KINETICS -  $K_M$  AND  $V_{MAX}$  - EFFECT OF PH - PH ADJUSTMENTS - BUFFER PREPARATION - TEMPERATURE ON ENZYMATIC REACTIONS - ANOMALOUS KINETICS OF COMPETITIVE AND NON-COMPETITIVE INHIBITION - END PRODUCT INHIBITION WITH EXAMPLES.

## **UNIT – 05**

COENZYMES 1 - COENZYMES & COFACTORS - SUBSTRATE ENZYME RELATIONSHIP - CLASSIFICATION OF CO-ENZYMES AS GROUP TRANSFER - HYDROGEN TRANSFER - STRUCTURE OF COENZYMES.

## **UNIT – 06**

COENZYMES 2 - FUNCTION OF NUCLEOTIDE COENZYMES - COA - NAD/NADP - FMN/FAD - BIOTIN - FOLIC ACID - VITAMIN B12 - BIOSYNTHESIS OF PURIDINE AND FLAVIN NUCLEOTIDES AND COA.

## **UNIT – 07**

MECHANISM OF ENZYME ACTION - ENZYME SPECIFICITY - ACTIVE SITE - STUDY OF MECHANISM OF ENZYME REACTION - PATHWAY OF ENZYME CATALYZED REACTIONS.

## **UNIT – 08**

MAPPING OF ACTIVE SITE - MECHANISMS AT ACTIVE SITE OF ENZYMES - COVALENT - CATALYSIS - ACID BASE CATALYSIS - PROXIMITY AND ORIENTATION EFFECT.

## **UNIT – 09**

REPRESENTATIVE ENZYMES - STRUCTURE AND MECHANISM OF ACTION OF REPRESENTATIVE ENZYMES - CHYMOTRYPSIN AND RIBONUCLEASE - REGULATION OF ENZYME ACTIVITY - COVALENT - MODULATED REGULATORY ENZYMES – ALLOSTERIC REGULATION.

## **UNIT – 10**

ENZYME TECHNOLOGY - APPLICATION IN FOOD AND PHARMACEUTICAL INDUSTRIES - LARGE SCALE ENZYME EXTRACTION - PURIFICATION AND STABILIZATION – INDUSTRIAL APPLICATION OF CARBOHYDRATES - PROTEOLYTIC ENZYME - LIGNOCELLULASE.

## **UNIT – 11**

DEGRADING ENZYME - PECTIN AND PECTIC ENZYME - APPLICATIONS OF ENZYMES IN FOOD INDUSTRY.

## **UNIT – 12**

CLINICAL ENZYMOLOGY - ENZYMES ENGINEERING - SERUM ENZYMES IN HEALTH AND DISEASES - IMMOBILIZED ENZYME TECHNOLOGY - DESIGNER ENZYMES - BIOSENSORS - RIBOZYMES.

# **109PBYT02 – BIO-INSTRUMENTATION**

## **UNIT - 01**

CHROMATOGRAPHY 1 - INTRODUCTION - PRINCIPLE - OPERATIVE TECHNIQUES AND APPLICATIONS OF PAPER - TYPES LAYER CHROMATOGRAPHY - DETECTION OF THIN LAYER - LOCATION AGENTS USED IN TLC - PREPARATION OF THIN LAYER PLATE - SAMPLE APPLICATION AND PLATE DEVELOPMENT - ADVANTAGES - USES – LIMITATIONS - ADSORPTION CHROMATOGRAPHY.

## **UNIT – 02**

CHROMATOGRAPHY 2 - GAS LIQUID CHROMATOGRAPHY (GLC) - INTRODUCTION - PRINCIPLE OF SEPARATION - PRACTICAL REQUIREMENTS - HIGH PERFORMANCE LIQUID CHROMATOGRAPHY (HPLC) - INTRODUCTION - ADVANCES AND ADVANTAGES - RETENTION TIME (TR) AND RETENTION VOLUME (VR) - RESOLUTION (R) - INSTRUMENTATION - STATIONARY PHASES IN HPLC - TYPES - LIQUID – SOLID (ADSORPTION) CHROMATOGRAPHY - LIQUID-LIQUID (PARTITION) CHROMATOGRAPHY - ION-EXCHANGE CHROMATOGRAPHY - GEL-EXCLUSION CHROMATOGRAPHY - MOLECULAR EXCLUSION CHROMATOGRAPHY - INTRODUCTION - PRINCIPLE - TYPES - THEORY - PROPERTIES - ADVANTAGES - APPLICATIONS.

## **UNIT – 03**

ELECTROPHORETIC TECHNIQUES 1 - INTRODUCTION - PRINCIPLE - COMPONENTS OF AN ELECTROPHORESIS UNIT - FACTORS AFFECTING ELECTROPHORETIC MOBILITY - SUPPORT MEDIUM - ADVANTAGE AND DISADVANTAGE OF SUPPORT MEDIUM – BUFFERS - CHOICE OF BUFFER - HOMOGENOUS BUFFER SYSTEM - REDUCING AGENTS - DETECTION ASSAY - RECORDING AND STORAGE - SAFETY.

## **UNIT – 04**

ELECTROPHORETIC TECHNIQUES 2 - TECHNIQUES - PAPER ELECTROPHORESIS - TYPES OF PAPER ELECTROPHORESIS - HORIZONTAL PAPER - HIGH VOLTAGE PAPER - CELLULOSE ACETATE - GEL ELECTROPHORESIS - PRINCIPLE - TYPES – HORIZONTAL GEL ELECTROPHORESIS - VERTICAL GEL ELECTROPHORESIS - ADVANTAGES & DISADVANTAGES OF VERTICAL GEL - APPLICATIONS OF GEL ELECTROPHORESIS - SDS.

## **UNIT – 05**

ELECTROPHORETIC TECHNIQUES 3 - HIGH VOLTAGE AND DISCONTINUOUS ELECTROPHORESIS - ISOELECTRIC FOCUSING ELECTROPHORESIS - PUSSED FIELD GEL ELECTROPHORESIS AND CAPILLARY ELECTROPHORESIS.

## **UNIT – 06**

SPECTROPHOTOMETRY 1 - INTRODUCTION - BASIC PRINCIPLES - CONSTRUCTION - ANALYSIS OF SPECTROPHOTOMETRIC - DESIGN OF SPECTROPHOTOMETERS - INSTRUMENTATION AND APPLICATION OF UV - VISIBLE - IR SPECTROPHOTOMETERS.

## **UNIT – 07**

SPECTROPHOTOMETRY 2 - MASS SPECTROMETRY - INTRODUCTION - BASIC THEORY - COMPONENTS OF SPECTROPHOTOMETER - IONIZATION - IN GAS PHASE IONIZATION TECHNIQUES - DESORPTION TECHNIQUES - FAST ATOM BOMBARDMENT – MASS ANALYZER - DETECTING OF IONS - RECORDING OF THE SPECTRUM - DATA HANDLING - FLAME HOTOMETRY - PRINCIPLES AND APPLICATIONS.

## **UNIT – 08**

CENTRIFUGATION TECHNIQUES 1 - INTRODUCTION - CENTRIFUGAL FORCE AND PRINCIPAL OF SEDIMENTATIONS - SVEDBERG UNIT - TYPES OF ROTORS - TYPES OF CENTRIFUGES - DETERMINATION OF MOLECULAR WEIGHTS - METHOD OF MOLECULAR WEIGHT DETERMINATION - APPLICATIONS.

## **UNIT – 09**

CENTRIFUGATION TECHNIQUES 2 - TYPES OF CENTRIFUGATION – DIFFERENTIAL CENTRIFUGATION - DENSITY GRADIENT CENTRIFUGATION - PRINCIPLE OF RATE ZONAL CENTRIFUGATION - PRINCIPLE OF ISOPYCNIC CENTRIFUGATION - PREPARATION OF DENSITY GRADIENTS - SAMPLE APPLICATION - RECOVER OF THE SAMPLE - CONVERSION OF RPM TO G - CONVERSION OF `G` TO RPM - ULTRA CENTRIFUGE.

## **UNIT – 10**

X-RAYS - X -RAY DIFFRACTION - CRYSTALS AND DETECTORS - QUANTITATIVE ANALYSIS AND APPLICATIONS - RADIO CHEMICAL METHODS - BASIC CONCEPTS – COUNTING METHODS AND APPLICATIONS - AUTORADIOGRAPHY.



## **UNIT – 11**

TRACER AND OTHER TECHNIQUES - RADIOACTIVE DECAY - UNITS OF RADIOACTIVITY - DETECTION AND MEASUREMENT OF RADIOACTIVITY.

## **UNIT - 12**

TYPES OF COUNTER METHOD - GEIGER - MULLER COUNTER – SCINTILLATIONS COUNTER - APPLICATIONS OF RADIOISOTOPES IN BIOLOGY - INVESTIGATING ASPECTS OF METABOLISM - METABOLIC PATHWAY - METABOLIC TURNOVER TIMERS - ADSORPTION - ACCULATION - PHARMACOLOGICAL STUDIES – ANALYTICAL APPLICATIONS - OTHER APPLICATIONS.

# **109PBYT03 – BIOMOLECULES AND STRIDULATION BIOLOGY**

## **UNIT – 01**

WATER - STRUCTURE AND PROPERTIES OF WATER - HYDROGEN BONDING OF WATER - SOLVENT PROPERTIES OF WATER - HYDROPHOBIC INTERACTION.

## **UNIT – 02**

CARBOHYDRATES - INTRODUCTION - DEFINITION - MONOSACCHARIDE - CLASSIFICATION - STEREOCHEMISTRY - CYCLIC CHARACTERISTICS OF ALDEHYDE AND KETONE GROUPS - ACTION OF ACIDS AND ALKALIES ON SUGARS - REACTION OF SUGARS DUE TO HYDROXYL GROUPS.

## **UNIT – 03**

DISACCHARIDES - DEFINITION - CLASSIFICATION - STRUCTURE - CHEMISTRY AND FUNCTION - TRISACCHARIDE.

## **UNIT – 04**

POLY SACCHARIDES - DEFINITION - STARCH - GYCOGEN - DEXTRIN AND MOLIN - STRUCTURAL POLYSACCHARIDES - CELLULOSE - CHITIN AND GLYCOSAMINOGLYCANS.

## **UNIT - 05**

LIPIDS - INTRODUCTION - DEFINITION - CLASSIFICATION OF LIPIDS - TYPES - SIMPLE - COMPOUND PROPERTIES OF FATS - COMPOUND LIPIDS - STRUCTURE AND FUNCTION OF PHOSPHOLIPDS - GLYCOLIPIDS AND LIPOPROTEINS.

## **UNIT – 06**

LIPIDS 2 - DERIVED LIPIDS - DEFINITION - FATTY ACID - STRUCTURE AND UNSATURATED FATTY ACIDS - ESSENTIAL FATTY ACIDS - STEROIDS - STRUCTURE OF CHOLESTEROL.

## **UNIT – 07**

AMINO ACIDS - INTRODUCTION - DEFINITION - AMINO ACIDS AS AMPHOLYTES - STRUCTURE AND CLASSIFICATION OF AMINO ACIDS - CHEMICAL REACTIONS OF AMINO ACIDS - PEPTIDES.

## **UNIT – 08**

STRUCTURE AND PROPERTIES - IDENTIFICATION OF N AND C TERMINAL RESIDUES - DETERMINATION OF PRIMARY STRUCTURE OF PEPTIDES - GLUTATHIONE AND OXYTOCIN.

## **UNIT – 09**

PROTEINS - INTRODUCTION - DEFINITION - STRUCTURE AND PROPERTIES OF PROTEINS - CLASSIFICATION - PRIMARY STRUCTURE - SECONDARY STRUCTURE – TERTIARY STRUCTURE AND QUATERNARY STRUCTURE WITH EXAMPLES - PROPERTIES OF SILK FIBRON - COLLAGEN AND HEMOGLOBIN.

## **UNIT – 10**

ELECTROSTATIC FORCES - FORCES IN PROTEIN INTERACTIONS - SHORT RANGE REPULSIONS - HYDROPHOBIC INTERACTIONS - THE RAMACHANDRAN PLOT.

## **UNIT - 11**

NUCLEIC ACIDS - STRUCTURE OF PURINES AND PYRIMIDINES - NUCLEOTIDES AND NUCLEOSIDES - DNA - DOUBLE HELIX - A, B & Z FORMS - COILING AND SUPERCOILING OF DNA - DNA DENATURATION AND RENATURATION - CHEMICAL AND PHYSICAL PROPERTIES OF DNA - PROTEINS INVOLVED IN DNA STRUCTURE - HISTONES - RNA - RNA TYPES - UNUSUAL BASES - ENZYMATIC REACTIONS OF NUCLEIC ACIDS AND ITS ROLE IN PROTEIN SYNTHESIS.

## **UNIT – 12**

VITAMINS AND MINERALS - MINERALS - DEFINITION - STRUCTURE AND CLASSIFICATION - SOURCES - ROLE OF VITAMINS IN ANIMAL PHYSIOLOGY - MINERALS - DEFINITION - ESSENTIAL MINERALS - SOURCES AND FUNCTIONS - A NOTE ON REQUIREMENT.

# **109PBYT04 – GENETICS MOLECULAR BIOLOGY**

## **UNIT – 01**

**STRUCTURE OF GENE - INTRODUCTION - FINE STRUCTURE OF GENE – CLASSICAL DEFINITION OF GENE - CISTRON - MUTON - CHROMOSOMAL STRUCTURE - CHROMOSOMAL ORGANIZATION OF GENES - CODING AND NON CODING REGIONS OF DNA.**

## **UNIT – 02**

**TRANSFERABLE GENES - PLASMIDS - AND TRANSPOSONS.**

## **UNIT – 03**

**STRUCTURAL ORGANIZATION OF EUKARYOTIC CHROMOSOMES – CHROMATIN STRUCTURE - HETEROCHROMATIN AND ECUCHROMATIN.**

## **UNIT – 04**

**DNA REPLICATION - MECHANISMS OF DNA REPLICATION IN PROKARYOTES AND EUKARYOTES - DIFFERENT MODELS OF DNA.**

## **UNIT – 05**

**MUTATION - INTRODUCTION - DEFINITION AND TYPES OF MUTATION – SPONTANEOUS AND INDUCED - MUTAGENIC AGENTS.**

## **UNIT – 06**

**DNA DAMAGE - MECHANISMS OF DIFFERENT TYPES OF DNA DAMAGE AND REPAIR SYSTEMS. MUTATION RATE AND SIGNIFICANCE OF MUTATION STUDIES.**

## **UNIT – 07**

**PROTEIN BIOSYNTHESIS - CENTRAL DOGMA - DIFFERENT PHASES OF PROTEIN SYNTHESIS - ACTIVATION - TRANSCRIPTION - TRANSLATION - TERMINATION AND POST TRANSLATIONAL MODIFICATIONS.**

## **UNIT – 08**

**RECOMBINATION - INTRODUCTION - DEFINITION - MODEL - HOLLIDAY MODEL - MESSELSON MODES - SITE SPECIFIC RECOMBINATION.**

## UNIT – 09

GENE ACTIVATION - REGULATION OF GENE ACTIVATION - REGULATION OF GENE ACTIVATION IN PROKARYOTES - ENZYME REGULATION OF GENE ACTION – OPERON HYPOTHESIS - EXAMPLES OF LAC ) OPERON - DEFINITION OF OPERON.

## UNIT – 10

GENE EXPRESSION - INTRODUCTION - MEANING - REGULATION OF GENE EXPRESSION IN SIMPLE EUKARYOTES - EUKARYOTIC GENE CONTROL.

## UNIT – 11

REGULATION - MEANING - HORMONAL REGULATION - REGULATIONS BY HISTONES - REGULATION OF HETEROCHROMATIN.

## UNIT – 12

RECOMBINATION - MEANING - MECHANISMS - FORMS OF RECOMBINATION - CONJUGATION - TYPES - BATCH CONJUGATION - TRANSDUCTION - TYPES - GENERALIZED - SPECIALIZED - TRANSFORMATION - PRINCIPLE - GRIFFITH EXPERIMENT - PROPERTIES OF RECIPIENT CELLS - RECOMBINATION STRAINS.

# **109PBYT05 – IMMUNOLOGY OF PNEUMOLOGY**

## **UNIT - 01**

**IMMUNITY - DEFINITION - INNATE IMMUNITY - MECHANISMS OF INNATE IMMUNITY - ACQUIRED IMMUNITY - ACTIVE AND PASSIVE IMMUNITY WITH EXAMPLES.**

## **UNIT – 02**

**ANTIGENS - DEFINITION - DETERMINATION OF ANTIGENICITY - ANTIBODIES - DEFINITION - TYPES - FUNCTIONS OF ANTIBODIES MONOCLONAL ANTIBODIES.**

## **UNIT – 03**

**ANTIGEN - ANTIBODY INTERACTION IN VITRO - PRECIPITATION - AGGLUTINATION.**

## **UNIT – 04**

**ELISA - COMPLEMENT FIXATION TECHNIQUES - APPLICATIONS.**

## **UNIT – 05**

**STRUCTURE AND FUNCTIONS OF IMMUNE SYSTEM - CENTRAL THYROID ORGANS - PERIPHERAL LYMPHOID ORGANS - CELLS OF LYMPHORETICULAR SYSTEM - LYMPHOCYTES.**

## **UNIT – 06**

**T-CELL MATURATION - B-CELL MATURATION NULL CELLS - PHAGOCYtic CELLS - ANTIGEN PROCESSING AND PRESENTATION MHC - ORGANIZATION.**

## **UNIT – 07**

**MHC MOLECULES AND GENES - CELLULAR DISTRIBUTION - REGULATION OF MHC - IMMUNE ANTIGENS MHC - DISEASE.**

## **UNIT – 08**

**COMPLEMENT SYSTEM - GENERAL PROPERTIES OF COMPLEMENT – COMPLEMENT ACTIVATION - CLASSICAL PATHWAY AND ALTERNATIVE PATHWAYS - REGULATION OF COMPLEMENT ACTIVATION.**

UNIT – 09

BIOLOGICAL EFFECTS OF C - HYPERSENSITIVITY - CLASSIFICATION - IMMEDIATE AND DELAYED TYPES - TYPE I, II, III AND IV -HYPERSENSITIVITY REACTIONS AND ITS MECHANISMS.

UNIT – 10

AUTOIMMUNITY - CLASSIFICATION OF AUTO IMMUNE DISEASE – HAEMOCYTOLYTIC AUTO IMMUNE DISEASE - LOCALIZED AUTO IMMUNE DISEASE.

UNIT – 11

SYSTEMIC AUTO IMMUNE DISEASE - PATHOGENESIS OF AUTO IMMUNE DISEASE.

UNIT - 12

IMMUNOLOGY OF TRANSPLANTATION - AUTOGRAFT - ALLOGRAFT - ISOGRAFT AND XENOGRAFT.

# 109PPBYP01 – PRACTICAL – I

UNIT – 01

COLORIMETRIC EXPERIMENTS:

- 1.ISOLATION AND ESTIMATION OF STARCH FROM POTATO.
- 2.ISOLATION AND ESTIMATION OF GLYCOGEN FROM LIVER TISSUE (RAT OR GOAT)
- 3.ISOLATION AND ESTIMATION OF ASCORBIC ACID FROM CITRUS FRUIT.
- 4.ESTIMATION OF FRUCTOSE IN FRUITS.
- 5.ESTIMATION OF RIBOFLAVIN FROM LEGUMES.
- 6.ESTIMATION OF NIACIN.
- 7.DETERMINATION OF VITAMIN E.
- 8.ESTIMATION OF BETA- CAROTENE FROM CARROT.
- 9.ESTIMATION OF TOTAL FREE AMINO ACIDS IN PLANT TISSUES.
- 10.ESTIMATION OF LECITHIN FROM EGG YOLK..
- 11.DETERMINATION OF PLANT HORMONES - IAA OR GIBBERLLIN.

ENZYMES STUDIES:

- 1.ASSAY OF GLUTAMINE SYNTHASE OR GLUTAMATE DEHYDROGENASE.
- 2.ISOLATION, PURIFICATION, PROPERTIES AND INHIBITOR STUDIES OF ANY ONE OF THE ENZYME CELLULASE.
- 3.ESTIMATION OF ALBUMIN
- 4.DETERMINATION OF  $Na^+$  ,  $K^+$  USING FLAME PHOTOMETER
- 5.DETERMINATION OF GLUCOSE, PROTEIN AND CHLORIDE IN CSF



## SEPARATION TECHNIQUES:

1. SEPARATION OF AMINO ACIDS BY PAPER CHROMATOGRAPHY - CIRCULAR, ASCENDING & DESCENDING.
2. SEPARATION OF LIPIDS BY TLC
3. SEPARATION OF PLANT PIGMENTS BY COLUMN CHROMATOGRAPHY

## **109PBYP02 - PRACTICAL – II**

### GENETICS AND MOLECULAR BIOLOGY:

1. POLYACRYLAMIDE GEL ELECTROPHORESIS OF DNA  
A. NON-DENATURING B) DENATURING
2. RESTRICTION ANALYSIS OF DNA
3. PREPARATION OF COMPETENT E COLI - TRANSFORMATION
4. PLASMID DNA ISOLATION
5. GENOMIC DNA ISOLATION
6. SOUTHERN BLOT HYBRIDIZATION (DEMONSTRATION )
7. POLYMERASE CHAIN REACTION FOR AMPLIFICATION OF DNA (DEMONSTRATION)
8. ESTIMATION OF RNA - UV AND VISIBLE METHOD.
9. ISOLATION AND ESTIMATION OF DNA FROM SPLEEN OR LIVER - UV AND VISIBLE

### METHOD

### IMMUNOLOGY:

1. IMMUNO DIFFUSION - SINGLE RADIAL AND DOUBLE IMMUNODIFFUSION
2. IMMUNOELECTROPHORESIS
3. ROCKET IMMUNOELECTROPHORESIS
4. AGGLUTINATION TESTS
5. RAISING OF ANTIBODIES - SINGLE SOLUBLE AND PARTICULATE ANTIGEN
6. IDENTIFYING BLOOD GROUPING AND RH TYPING.

# **209PBYT01 – CLINICAL AND PLANT BIOCHEMISTRY**

## **UNIT – 01**

**ENZYMES STUDIES - ISOENZYMES - CLINICAL IMPORTANCE - ENZYME – CLINICAL SIGNIFICANCE OF ENZYMES (SERUM ENZYMES) - ISOENZYMES - VALUE AND SIGNIFICANCE - RENAL FUNCTION OF LIVER - CLASSIFICATION AND TYPES IN DETAIL.**

## **UNIT – 02**

**LIVER GASTRIC FUNCTION OF LIVER - CLASSIFICATION OF LIVER FUNCTION TEST - GASTRIC FUNCTION TEST - CLASSIFICATION AND ANALYSIS THYROID FUNCTION TEST - CLASSIFICATION.**

## **UNIT – 03**

**BLOOD HORMONE ANALYSIS - IMMUNOLOGICAL TEST FOR THYROID FUNCTION - NORMAL WATER AND ELECTROLYTE BALANCE - DISTRIBUTION OF BODY WATER AND ELECTROLYTES - NORMAL WATER BALANCE AND NORMAL ELECTROLYTE BALANCE.**

## **UNIT – 04**

**REGULATORY MECHANISMS - ABNORMAL WATER AND ELECTROLYTE METABOLISM - DEHYDRATION - PATHOLOGICAL VARIATIONS - WATER INTOXICATION - ACID BASE BALANCE - ACID BASE BALANCE IN NORMAL HEALTH.**

## **UNIT - 05**

**MECHANISM OF REGULATION OF PH - (ROLE OF RESPIRATION IN ACID - BASE BALANCE) - RENAL MECHANISM FOR REGULATION OF ACID BASE.**

## **UNIT – 06**

**ACID BASE IMBALANCE - ACIDOSIS - CSF - APPEARANCE OF CSF – BIOCHEMICAL CHANGES OF CSF URINE ANALYSIS ALKALOSIS - AMINOACIDURIAS - PROTEINURIA.**

## **UNIT – 07**

**CELL -CELL AND DETAILED STUDY OF THE CHEMICAL COMPOSITION - STRUCTURE OF THE CELL WALL - WALL PROPERTIES - FORMATION OF WALLS - INITIATION OF WALL DURING CELL DIVISION AND GROWTH OF WALLS.**

## UNIT – 08

ROLE OF WATER - MOVEMENT OF WATER IN PLANTS -- STRUCTURE AND PROPERTIES OF WATER - WATER POTENTIAL CONCEPT - MOVEMENT OF WATER IN CELLS - MEASUREMENT OF WATER POTENTIAL.

## UNIT – 09

OSMOTIC POTENTIAL AND PRESSURE POTENTIAL - WATER TRANSPORT - WATER IN THE SOIL - WATER UPTAKE - ASCENT OF SAP - STOMATA AND MECHANISM OF STOMATAL MOVEMENT - TRANSPIRATION MOVEMENT OF PHOTOSYNTHETIC / PHLOEM TRANSLOCATION.

## UNIT - 10

PATHWAYS OF TRANSLOCATION - MATERIALS TRANSLOCATED - RATES OF MOVEMENT - PHLOEM LOADING AND UNLOADING - MECHANISM OF TRANSLOCATION – TRANSPORT SYSTEMS AND PLANT GROWTH.

## UNIT – 11

PLANT HORMONE - STRUCTURE AND FUNCTIONS OF PLANT HORMONES-- ETHYLENE - CYTOKININS -AUXINS - INDOLE ACETIC ACID - ABSICIC ACID FLORIGIN AND GIBBERELLINS PHOTOCHEMICAL AND HORMONAL CONTROL IN PLANTS – PHOTO MORPHOGENESIS - STRUCTURE PROPERTIES FUNCTIONS AND MECHANISM OF ACTION OF PHYTOCHROMES SENESCENCE BIOCHEMICAL CHANGES REGULATION.

## UNIT – 12

SECONDARY PLANT PRODUCTS - STRUCTURE AND FUNCTIONS OF TANNINS - TERPENES - ALLKALOIDS - CATECHIN - QUINOLINE - NICOTINE - MORPHINE – FLAVANOLS CONIFERYL ALCOHOL MENTHOL MYRCENE LINALOOL - MALIC ACID - PAPAIN - CAMPHOR- EUCALYPTUS - BORNEOL ABIETIC ACID ABOITOC ACID - QUERCETIN.

## **209PBYT02 – BIOTECHNOLOGY**

### **UNIT – 01**

**BIOTECHNOLOGY - DEFINITION, SCOPE, ACHIEVEMENTS - APPLICATION OF BIOTECHNOLOGY IN MEDICAL AND OTHER FIELDS - APPLICATION IN GENETIC ENGINEERING.**

### **UNIT – 02**

**ENZYME BIOTECHNOLOGY; INDUSTRIAL USES OF ENZYMES - FOOD TEXTILE, PAPER, DETERGENTS AND MEDICINE - ISOLATION AND PURIFICATION OF ENZYMES BY CHROMATOGRAPHY AND ELECTROPHORESIS; IMMOBILISED ENZYMES - IMMOBILIZATION OF ENZYMES AND APPLICATION OF IMMOBILISED ENZYMES.**

### **UNIT – 03**

**COMMERCIAL AND PHARMACEUTICAL PRODUCTION OF INSULIN, SOMATOTROPIN, INTERFERON'S; MONOCLONAL ANTIBODIES - PRODUCTION OF VITAMINS, ORGANIC ACIDS, ALCOHOLS, ANTIBIOTICS - PENICILLIN.**

### **UNIT – 04**

**BIO FERTILIZERS - BACTERIA AZOTOBACTER, AZOSPIRILLUM - BLUE GREEN ALGAE, AZOLLA, MICRORHYZAE TYPES; MICRORHYZAE AS BIO FERTILIZERS – BIO GEOCHEMICAL CYCLES - BIOLOGICAL NITROGEN FIXATION (CARBON CYCLE, SULPHUR CYCLE, NITROGEN CYCLE), BIOTECHNICAL BIOMINING.**

### **UNIT – 05**

**BIOTECHNOLOGY IN AGRICULTURE FIELD - TOTAL POTENCY BASIS OF PLANT AND TISSUE CULTURE - MEDIA, TYPES, CALLUS, SOMATIC EMBRYOGENESIS, SOMOCLONAL VARIATION, PROTOPLAST CULTURE, CELL CLONES PROTOPLAST FUSION AND SOMATIC HYBRIDIZATION - HYBRIDS - MICRO PROPAGATION; PRODUCTION OF HAPLOID PLANTS.**

# 209PBYT03 – BIO-INFORMATION BIO STATICS

## UNIT – 01

INTRODUCTION - GOALS - SCOPE - FUNDAMENTAL OF BIOLOGICAL SYSTEM - CELLS - CELL TRANSPORT THROUGH PLASMA MEMBRANE - ENERGETIC AND RESPIRATION.

## UNIT – 02

CELL CYCLE - FUNDAMENTALS OF GENETICS - IMMUNE SYSTEM - BIOLOGY OF ENVIRONMENT - BASIC PRINCIPLES AND POPULATION ECOLOGY - FOOD CHAIN – FOOD WEB IN ECOSYSTEM.

## UNIT – 03

MOLECULAR MODELING - INTRODUCTION - MOLECULAR STRUCTURE AND INTERNAL ENERGY - APPLICATION MACROMOLECULAR MODELING.

## UNIT – 04

MOLECULAR MECHANICS AND MOLECULAR DYNAMICS OF OLIGOPEPTIDES - NUCLEOTIDES - DRUG MOLECULES.

## UNIT - 05

MOLECULAR DESIGN - EMERGING AREAS IN BIOINFORMATICS - BIO - COMPUTING.

## UNIT – 06

DATABASE SYSTEMS - INTRODUCTION -DATA ABSTRACTION - DATA MODELS - INSTANCES AND SCHEMES - NETWORK DATA MODEL - BASIC CONCEPTS – HIERARCHIAL DATA MODEL.

## UNIT - 07

BASIC CONCEPTS - ORACLE - RDBMS - VISUAL BASIC - CLIENT / SERVER TECHNOLOGY - DATA TYPES - STRINGS -VARIANT - CONSTANT - DATA - ARRAYS.

## UNIT – 08

LOOPING -GENOMIC DATA BANKS - MICROBIAL AND CELLULAR DATA BANKS - COMPUTER NETWORKING - LAN - WAN - MODEMS - INTERNET.

## UNIT – 09

INTRODUCTION - DEFINITION - FUNCTIONS - SCOPE AND LIMITATIONS OF BIOSTATISTICS -COLLECTION OF DATA - SAMPLING - SAMPLING DESIGN.

## UNIT – 10

CLASSIFICATION AND TABULATION -TYPES BAR DIAGRAMS - PIE DIAGRAMS AND CURVES -MEASURES OF CENTRAL TENDENCY - MEAN - MODE - MEDIAN – GEOMETRIC MEAN.

## UNIT – 11

CORRELATION AND REGRESSION - POSITIVE AND NEGATIVE CORRELATION - SIMPLE - PARTIAL - MULTIPLE - LINEAR AND NON-LINEAR CORRELATION.

## UNIT - 12

TYPES OF REGRESSION ANALYSIS - REGRESSION EQUATION - TEST FOR SIGNIFICANCE - `T` TEST - `CHI` SQUARE TEST.

# **209PBYT04 – PHYSIOLOGY OF NUTRITIONAL BIO-CHEMISTRY**

## UNIT – 01

CARBOHYDRATES AND THEIR METABOLISM - DIGESTION OF SUGARS AND STARCH - DIGESTION OF COMPLEX POLYSACCHARIDES - ABSORPTION AND STORAGE OF CARBOHYDRATES.

## UNIT – 02

TRANSFORMATION OF SUGAR INTO FAT - TISSUE CARBOHYDRATES - CATABOLISM OF CARBOHYDRATES.

## UNIT - 03

ESSENTIAL AND NONESSENTIAL AMINO ACIDS - SYNTHESIS OF NON ESSENTIAL AMINO ACIDS.

## UNIT – 04

PROTEIN METABOLISM - PRODUCTS OF PROTEIN DIGESTION - PROTEIN CATABOLISM - ENDOGENOUS AND EXOGENOUS CATABOLISM AND OPTIMUM PROTEIN INTAKE CYCLE - PROTEIN CALORIE -MALNUTRITION.

## UNIT – 05

LIPID METABOLISM - FATTY ACID ANABOLISM AND CATABOLISM - REGULATION OF FATTY ACID - ROLE OF HORMONES - EFFECT OF DIET ON FATTY ACID SYNTHESIS.

## UNIT – 06

DYNAMICS OF ENERGY - DEFINITION OF KILOCALORIES - JOULE - EXERGONIC AND ENDERGONIC REACTIONS.

## UNIT - 07

CALORIC VALUE OF FOODS - BASAL METABOLISM AND BMR RESPIRATORY QUOTIENT - FACTORS AFFECTING AND CLINICAL ASPECTS - CALORIC REQUIREMENTS.

## UNIT - 08

NUTRITIONAL ASPECTS - PROTEIN FACTORS IN NUTRITION - QUALITY OF PROTEINS - CLASSIFICATION - QUANTITATIVE ASPECTS - PROTEIN DEFICIENCY - ROLE OF CARBOHYDRATES IN DIET.

UNIT - 09

ROLE OF LIPIDS- METABOLISM- LIPID CONTENTS IN DIET - ROLE OF MINERALS IN DIET.

UNIT – 10

BALANCED DIET - OBESITY - IMPORTANCE - TYPES - PATHOGENESIS – METABOLIC CHANGES IN OBESITY AND CLINICAL FEATURES.

UNIT – 11

DIET FOR IN PREGNANCY AND LACTATION.

UNIT – 12

CONSTITUENTS AND NUTRITIVE VALUE OF COMMON FOODS - MILK - EGG - MEAT AND FISH - PULSES AND LEGUMES - GREEN LEAFY VEGETABLES AND - ROLE OF DIETARY FIBRES.



## **209PBYP01 - PRACTICAL – III**

### UNIT – 01

#### COLORIMETRIC EXPERIMENTS

- 1.ISOLATION AND ESTIMATION OF STARCH FROM POTATO.
- 2.ISOLATION AND ESTIMATION OF GLYCOGEN FROM LIVER TISSUE (RAT OR GOAT)
- 3.ISOLATION AND ESTIMATION OF ASCORBIC ACID FROM CITRUS FRUIT.
- 4.ESTIMATION OF FRUCTOSE IN FRUITS.
- 5.ESTIMATION OF RIBOFLAVIN FROM LEGUMES.
- 6.ESTIMATION OF NIACIN.
- 7.DETERMINATION OF VITAMIN E.
- 8.ESTIMATION OF BETA- CAROTENE FROM CARROT.
- 9.ESTIMATION OF TOTAL FREE AMINO ACIDS IN PLANT TISSUES.
- 10.ESTIMATION OF LECITHIN FROM EGG YOLK..
- 11.DETERMINATION OF PLANT HORMONES - IAA OR GIBBERLLIN.

#### ENZYMES STUDIES

- 1.ASSAY OF GLUTAMINE SYNTHASE OR GLUTAMATE DEHYDROGENASE.
- 2.ISOLATION, PURIFICATION, PROPERTIES AND INHIBITOR STUDIES OF ANY ONE OF THE ENZYME CELLULASE.
- 3.ESTIMATION OF ALBUMIN
- 4.DETERMINATION OF  $Na^+$  ,  $K^+$  USING FLAME PHOTOMETER
- 5.DETERMINATION OF GLUCOSE, PROTEIN AND CHLORIDE IN CSF

## SEPARATION TECHNIQUES

1. SEPARATION OF AMINO ACIDS BY PAPER CHROMATOGRAPHY -  
CIRCULAR, ASCENDING & DESCENDING.

2. SEPARATION OF LIPIDS BY TLC

3. SEPARATION OF PLANT PIGMENTS BY COLUMN CHROMATOGRAPHY

### **209PBYP02 – PRACTICAL IV**

UNIT – 01

## GENETICS AND MOLECULAR BIOLOGY

1. POLYACRYLAMIDE GEL ELECTROPHORESIS OF DNA

A. NON-DENATURING B) DENATURING

2. RESTRICTION ANALYSIS OF DNA

3. PREPARATION OF COMPETENT E COLI - TRANSFORMATION

4. PLASMID DNA ISOLATION

5. GENOMIC DNA ISOLATION

6. SOUTHERN BLOT HYBRIDIZATION (DEMONSTRATION)

7. POLYMERASE CHAIN REACTION FOR AMPLIFICATION OF DNA

(DEMONSTRATION)

8. ESTIMATION OF RNA - UV AND VISIBLE METHOD.

9. ISOLATION AND ESTIMATION OF DNA FROM SPLEEN OR LIVER - UV AND  
VISIBLE

## METHOD

### IMMUNOLOGY

1. IMMUNO DIFFUSION - SINGLE RADIAL AND DOUBLE IMMUNODIFFUSION
2. IMMUNOELECTROPHORESIS
3. ROCKET IMMUNOELECTROPHORESIS
4. AGGLUTINATION TESTS
5. RAISING OF ANTIBODIES - SINGLE SOLUBLE AND PARTICULATE ANTIGEN
6. IDENTIFYING BLOOD GROUPING AND RH TYPING.

## **209PBYP03 - PROJECT**