

**SRI KRISHNADEVARAY UNIVERSITY:: ANANTAPURAMU**

**UG CBCS SYLLABUS  
VI Semester  
(2017-2018)**

**B.Sc., BIO-CHEMISTRY  
VI SEMESTER- SYLLABUS**

**(AS PER CBCS AND SEMESTER SYSTEM)**

**III YEARS**

**w.e.f. 2017-2018**



**AP STATE COUNCIL OF HIGHER EDUCATION  
CBCS - PATTERN FOR BIO-CHEMISTRY**

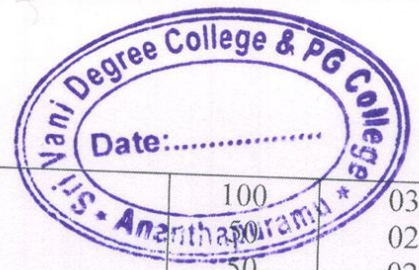
*Y. Ushethi*



AP STATE COUNCIL OF HIGHER EDUCATION  
**BIOCHEMISTRY COURSE STRUCTURE UNDER**  
 (w.e.f. 2015-16, Revised)

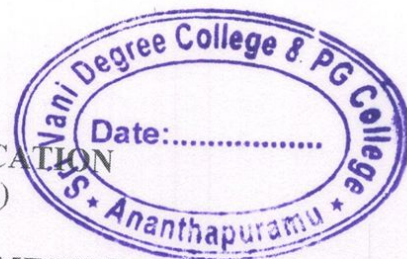
YEAR	SEMESTER	PAPER	TITLE	MARKS	CREDITS	
I	I	I	Theory- BCT-101: Biomolecules	100	03	
			Practical - I- BCP- 101: Qualitative Analysis	50	02	
	II	II	Theory –BCT-201: Nucleic acids and biochemical techniques	100	03	
			Practical - II,BCP-201 : Isolations and Biochemical Techniques	50	02	
II	III	III	Theory –BCT-301: Enzymology and Bioenergetics	100	03	
			Practical – III, BCP 301: Enzymology	50	02	
	IV	IV	Theory – BCT-401: Intermediary Metabolism	100	03	
			Practical - IV– BCP-401 : Quantitative Analysis	50	02	
III	V	V	Theory – BCT-501: Human Physiology and Clinical Biochemistry	100	03	
			Practical - V,BCP-501	50	02	
		VI	Theory - BCT-502: Nutritional biochemistry, Immunology & Endocrinology	100	03	
			Elective Practical – BCP-502	50	02	
	Any one cluster from I, II and III	VII A	VII A	Microbiology and Molecular Biology	100	03
				Practical - VII (A)	50	02
		VII B	VII B	Cell Biology and Genetics		
				Practical - VII (B)		
		VII C	VII C	Basic Microbiology		
				Practical - VII (C)		
		VI	Cluster VIII-A**	<b>Cluster Electives –VIII-Medical diagnostics</b>		
				1.Haematology 2.Clinical Microbiology 3.Biochemical Correlations in Diseases Practical – VIII: 1 Practical – VIII: 2 Project Work	100 100 100 50 50 50	03 03 03 02 02 02
	VI	Cluster VIII-B**	<b>Cluster Electives –VIII-B : Biotechnology</b>			
			1.Recombinant technology 2. Plant and animal biotechnology	100 100	03 03	

*Y. Ushad*



		3. Bioinformatics	100	03
		Practical – VIII: 1	50	02
		Practical – VIII: 2	50	02
		Project Work	50	02
	Cluster VIII-C**	<b>Cluster Electives – VIII-C : Nutrition and health</b>		
		1. Fundamentals of nutrition and food science	100	03
		2: Nutrition for the family& public health		
		3: <b>Therapeutic</b> nutrition	100	03
		Practical – VIII: 1	100	03
		Practical – VIII: 2	50	02
		Project Work	50	02

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**BIOCHEMISTRY SYLLABUS FOR I SEMESTER**

**BIOCHEMISTRY - PAPER - I**

**BIOMOLECULES**

**Periods:60**

**Max. Marks:100**

**Unit – I: Biophysical Concepts**

- 1.1 Water as a biological solvent and its role in biological processes.
- 1.2 Biological relevance of pH, Measurement of pH.
- 1.3. pKa of functional groups in biopolymers such as proteins and nucleic acids.
- 1.4 Importance of buffers in biological systems.
- 1.5 Donnan membrane equilibrium, significance of osmotic pressure in biological systems.

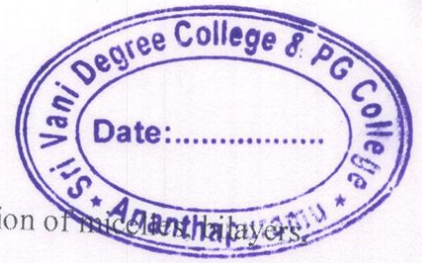
**Unit – II: Carbohydrates**

- 2.1 Carbohydrates: Classification, monosaccharides, D and L designation, open chain and cyclic structures, epimers and anomers, mutarotation
- 2.2 Reactions of carbohydrates (due to functional groups - hydroxyl, aldehyde and ketone).
- 2.3 Amino sugars, Glycosides.
- 2.4 Structure and biological importance of disaccharides (sucrose, lactose, maltose, isomaltose, trehalose), trisaccharides (raffinose, melezitose),
- 2.5 Structural Polysaccharides (cellulose, chitin, pectin) and storage polysaccharides (starch, inulin, glycogen).
- 2.6 Glycosaminoglycans, Bacterial cell wall polysaccharides.
- 2.7 Outlines of glycoproteins, glycolipids and blood group substances.

**Unit – III Lipids**

- 3.1 Lipids: Classification, saturated and unsaturated fatty acids.
- 3.2 Structure and properties of fats and oils (Acid, saponification and iodine values, rancidity).
- 3.3 General properties and structures of phospholipids, sphingolipids and cholesterol
- 3.4 Prostaglandins- structure and biological role of PGD<sub>2</sub>, PGE<sub>2</sub> and PGF<sub>2</sub>

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3.5 Lipoproteins: Types and functions.

3.6 Biomembranes: Behaviour of amphipathic lipids in water- formation of micelles, vesicles and liposomes.

3.7 Membrane composition and organization – Fluid mosaic model.

#### **Unit-IV: Amino Acids and Peptides**

4.1 Amino Acids: Classification, structure, stereochemistry.

4.2 Chemical reactions of amino acids due to carbonyl and amino groups.

4.3 Titration curve of glycine and pK values.

4.4 Essential and non-essential amino acids, non-protein amino acids.

4.5 Peptide bond - nature and conformation.

4.6 Naturally occurring peptides – glutathione, enkephalin.

#### **Unit-V: Proteins**

5.1 Proteins: Classification based on solubility, shape and function

5.2 Determination of amino acid composition of proteins.

5.3 General properties of proteins, denaturation and renaturation of proteins.

5.4 Structural organization of proteins- primary, secondary, tertiary and quaternary structures (E.g. Haemoglobin and Myoglobin)

5.5 Forces stabilizing the structure of protein.

5.6 Outlines of protein sequencing

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**BIOCHEMISTRY MODEL PAPER FOR I SEMESTER**

**BIOCHEMISTRY - PAPER - I**

**BIOMOLECULES**

Time: 3 hrs

Max. Marks: 75

**I. Answer any FIVE of the following:**

Draw labelled diagrams wherever necessary

5x5=25

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**II. Answer any FIVE of the following:**

Draw labelled diagrams wherever necessary

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**BIOCHEMISTRY PRACTICAL SYLLABUS FOR I SEMESTER**

**BIOCHEMISTRY - PAPER - I**

**BIOMOLECULES**

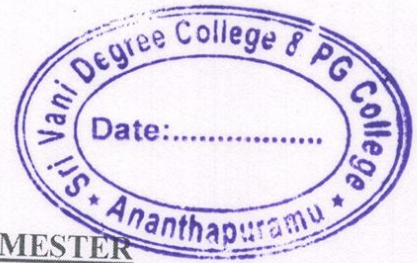
**Periods: 24**

**Max. Marks: 50**

**List of Experiments:**

1. Preparation of buffers (acidic, neutral and alkaline) and determination of pH.
2. Titration curve of glycine and determination of pK and pI values.
3. Qualitative identification of carbohydrates- glucose, fructose, ribose/xylose, maltose, sucrose, lactose, starch/glycogen.
4. Qualitative identification of amino acids – histidine, tyrosine, tryptophan, cysteine, arginine.
5. Qualitative identification of lipids- solubility, saponification, acrolein test, Salkowski test, Lieberman- Burchard test.
6. Preparation of Osazones and their identification.
7. Absorption maxima of colour substances- *p*-Nitrophenol, Methyl orange.
8. Absorption spectra of protein-BSA, nucleic acids- Calf thymus DNA

*Y. Ushak*



**BIOCHEMISTRY SYLLABUS FOR II SEMESTER**

**BIOCHEMISTRY - PAPER - II**

**NUCLEIC ACIDS AND BIOCHEMICAL TECHNIQUES**

**Periods: 60**

**Max. Marks: 100**

**Unit-I: Nucleic Acids**

- 1.1 Nature of nucleic acids.
- 1.2 Structure of purines and pyrimidines, nucleosides, nucleotides.
- 1.3 Stability and formation of phosphodiester linkages. Effect of acids, alkali and nucleases on DNA and RNA.
- 1.4 Structure of Nucleic acids- Watson-Crick DNA double helix structure,
- 1.5 Introduction to circular DNA, supercoiling.
- 1.6 Denaturation of nucleic acids- hyperchromic effect,  $T_m$ -values and their significance.
- 1.7 Reassociation kinetics, cot curves and their significance.
- 1.8 Types of RNA and DNA.

**Unit-II: Porphyrins**

- 2.1 Structure of porphyrins, protoporphyrin, porphobilinogen
- 2.2 Properties, Identification of Porphyrins.
- 2.3 Structure of Metalloporphyrins—heme, cytochromes and chlorophylls.

**Unit-III: Biochemical Techniques I**

- 3.1 Methods of tissue homogenization: (Potter-Elvehjem, mechanical blender, sonicator and enzymatic).
- 3.2 Principle and applications of centrifugation techniques- differential, density gradient. Ultracentrifugation-- preparative and analytical.
- 3.3 Principle and applications of chromatographic techniques- paper, thin layer, gel filtration, ion- exchange and affinity chromatography.
- 3.4 Electrophoresis- principles and applications of paper, polyacrylamide (native and SDS) and agarose gel electrophoresis.

*Y. V. S. Rao*





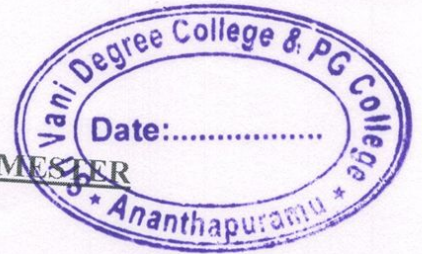
#### **Unit-IV: Biochemical Techniques II**

- 4.1 Colorimetry and Spectrophotometry- Laws of light absorption- Beer Lambert Law.
- 4.2 UV and visible absorption spectra, molar extinction coefficient, biochemical applications of spectrophotometer.
- 4.3 Principle of fluorimetry.
- 4.4 Tracer techniques: Radio isotopes, units of radio activity, half life,  $\beta$  and  $\gamma$ - emitters, use of radioactive isotopes in biology.

#### **Unit- V: Techniques employed in metabolic studies**

- 5.1 Broad outlines of Intermediary metabolism
- 5.2 Methods of investigation, Intermediary metabolism-- in vivo studies such as analysis of excretion, respiratory exchange, removal of organs and perfusion studies
- 5.3 In vitro studies such as tissue slice techniques; Homogenates and purified enzyme systems;
- 5.4 Isotope tracer studies,
- 5.5 Use of inhibitors and antimetabolites

Y. Ushar



**BIOCHEMISTRY MODEL PAPER FOR II SEMESTER**

**BIOCHEMISTRY- PAPER – II**

**NUCLEIC ACIDS AND BIOCHEMICAL TECHNIQUES**

Time: 3 hrs.

Max. Marks: 75

**I. Answer any FIVE of the following:**

Draw labelled diagrams wherever necessary

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**II. Answer any FIVE of the following:**

Draw labelled diagrams wherever necessary

5x10=50

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Draw labelled diagrams wherever necessary

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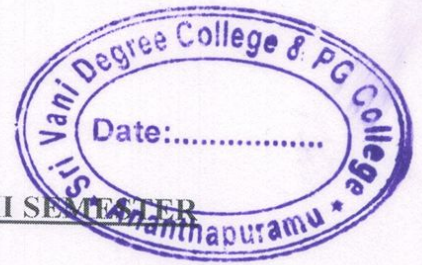
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**BIOCHEMISTRY PRACTICAL SYLLABUS FOR II SEMESTER**

**BIOCHEMISTRY - PAPER – II**

**NUCLEIC ACIDS AND BIOCHEMICAL TECHNIQUES**

**Periods: 24 Max. Marks: 50**

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**List of Experiments:**

1. Isolation of RNA and DNA from tissue/culture.
2. Qualitative Identification of DNA, RNA and Nitrogen Bases
3. Isolation of egg albumin from egg white.
4. Isolation of cholesterol from egg yolk.
5. Isolation of starch from potatoes.
6. Isolation of casein from milk.
7. Separation of amino acids by paper chromatography.
8. Separation of serum proteins by paper electrophoresis.
9. Separation of plant pigments by TLC

*Y. Ushas*



**BIOCHEMISTRY SYLLABUS FOR III SEMESTER**

**BIOCHEMISTRY - PAPER – III**

**ENZYMOLGY AND BIOENERGETICS**

**Periods: 60**

**Max. Marks:100**

**Unit-I: Classification of Enzymes and Structure**

- 1.1 Introduction to biocatalysis, differences between chemical and biological catalysis.
- 1.2 Nomenclature and classification of enzymes.
- 1.3 Enzyme specificity
- 1.4 Active site, principles of energy of activation, transition state.
- 1.5 Interaction between enzyme and substrate- lock and key, induced fit models
- 1.6. Definition of holoenzyme, apo-enzyme, coenzyme, co-factor.
- 1.7 Fundamentals of enzyme assay, enzyme units.

**Unit II: Influence of Physical factors and Inhibitors on Enzyme activity.**

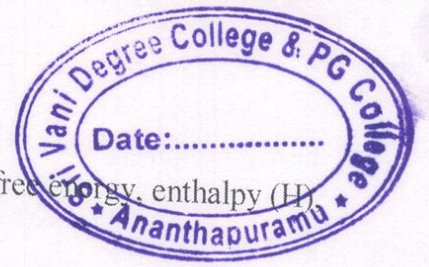
- 2.1 Factors affecting the catalysis- substrate concentration, pH, temperature.
- 2.2 Michaelis -Menten equation for uni-substrate reaction (derivation not necessary),
- 2.3 Significance of  $K_M$  and  $V_{max}$
- 2.4 Enzyme inhibition –irreversible and reversible type's inhibitions- competitive and non-competitive.

**Unit-III: Mechanism of enzyme action**

- 3.1 Outline of mechanism of enzyme action- acid-base catalysis, covalent catalysis, electrostatic catalysis, and metal ion catalysis
- 3.2. Regulation of enzyme activity-allosterism and co-operativity,
- 3.3 ATCase as an allosteric enzyme,
- 3.4 Covalent modulation- covalent phosphorylation of phosphorylase
- 3.5 Zymogen activation- activation of trypsinogen and chymotrypsinogen.
- 3.6 Isoenzymes (LDH). Multienzyme complexes (PDH). Ribozyme

**Unit- IV: Bioenergetics**

*Y. V. S. Reddy*



4.1 Bioenergetics: Thermodynamic principles, chemical equilibria, free energy, enthalpy (H) entropy (S)

4.2 Free energy change in biological transformations in living systems;

4.3 High energy compounds.

4.4 Oxidation-reduction reactions.

#### **Unit V: Biological Oxidations in Mitochondria**

5.1 Organization of electron carriers and enzymes in mitochondria.

5.2 Classes of electron-transferring enzymes, inhibitors of electron transport.

5.3 Oxidative phosphorylation, mechanism of oxidative phosphorylation.

5.4 Uncouplers and inhibitors of oxidative phosphorylation

*Y. Vishal*

**BIOCHEMISTRY MODEL PAPER FOR III SEMESTER**

**BIOCHEMISTRY- PAPER – I11**

**Time: 3 hrs. ENZYMOLOGY AND BIOENERGETICS**

**Max. Marks: 75**



**I. Answer any FIVE of the following:**

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**Draw labelled diagrams wherever necessary**

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**II. Answer any FIVE of the following:**

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**Draw labelled diagrams wherever necessary**

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*Y. Vishal*



**BIOCHEMISTRY PRACTICAL SYLLABUS FOR III SEMESTER**

**BIOCHEMISTRY - PAPER - III**

**ENZYMOLGY AND BIOENERGETICS**

**Periods: 24**

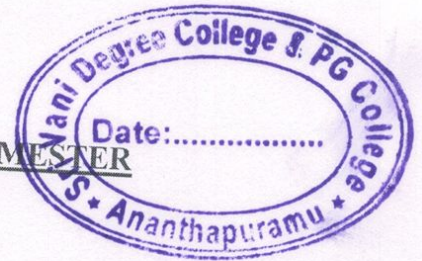
**Max. Marks: 50**

**List of Experiments:**

1. Assay of amylase
2. Assay of urease
3. Assay of catalase.
4. Assay of phosphatase
5. Determination of optimum temperature for amylase.
6. Determination of optimum pH for phosphatise

Y. V. S. Reddy

**BIOCHEMISTRY SYLLABUS FOR IV SEMESTER**



**BIOCHEMISTRY - PAPER - IV**

**INTERMEDIARY METABOLISM**

Periods: 60

Max. Marks: 100

**Unit- I: Carbohydrate Metabolism**

- 1.1 Concept of anabolism and catabolism.
- 1.2 Glycolytic pathway, energy yield. Fate of pyruvate- formation of lactate and ethanol, Pasteur effect.
- 1.3 Citric acid cycle, regulation, energy yield, amphipathic role. Anaplerotic reactions.
- 1.4 Glycogenolysis and glycogenesis.
- 1.5 Pentose phosphate pathway, gluconeogenesis.
- 1.6 Photosynthesis- Light and Dark reactions, Calvin cycle, C4 Pathway.
- 1.7 Disorders of carbohydrate metabolism.

**Unit- II: Lipid Metabolism**

- 2.1 Catabolism of fatty acids ( $\beta$ - oxidation) with even and odd number of carbon atoms.
- 2.2 Ketogenesis.
- 2.3 *De novo* synthesis of fatty acids.
- 2.4 Elongation of fatty acids in mitochondria and microsomes.
- 2.5 Biosynthesis and degradation of triacylglycerol and lecithin.
- 2.6 Biosynthesis of cholesterol.
- 2.7 Disorders of lipid metabolism.

**Unit- III: Metabolism of Amino acids**

- 3.1 General reactions of amino acid metabolism- transamination, decarboxylation and deamination
- 3.2 Urea cycle and regulation.
- 3.3 Catabolism of carbon skeleton of amino acids- glycogenic and ketogenic amino Acids.
- 3.4 Metabolism of glycine, serine, aspartic acid, methionine, phenylalanine and leucine.
- 3.5 Biosynthesis of creatine.
- 3.6 Inborn errors of aromatic and branched chain amino acid metabolism.

**Unit- IV: Nitrogen Fixation**

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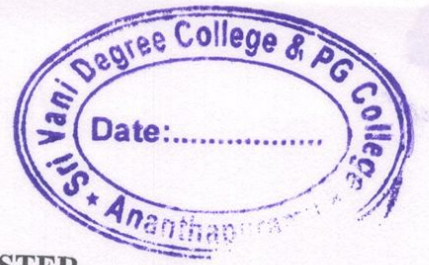


- 4.1 Nitrogen cycle,
- 4.2 Non-biological and biological nitrogen fixation.
- 4.2 Nitrogenase system.
- 4.3 Utilization of nitrate ion, Ammonia incorporation into organic compounds.
- 4.4 Synthesis of glutamine and regulatory mechanism of glutamine synthase.

**Unit- V: Metabolism of Nucleic acid and heme:**

- 5.1 Biosynthesis and regulation of purine and pyrimidine nucleotides. (De novo and salvage pathways)
- 5.3 Catabolism of purines and pyrimidines.
- 5.4 Biosynthesis of deoxyribonucleotides- ribonucleotide reductase and thymidylate synthase and their significance.
- 5.5 Disorders of nucleotide metabolism- Gout, Lesch-Nyhan syndrome .
- 5.6 Biosynthesis and degradation of heme.

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**BIOCHEMISTRY MODEL PAPER – IV SEMESTER**

**BIOCHEMISTRY- PAPER -- IV**

**INTERMEDIARY METABOLISM**

**Max. Marks: 75**

**I. Answer any FIVE of the following:**

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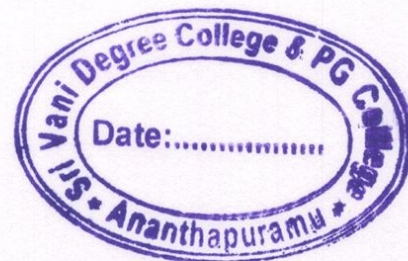
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**BIOCHEMISTRY PRACTICAL SYLLABUS FOR IV SEMESTER**

**BIOCHEMISTRY - PAPER - IV**

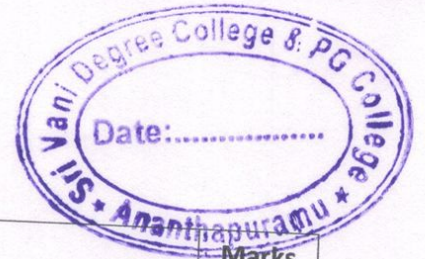
**QUANTITATIVE ANALYSIS**

**Periods: 24 Max. Marks: 50**

**List of Experiments:**

1. Estimation of amino acid by Ninhydrin method.
2. Estimation of protein by Biuret method.
3. Estimation of protein by Lowry method.
4. Estimation of glucose by DNS method.
5. Estimation of glucose by Benedict's titrimetric method

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SEMESTER - V	
Theory – BCT-501: Physiology, Clinical Biochemistry and Immunology	Marks
Unit-I : Physiology	75
Unit II: Endocrinology	
Unit-III : Nutritional Biochemistry	
Unit-IV : Clinical Biochemistry	
Unit-V : Immunology	
<b>Practical – BCP-501 : Nutritional and Clinical Biochemistry</b>	<b>50</b>
SEMESTER – VI	
<b>Theory – BCT-601 Microbiology and Molecular Biology</b>	<b>75</b>
Unit-I : Microbiology	
Unit II-Applied Biochemistry	
Unit-III : DNA Replication and Transcription	
Unit-IV : Protein Synthesis and Regulation of Gene Expression	
Unit-V : Recombinant-DNA Technology	
<b>Practical – BCP-601 : Microbiology and Molecular Biology</b>	<b>50</b>

### ELECTIVE PAPERS

#### Semester

DSE 2: Molecular Basis of Infectious Diseases

#### Semester VI

GE 2: Biochemical Correlations in Diseases

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## Semester-V

45 hrs

### BCT-501: Physiology, Clinical Biochemistry and Immunology

#### **Unit- I : Physiology**

9 hours

Digestion and absorption of carbohydrates, lipids and proteins. Composition of blood and coagulation of blood. Hemoglobin and transport of gases in blood (oxygen and CO<sub>2</sub>).

Muscle- kinds of muscles and mechanism of muscle contraction.

#### **Unit II: Endocrinology**

9 hours

Endocrinology- organization of endocrine system. Classification of hormones. Outlines of chemistry, physiological role and disorders of hormones of thyroid, parathyroid, pituitary and hypothalamus. Introduction of gastrointestinal hormones. Mechanism of hormonal action- signal transduction pathways for glucocorticoids and insulin. Adrenalin, estrogen and progesterone.

#### **Unit- III : Nutritional Biochemistry**

9 hours

Balanced diet. Calorific values of foods and their determination by bomb calorimeter. BMR and factors affecting it. Specific dynamic action of foods. Energy requirements and recommended dietary allowance (RDA) for children, adults, pregnant and lactating women. Sources of complete and incomplete proteins. Biological value of proteins. Malnutrition- Kwashiorkar, Marasmus and PEM.

Vitamins- sources, structure, biochemical roles, deficiency disorders of water and fat soluble vitamins. Introduction to nutraceutical and functional foods. Bulk and trace elements-Ca, Mg, Fe, I, Cu, Mo, Zn, Se and F. Obesity and starvation.

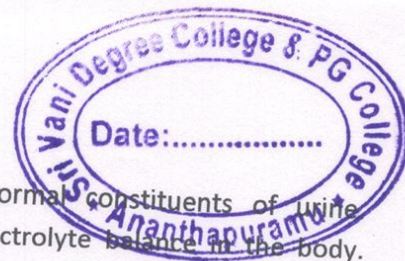
#### **Unit- IV : Clinical Biochemistry**

9 hours

Plasma proteins in health and disease. Disorders of blood coagulation (haemophilia). Types of anemias, haemoglobinopathies-sickle cell anemia.

Liver diseases-jaundice. Liver function tests- conjugated and total bilirubin in serum, albumin: globulin ratio, Serum enzymes in liver diseases- SGPT, GGT and alkaline phosphatase.

*Y. Ushel*



Kidneys-structure of nephron, urine formation, normal and abnormal constituents of urine  
Biological buffers. Role of kidneys in maintaining acid-base and electrolyte balance in the body.  
Renal function test- creatinine.

**Unit- V : Immunology**

9 hours

Organization of immune system. Organs and cells of immune system. Innate and acquired immunity. Cell mediated and humoral immunity (T- and B- cells). Classification of immunoglobulins, structure of IgG. Epitopes / antigenic determinants. Concept of haptens. Adjuvants. Monoclonal antibodies.

Antigen-antibody reactions- agglutination, immunoprecipitation, immunodiffusion. Blood group antigens. Immunodiagnosics- ELISA. Vaccines and their classification. Traditional vaccines-live and attenuated. Modern vaccines- recombinant and peptide vaccines. Outlines of hypersensitivity reactions.

**Practical BCP-501 -: Nutritional and Clinical Biochemistry**

45 hrs

**List of Experiments:**

1. Estimation of calcium by titrimetry
2. Estimation of iron by Wong's method.
3. Estimation of vitamin C by 2, 6 -dichlorophenol indophenol method.
4. Determination of iodine value of an oil.
5. Estimation of hemoglobin in blood.
6. Total count - RBC and WBC. Differential count.
7. Determination of blood group and Rh typing.
8. Visualization of antigen antibody reactions (Ouchterlony technique).
9. Urine analysis for albumin, sugars and ketone bodies.
10. Estimation of urinary creatinine.
11. Estimation of blood Glucose.
12. Estimation of serum total cholesterol.

**Semester -V**  
**Elective Papers**

**DSE-2 : MOLECULAR BASIS OF INFECTIOUS DISEASES (THEORY)**

45 hrs  
(3 per/week)

**Total Hours: 45**

**CREDITS: 4**

**Unit-I : Classification of infectious agents**

**No. of Hours : 9**

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Bacteria, Viruses, protozoa and fungi. Past and present emerging and re-emerging infectious diseases and pathogens. Source, reservoir and transmission of pathogens, Antigen shift and antigenic drift. Host parasite relationship, types of infections associated with parasitic organisms. Overview of viral and bacterial pathogenesis. Infection and evasion.

**Unit-II: Overview of diseases caused by bacteria**

**No. of Hours : 9**

Detailed study of tuberculosis: History, causative agent, molecular basis of host specificity, infection and pathogenicity, Diagnostics, Therapeutics, inhibitors and vaccines. Drug resistance and implications on public health. Other bacterial diseases including Typhoid, Diphtheria, Pertussis, Tetanus and Pneumonia.

**Unit-III: Overview of diseases caused by Viruses**

**No. of Hours : 9**

Detailed study of AIDS, history, causative agent, pathogenesis, Diagnostics, Drugs and inhibitors. Other viral diseases including hepatitis, influenza, rabies, chikungunya and polio.

**Unit-IV: Overview of diseases caused by Parasites**

**No. of Hours : 9**

Detailed study of Malaria, history, causative agents, Vectors, life cycle, Host parasite interactions, Diagnostics, Drugs and Inhibitors, Resistance, Vaccine development. Other diseases including leishmaniasis, amoebiasis.

**Unit-V: Overview of diseases caused by other organisms**

**No. of Hours : 9**

Fungal diseases, General characteristics. Medical importance of major groups, pathogenesis, treatment.

**DSE-2 : MOLECULAR BASIS OF INFECTIOUS DISEASES (PRACTICALS) 45 hrs**

**3 per/ Week**

**Total Hours: 45**

**CREDITS: 2**

1. Permanent slides of pathogens. Mycobacterium tuberculosis, Leishmania, Plasmodium

falciparum

2. WIDAL test


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3. Gram staining
4. Acid fast staining
4. PCR based diagnosis
5. Dot Blot ELISA
6. Immunization Programme- Field visit.

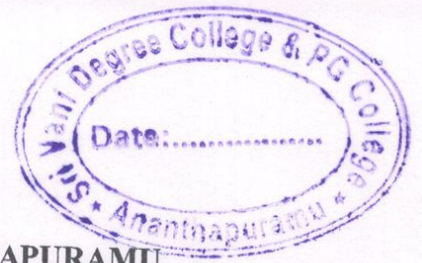


#### SUGGESTED READINGS

1. Prescott, Harley, Klein's Microbiology (2008) 7<sup>th</sup> Ed., Willey, J.M., Sherwood, L.M., Woolverton, C.J. Mc Graw Hill International Edition (New York) ISBN: 978-007126727.
2. Mandell, Douglas and Bennett.S, Principles and practices of Infectious diseases, 7<sup>th</sup> edition, Volume, 2. Churchill Livingstone Elsevier.
3. Sherris Medical Microbiology: An Introduction to Infectious Diseases by Kenneth J.Ryan, C. George Ray, Publisher: McGraw-Hill
4. Medical Microbiology by Patrick R. Murray, Ken S. Rosenthal, Michael A. Pfaller, Elsevier Health Sciences

  
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**SRI KRISHNADEVARAYA UNIVERSITY:: ANANTAPURAMU**

**AP STATE COUNCIL OF HIGHER EDUCATION  
B.Sc., BIOCHEMISTRY SYLLABUS FOR VI SEMESTER  
BIOCHEMISTRY - PAPER – VII  
MICROBIOLOGY AND MOLECULAR BIOLOGY**

**Periods: 60**

**Unit- I : Microbiology**

**Max. Marks: 100**

Introduction to brief history of microbiology. Classification of microorganisms- prokaryotic and eukaryotic microorganisms. Isolation and cultivation of bacteria. Selective media and enriched media. Bacterial growth curve and kinetics of growth. Gram's staining- Gram positive and Gram negative bacteria, motility and sporulation.

Structure and composition of viruses. Isolation and cultivation of bacterial plaques. Lytic and lysogenic life cycle of  $\lambda$  phage. Retro viruses- HIV.

**Unit II-Applied Biochemistry**

Fermentation Technology: Batch, continuous culture techniques, principle types of fermentors. Industrial production of chemicals- alcohol, acids (citric acid), solvents (acetone), antibiotics (penicillin),

Enzyme Technology: Immobilization of enzymes and cells, different methods. Industrial applications.

Production of transgenic plants and their applications.

Introduction to Bioinformatics- definitions of proteomics and genomics. Gene bank, NCBI, DDBJ, Swissprot, PDB. Sequence alignments- BLAST and FASTA.

**Unit- III : DNA Replication and Transcription**

Nature and structure of the gene. DNA replication- models of replication, Meselson-Stahl's experimental proof for semi-conservative model. DNA polymerases I, II and III of *E.coli*, helicase, topoisomerases, primase, ligase. Bidirectional replication model. Okazaki fragments, leading and lagging strands of DNA synthesis. Inhibitors of DNA replication.

Transcription - RNA synthesis, RNA polymerases of prokaryotes. Promoters, Initiation- sigma factors and their recognition sites. Elongation- role of core enzyme. Termination- rho dependent and rho independent.

*Y. Vishay*



#### **Unit- IV: Protein Synthesis and Regulation of Gene Expression**

Introduction to protein synthesis- Genetic code, deciphering of genetic code, Nirenberg's and Khorana's experiments, wobble hypothesis, degeneracy of genetic code.

Protein synthesis- activation of amino acids (aminoacyl t-RNA synthetases). Ribosome structure. Initiation, elongation and termination of protein synthesis. Post- translational modifications- signal hypothesis. Inhibitors of protein synthesis.

Regulation of prokaryotic gene expression- induction and repression. Lac operon.

#### **Unit- V: Recombinant DNA technology**

Outlines of cloning strategies. DNA sequencing- Maxam Gilbert and Sanger's methods. Tools of r-DNA technology: Enzymes- Restriction endonucleases, ligase, phosphatases, reverse transcriptase, polynucleotide kinases, terminal transferase nucleases- $S_1$  and RNAase H. Restriction mapping. Cloning vectors- Plasmid, Expression vector - Host- *E.coli*.

Construction of c-DNA and genomic libraries. Isolation and sequencing of cloned genes- colony hybridization, nucleic acid hybridization.

Polymerase chain reaction- principle and applications. Outlines of blotting techniques-Southern, Northern and Western.

Applications of gene cloning- production of insulin and human growth hormone, production of Bt cotton and edible vaccines.

### **BIOCHEMISTRY - PAPER – VII**

#### **PRACTICAL SYLLABUS :MICROBIOLOGY AND MOLECULAR BIOLOGY**

**Periods: 24**

**Max. Marks: 50**

List of Experiments:

1. Preparation of culture media and sterilization methods.
2. Isolation of pure cultures: (i) Streak plate method. (ii) Serial dilution method.
3. Gram staining.
4. Motility of bacteria by hanging drop method.
5. Antibiotic sensitivity by paper disc method.
6. Isolation of DNA from onion/liver/coconut endosperm.

*Y. V. S. S. S.*



**SRI KRISHNADEVARAYA UNIVERSITY:: ANANTAPURAMU**

**BIOCHEMISTRY CLUSTER SYALLABUS**

**Elective Paper: VIII-A-1**

**HAEMATOLOGY**

Hours 60

Marks 100

**Unit – I: Laboratory Preparation in Haematology:** Introduction to practical, Basic requirements. Collection of blood. Anticoagulants and effects of anticoagulants on blood cell morphology. Effects of storage of blood.

**Unit – II: Routine Haematology:** Composition of blood. Haemoglobin synthesis. Various haemoglobins. Haemopoietic system of the body. Blood cell counts. Erythropoiesis. Leucopoiesis and development of blood corpuscles. Thrombopoiesis. Laboratory technique of haemocytometry. Clinical significance of Total erythrocyte count, total leucocyte count, differential count, erythrocyte sedimentation rate and platelet count.

**Unit – III: Haemostasis and Haematological Diseases:** General consideration of blood coagulation. Mechanism of coagulation. The fibrinolytic mechanism. Clinical significance of routine coagulation tests. Anaemia, Various types of anaemias – Iron deficiency anaemia, Aplastic anaemia, Pernicious anaemia, Sideroblastic anaemia and Sickle cell anaemia, Other haematological diseases – HDNB, Thalassaemia, Leukaemia. Parasitic infections of blood – structure and life cycle of Plasmodium vivax, types of malaria, Structure and life cycle of Wuchereria bancrofti.

**Unit- IV: Automation in Haematology:** General considerations. Blood cell counters, Flow through cytochemical differential counter. Automated coagulated systems.

**Unit - V: Immunohaematology and Blood banking:** Human blood Group systems. Inheritance of blood group systems. Blood transfusion.

**SUGGESTED READINGS**

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3. Cheesbrough M., A Laboratory Manual for Rural Tropical Hospitals, A Basis for Training Courses
4. Guyton A.C. and Hall J.E. Textbook of Medical Physiology.
5. Robbins and Cortan, Pathologic Basis of Disease, VIII Edition.
6. Prakash, G. (2012), Lab Manual on Blood Analysis and Medical Diagnostics, S. Chand and Co. Ltd.

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**SRI KRISHNADEVARAYA UNIVERSITY:: ANANTAPURAMU**  
**BIOCHEMISTRY CLUSTER SYALLABUS**  
**Elective Paper: VIII-A-2**  
**CLINICAL MICROBIOLOGY**

Hours 60

Marks 100

**Unit – I: Introduction to Clinical Microbiology:**

Introduction to microbiology. Introduction to bacteriology. Classification of bacteria. Basic features of bacteria. Factors influencing the growth of bacteria. Morphology of bacteria. Normal bacterial flora of the body. Pathogenic microorganisms.

**Unit – II: Clinical Bacteriology Laboratory & Staining methods:**

Requirements of a microbiological lab – safe disposal strategies. Safety practices to be followed in a microbiological laboratory. Sterilization and disinfection. Requirements in a microbiological lab. Microscopy. Automation in Bacteriology. Introduction to Staining. Gram Staining. Acid-Fast Staining. Capsule Staining. Transfer of bacteria.

**Unit – III: Culturing of Microorganisms and Identification of Bacteria:**

Composition of culture media. Different types of culture media. Preparation of culture media. Inoculation of culture media. Culturing of anaerobes and different types of culture media used. Use, preparation and quality control of various culture media. Identification of bacteria – staining reactions, cultural characteristics and biochemical properties. Study of Gram Negative Bacteria – Bacilli and Cocci. Study of Gram Positive Bacteria – Gram positive Cocci, Anaerobic bacteria, study of genus – Bacillus and Corynebacterium. Study of Mycobacteria, Spirochetes and Rickettsia. Basic sterilization principles - autoclaving.

**Unit- IV: Clinical Mycology and Virology:**

Basic morphological classification of clinically important fungi. Parasitic fungi – Superficial Mycoses and Dermatophytes, Subcutaneous Mycoses, Intermediate Superficial Deep Mycoses and Deep or Systemic mycoses. Classification based on symptomatology. Some important viruses and related diseases (Measles viruses, Influenza viruses, Rotaviruses, Polioviruses Herpes viruses, Rabies viruses, Hepatitis viruses. . General transmission routes for viruses.

**Unit - V: Diagnostic Serology:**

General view of immune system. Antibodies. Harmful effect of immunity. Autoimmune diseases. Principles of Serodiagnostic tests - Flocculation test, Agglutination test, Slide agglutination test, Tube agglutination test, Complement test, Micro titration test, Precipitin test and ELISA.

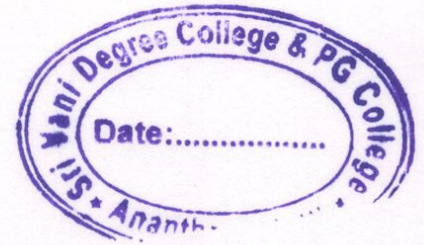
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**BIOCHEMISTRY CLUSTER SYALLABUS**

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**Elective Paper: VIII-A-3**  
**BIOCHEMICAL CORRELATIONS IN DISEASES**

Hours 60

Marks 100

**Unit- I: Inborn errors of metabolism**

Alkaptonuria, Phenylketonuria, Glycogen and Lipid storage diseases, SCID, Diseases caused due to misfolded proteins: Alzheimer's, Huntington's disease, Kuru, Creutzfeldt-Jakob disease,

**Unit- II: Nutritional Deficiency and Life style diseases**

Kwashiorkar, Marasmus, Beri-beri, Scurvy, Pellagra, Night blindness, Rickets, Osteomalacia, Osteoporosis, Wilson's disease, Obesity, Cardiovascular diseases, Atherosclerosis, Diabetes mellitus-II, Inflammatory Bowel Disease (IBD).

**Unit- III: Hormonal Imbalances and Autoimmune diseases**

Outline of hormone action and imbalances leading to disease - precocious puberty, hyper and hypopituitarism. Hyper and hypothyroidism. Concepts in immune recognition - self and non self discrimination,

organ specific autoimmune diseases – Hashimoto's thyroiditis, Grave's disease, myasthenia gravis; Systemic diseases - SLE, rheumatoid arthritis; Diabetes Mellitus-I.

**Unit- IV : Diseases caused due to misfolded proteins**

Alzheimer's, Huntington's disease, Kuru, Creutzfeldt-Jakob disease, Sickle cell anaemia, Thalassemia.

**Unit- V: Infectious diseases**

Viral infection (polio, measles, mumps, influenza, HIV) .

Bacterial infections (tetanus, diphtheria, tuberculosis, typhoid, cholera).

Protozoan (*Plasmodium* and *Trypanosoma*) and parasitic infections.

Vaccines against diseases. General strategies in the design and development of vaccines.

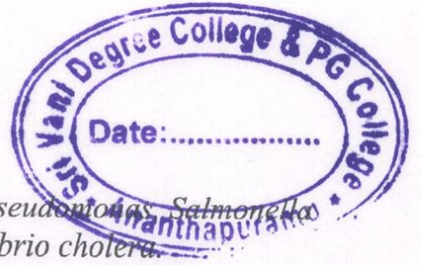
**BIOCHEMISTRY CLUSTER PRACTICAL SYLLABUS**  
**PRACTICAL – 1 CLINICAL BIOCHEMISTRY**

- 1  Collection of blood specimen and serum preparation.
- 2  Estimation of Blood glucose
3. Estimation of urine glucose estimation.
- 4  LFT, Kidney Function and Cardiac Profile tests.
- 5  Determination of serum proteins, SGOT, SGPT, S.ALP, S.ACP
- 6  Determination of sodium, potassium and chlorides

**PRACTICAL – 2 HAEMATOLOGY & CLINICAL MICROBIOLOGY**

- 1  Routine haematological tests – Blood smear preparation, TC, DC, ESR, Platelet count.
- 2  Determination of Haemoglobin.
- 3  Determination of PCV.
- 4  Determination of bleeding time.
- 5  Determination of blood clotting time.
- 6  Blood Grouping.
- 7  Preparation of nutrient agar, culture plates and isolation of bacteria on nutrient agar plate.

*Y. Ushah*



8  Study of permanent slides of *Candida albicans*, *Enterobactersps*, *Pseudomonas*, *Salmonella* *sps*, *Shigellasps*, *Staphylococcus aureus*, *Streptococcus pyogenes* and *Vibrio cholera*.

9  Staining methods – Albert's and Gram's staining methods.


10  Hepatitis test and Pregnancy test using ELISA

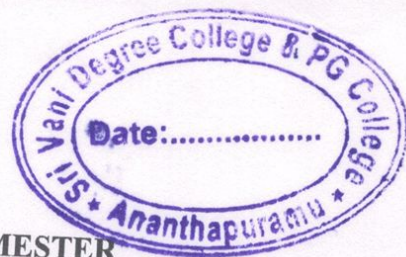
11  VDRL qualitative and quantitative test.

12  WIDAL slide agglutination and tube agglutination test.

**PRACTICAL - III: PROJECT WORK**

Associated with a Clinical Diagnostic Laboratory.

  
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## BIOCHEMISTRY SYLLABUS FOR VI SEMESTER

### BIOCHEMISTRY - PAPER - VII-A

### MICROBIOLOGY AND MOLECULAR BIOLOGY

**Periods: 60**

**Max. Marks: 100**

#### **Unit- I: Microbiology**

- 1.1 Introduction to brief history of microbiology. Classification of microorganisms--prokaryotic and eukaryotic microorganisms.
- 1.2 Isolation and cultivation of bacteria. Selective media and enriched media.
- 1.3 Bacterial growth curve and kinetics of growth. Gram's staining- Gram positive and Gram negative bacteria.
- 1.4 Structure and composition of viruses. Isolation and cultivation of bacterial plaques.
- 1.5 Lytic and lysogenic life cycle of  $\lambda$  phage.
- 1.6 Retro viruses- HIV.

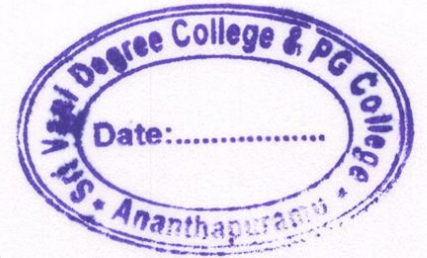
#### **UNIT- II: DNA Replication and Transcription**

- 2.1 Nature and structure of the gene.
- 2.2 DNA replication- models of replication, Meselson-Stahl's experimental proof for semi-conservative model.
- 2.3 DNA polymerases I, II and III of E.coli, helicase, topoisomerases, primase, ligase.
- 2.4 Bidirectional replication model. Okazaki fragments, leading and lagging strands of DNA synthesis.
- 2.5 Inhibitors of DNA replication.
- 2.6 Transcription - RNA synthesis, RNA polymerases of prokaryotes. Promoters, Initiation- sigma factors and their recognition sites. Elongation- role of core enzyme Termination- rho dependent and rho-independent.

#### **Unit- III Protein Synthesis and Regulation of Gene Expression**

- 3.1 Introduction to protein synthesis- Genetic code, deciphering of genetic code
- 3.2 Nirenberg's and Khorana's experiments

*Y. Vishal*



- 3.3 wobble hypothesis, degeneracy of genetic code.
- 3.4 Protein synthesis- activation of amino acids (aminoacyl t-RNA synthetases).
- 3.5 Ribosome structure. Initiation, elongation and termination of protein synthesis.
- 3.6 Post- translational modifications-
- 3.7 Inhibitors of protein synthesis.
- 3.8 Regulation of prokaryotic gene expression- induction and repression. Lac operon.

#### **Unit-IV: Recombinant DNA Technology**

- 4.1 Outlines of cloning strategies.
- 4.2 Tools of r-DNA technology: Enzymes- Restriction endonucleases, ligase, phosphatases, reverse transcriptase, polynucleotide kinases, terminal transferases nucleases- $S_1$  and RNAase H. Restriction mapping.
- 4.3 Cloning vectors- Plasmid, Expression vector - Host- E.coli.
- 4.4 Construction of C-DNA and Genomic libraries. Isolation and sequencing of cloned genes- Colony hybridization, Nucleic acid hybridization.

#### **Unit V –Applied Biochemistry**

- 5.1 DNA sequencing- Maxam Gilbert and Sanger's methods.
- 5.2 Polymerase chain reaction- principle and applications.
- 5.3 Outlines of blotting techniques-Southern, Northern and Western.
- 5.4 Applications of gene cloning- production of insulin and human growth hormone, production of Bt cotton and edible vaccines.
- 5.5 Introduction to Bioinformatics- definitions of proteomics and genomics. Gene bank, NCBI, DDBJ, Swissprot, PDB. Sequence alignments- BLAST and FASTA

*Y. Ushak*





**BIOCHEMISTRY MODEL PAPER FOR VI SEMESTER**

**BIOCHEMISTRY - PAPER - VII-A**

**MICROBIOLOGY AND MOLECULAR BIOLOGY**

**Time: 3 hrs**

**Max. Marks: 75**

**I. Answer any FIVE of the following:**

**5x5=25**

**Draw labelled diagrams wherever necessary**

- 1.
- 2.
- 3.
- 4.
- 5.
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- 8.

**II. Answer any FIVE of the following:**

**5x10=50**

**Draw labelled diagrams wherever necessary**

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*Y. Vishal*



**BIOCHEMISTRY PRACTICAL SYLLABUS FOR VI SEMESTER**

**BIOCHEMISTRY - PAPER - VII-A**

**MICROBIOLOGY AND MOLECULAR BIOLOGY**

**Periods: 24 Max. Marks: 50**

List of Experiments:

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1. Preparation of culture media and sterilization methods.
2. Isolation of pure cultures: (i) Streak plate method. (ii) Serial dilution method.
3. Gram staining.
4. Motility of bacteria by hanging drop method.
5. Antibiotic sensitivity by paper disc method.
6. Isolation of DNA from onion/liver/coconut endosperm.
7. Estimation of DNA by diphenylamine method.
8. Estimation of RNA by orcinol method..
9. Sequence alignments of insulin/BSA with other proteins using BLAST and FASTA.
10. Examination of milk quality by MBRT method.

*Y. V. S. Reddy*



AP STATE COUNCIL OF HIGHER EDUCATION

w.e.f. 2015-16 (Revised in April, 2016)

**BIOCHEMISTRY SYLLABUS FOR VI SEMESTER**

**Biochemistry Cluster Elective Paper: VIII-A-1**

**HAEMATOTOLOGY**

Hours 60

Marks 100

**Unit – I: Laboratory Preparation in Haematology:**

Introduction to practical, Basic requirements. Collection of blood. Anticoagulants and effects of anticoagulants on blood cell morphology. Effects of storage of blood.

**Unit – II: Routine Haematology:**

Composition of blood. Haemoglobin synthesis. Various haemoglobins. Haemopoietic system of the body. Blood cell counts. Erythropoiesis. Leucopoiesis and development of blood corpuscles. Thrombopoiesis. Laboratory technique of haemocytometry. Clinical significance of Total erythrocyte count, total leucocyte count, differential count, erythrocyte sedimentation rate and platelet count.

**Unit – III: Haemostasis and Haematological Diseases:**

General consideration of blood coagulation. Mechanism of coagulation. The fibrinolytic mechanism. Clinical significance of routine coagulation tests. Anaemia, Various types of anaemias – Iron deficiency anaemia, Aplastic anaemia, Pernicious anaemia, Sideroblastic anaemia and Sickel cell anaemia, Other haematological diseases – HDNB, Thalassaemia, Leukaemia. Parasitic infections of blood – structure and life cycle of Plasmodium vivax, types of malaria, Structure and life cycle of Wuchereria bancrofti.

**Unit- IV: Automation in Haematology:**

General considerations. Blood cell counters, Flow through cytochemical differential counter. Automated coagulated systems.

**Unit - V: Immunohaematology and Blood banking:**

Human blood Group systems. Inheritance of blood group systems. Blood transfusion.

*Y. Nishal*



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- Robbins and Cortan, Pathologic Basis of Disease, VIII Edition.
- Prakash, G. (2012), Lab Manual on Blood Analysis and Medical Diagnostics, S. Chand and Co. Ltd.

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**BIOCHEMISTRY MODEL PAPER FOR VI SEMESTER**

**BIOCHEMISTRY- PAPER - VIII**

**Cluster Elective Paper: VIII-A-1**

**HAEMATOLOGY**

**Time: 3 hrs**

**Max. Marks: 75**

**I. Answer any FIVE of the following:**

**5x5=25**

**Draw labeled diagrams wherever necessary**

- 1.
- 2.
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**II. Answer any FIVE of the following:**

**5x10=50**

**Draw labeled diagrams wherever necessary**

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*Y. Ushah*



AP STATE COUNCIL OF HIGHER EDUCATION

w.e.f. 2015-16 (Revised in April, 2016)

BIOCHEMISTRY SYLLABUS FOR VI SEMESTER

Biochemistry Cluster Elective Paper: VIII-A-2

CLINICAL MICROBIOLOGY

Hours 60

Marks 100

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**Unit – I: Introduction to Clinical Microbiology:**

Introduction to microbiology. Introduction to bacteriology. Classification of bacteria. Basic features of bacteria. Factors influencing the growth of bacteria. Morphology of bacteria. Normal bacterial flora of the body. Pathogenic microorganisms.

**Unit – II: Clinical Bacteriology Laboratory & Staining methods:**

Requirements of a microbiological lab — safe disposal strategies. Safety practices to be followed in a microbiological laboratory. Sterilization and disinfection. Requirements in a microbiological lab. Microscopy. Automation in Bacteriology. Introduction to Staining. Gram Staining. Acid-Fast Staining. Capsule Staining. Transfer of bacteria.

**Unit – III: Culturing of Microorganisms and Identification of Bacteria:**

Composition of culture media. Different types of culture media. Preparation of culture media. Inoculation of culture media. Culturing of anaerobes and different types of culture media used. Use, preparation and quality control of various culture media. Identification of bacteria — staining reactions, cultural characteristics and biochemical properties. Study of Gram Negative Bacteria — Bacilli and Cocci. Study of Gram Positive Bacteria — Gram positive Cocci, Anaerobic bacteria, study of genus — Bacillus and Corynebacterium. Study of Mycobacteria, Spirochetes and Rickettsia. Basic sterilization principles - autoclaving.

**Unit- IV: Clinical Mycology and Virology:**

Basic morphological classification of clinically important fungi. Parasitic fungi — Superficial Mycoses and Dermatophytes, Subcutaneous Mycoses, Intermediate Superficial Deep Mycoses and Deep or Systemic mycoses. Classification based on symptomatology. Some important

Y. Ushool



viruses and related diseases (Measles viruses, Influenza viruses, Rotaviruses, Polioviruses, Herpes viruses, Rabies viruses, Hepatitis viruses. . General transmission routes for viruses.

#### **Unit - V: Diagnostic Serology:**

General view of immune system. Antibodies. Harmful effect of immunity. Autoimmune diseases. Principles of Serodiagnostic tests - Flocculation test, Agglutination test, Slide agglutination test, Tube agglutination test, Complement test, Micro titration test, Precipitin test and ELISA.

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Y. V. S. Reddy



**BIOCHEMISTRY MODEL PAPER FOR VI SEMESTER**

**BIOCHEMISTRY- PAPER - VIII**

**Biochemistry Cluster Elective Paper: VIII-A-2**

**CLINICAL MICROBIOLOGY**

**Time: 3 hrs**

**Max. Marks: 75**

**I. Answer any FIVE of the following:**

**5x5=25**

**Draw labeled diagrams wherever necessary**

- 1.
- 2.
- 3.
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**II. Answer any FIVE of the following:**

**5x10=50**

**Draw labeled diagrams wherever necessary**

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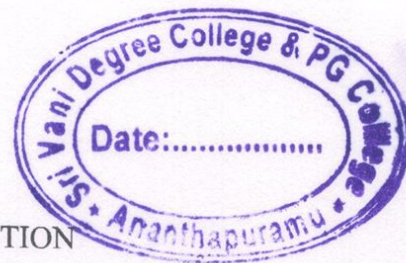
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**BIOCHEMISTRY SYLLABUS FOR VI SEMESTER**

**Biochemistry Cluster Elective Paper: VIII-A-3**

**BIOCHEMICAL CORRELATIONS IN DISEASES**

Hours 60

Marks 100

**Unit- I: Inborn errors of metabolism**

Alkaptonuria, Phenylketonuria, Glycogen and Lipid storage diseases, SCID,  
Diseases caused due to misfolded proteins: Alzheimer's, Huntington's disease, Kuru,  
Creutzfeldt-Jakob disease,

**Unit- II: Nutritional Deficiency and Life style diseases**

Kwashiorkar, Marasmus. Beri-beri, Scurvy, Pellagra. Night blindness. Rickets,  
Osteomalacia, Osteoporosis. Wilson's disease. Obesity. Cardiovascular diseases, Atherosclerosis,  
Diabetes mellitus-II. Inflammatory Bowel Disease (IBD).

**Unit- III: Hormonal Imbalances and Autoimmune diseases**

Outline of hormone action and imbalances leading to disease - precocious puberty, hyper and  
hypopituitarism. Hyper and hypothyroidism. Concepts in immune recognition - self and non self-  
discrimination, organ specific autoimmune diseases – Hashimoto's thyroiditis, Grave's  
disease, myasthenia gravis; Systemic diseases - SLE, rheumatoid arthritis; Diabetes Mellitus-I.

**Unit- IV: Classification of infectious agents**

Bacteria, Viruses, protozoa and fungi. Past and present emerging and re-emerging infectious  
diseases and pathogens. Source, reservoir and transmission of pathogens, Antigenic shift and  
antigenic drift. Host parasite relationship, types of infections associated with parasitic organisms.  
Overview of viral and bacterial pathogenesis. Infection and evasion.

**Unit- V: Infectious diseases**

Viral infection (polio, measles, mumps, influenza, HIV) .

Bacterial infections (tetanus, diphtheria, tuberculosis, typhoid, cholera).

Protozoan (*Plasmodium* and *Trypanosoma*) and parasitic infections.

Vaccines against diseases. General strategies in the design and development of vaccines.



CLUSTER ELECTIVE –VIII-A: VI SEMESTER

MEDICAL DIAGNOSTICS

**PRACTICAL – 1 CLINICAL BIOCHEMISTRY**


- Collection of blood specimen and serum preparation.
- Blood glucose and urine glucose estimation.
- LFT, Kidney Function and Cardiac Profile tests.
- Determination of serum proteins, SGOT, SGPT, S.ALP, S.ACP
- Determination of sodium, potassium and chlorides

**PRACTICAL – 2 HAEMATOLOGY & CLINICAL MICROBIOLOGY**

- Routine haematological tests – Blood smear preparation, TC, DC, ESR, Platelet count.
- Determination of Haemoglobin.
- Determination of PCV.
- Determination of bleeding time.
- Determination of blood clotting time.
- Blood Grouping.
- Preparation of nutrient agar, culture plates and isolation of bacteria on nutrient agar plate.
- Study of permanent slides of *Candida albicans*, *Enterobactersps*, *Pseudomonas*, *Salmonella sps*, *Shigellasps*, *Staphylococcus aureus*, *Streptococcus pyogenes* and *Vibrio cholera*.
- Staining methods – Albert's and Gram's staining methods.
- Hepatitis test and Pregnancy test using ELISA
- VDRL qualitative and quantitative test.
- WIDAL slide agglutination and tube agglutination test.

**PRACTICAL - III: PROJECT WORK**

Associated with a Clinical Diagnostic Laboratory.

  
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ANANTAPURAMU.