

Department of Biochemistry
B.Sc Biochemistry(2022-2023 Regulation)

Program Outcomes:

<u>S.No</u>	<u>OUTCOMES</u>
PO1	The students achieved for best computational performance in a specific context.
PO2	They cultivate the highest level of learning and technological key.
PO3	We were choose social welfare oriented skill based subject and its applications in biology, helps to the students & social welfare.
PO4	ese competences of a course possess upon achieved for course specific goals.
PO5	able to design and contact scientific experiments and analyzing the data

Program specific Outcomes:

<u>S.No</u>	<u>OUTCOMES</u>
PSO 1	Acquire knowledge and skills to undertake a career in Higher Studies in an academic setup
PSO 2	ply the knowledge of experimental approaches to save problems of a chemical nature & ability to enter that knowledge to the solution
PSO 3	nderstand and apply the concepts of life sources, empower the technical knowledge know &practical hands-on Training in the field.
PSO 4	Its academic, research, industrial & pharmaceutical applications.
PSO 5	ug development and synthesize the knowledge & apply the same for multitude of laboratory applications

SEMESTER-I**PAPER-1****CELL BIOLOGY****SEMESTER-1****CREDITS-4****CATEGORY-CORE PAPER****NO.OF. HOUR/WEEK-15****TOTAL HOURS-75****COURSE CODE: FBC11**

SEMESTER	COURSE NAME	COURSE CREDITS	COURSE OUTCOMES
Semester - I	Cell Biology	04	<p>CO1- Students gain the Knowledge on Structure and Functions of Prokaryotic and Eukaryotic cells.</p> <p>CO 2-Composition of cell, Phases of cell Cycle and Biological role of extracellular matrix.</p> <p>CO3-Understanding types of microfilaments and mitochondria.</p> <p>CO4-Describe the nucleus and nucleolus.</p> <p>CO5- Relate the structure and biological role of cell.</p> <p>CO6- Cell -Cell junction with physiological.Processes.</p>

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	S	M
CO2	M	S	S	S	S
CO3	S	S	S	S	M
CO4	M	M	S	S	M
CO5	S	S	S	S	M
CO6	S	S	S	S	M

PO- Programme outcome, CO- Course outcome S- Strong, M- Medium, L- Low (may be avoided).

PAPER-2**BIOMOLECULES****SEMESTER-2****CREDITS-4****CATEGORY-CORE****NO.OF. HOUR/WEEK-6****TOTAL HOURS-75****COURSE CODE: FBC21**

SEMESTER	COURSE NAME	COURSE CRETIDS	COURSE OUTCOMES
II	Biomolecules	04	<p>CO1- Students gain the knowledge on structure and functions of carbohydrates.</p> <p>CO2- Students gain the knowledge on structure and functions of Amino acid.</p> <p>CO3- Understanding the importance and classification of Proteins.</p> <p>CO4-To gain insights about the types, structure and properties nucleic acids.</p> <p>CO5-To understand the structural organization of Proteins and its properties.</p> <p>CO6- To Acquire Knowledge about the Classification, structure and Properties of different types of lipids.</p>

Cos	PO1	PO2	PO3	PO4	PO5
CO1	M	M	M	M	M
CO2	S	M	M	M	M
CO3	M	S	S	M	M
CO4	M	M	M	M	M
CO5	M	M	M	M	M
CO6	S	S	M	M	S

PO- Programme outcome, CO- Course outcome

S- Strong, M- Medium, L- Low (may be avoided)

PAPER-3

CORE PRACTICAL-1 PRACTICAL-1

SEMESTER-2

CREDITS-2

CATEGORY-CORE

NO.OF. HOUR/WEEK-6

TOTAL HOURS-78

COURSE CODE: FPBC22

SEMESTER	COURSE NAME	COURSE CRETIDS	COURSE OUTCOMES
II	Titrimetric and Qualitative analysis	02	CO1-To Qualitatively Analyze the carbohydrates and Amino acids Based on Specific tests. CO2-Differentiate the carbohydrates based on Microscopic Examination. CO3- Quantify Glucose By Benedicts' Method. CO4- Quantify Glycine by Sorenson's Formol Titration Method.

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	M	M
CO2	S	S	M	M	M
CO3	S	S	M	M	M
CO4	S	S	M	M	M

PO- Programme outcome, CO- Course outcome

S- Strong, M- Medium, L- Low (may be avoided)

PAPER-4**SEMESTER III****CORE PAPER - 3 ANALYTICAL BIOCHEMISTRY****SEMESTER-3****CREDITS-3****CATEGORY-CORE****NO.OF. HOUR/WEEK-6****TOTAL HOURS-75****COURSE CODE: CBC31**

SEMESTER	COURSE NAME	COURSE CREDITS	COURSE OUTCOMES
III	CORE PAPER - 3 ANALYTICAL BIOCHEMISTRY	03	<p>CO1 -Students can able to understand the preparation and separation of biological sample.</p> <p>CO 2- separation of sub cellular organelles.</p> <p>CO 3-Assay of Biomolecules using spectroscopy and spectrofluorimetry.</p> <p>CO 4-A practical knowledge on the preparation of solutions.</p> <p>CO 5- Separate biological sample by centrifugation.</p>

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	S	M
CO2	S	S	S	S	S
CO3	M	S	S	S	M
CO4	M	M	S	S	M
CO5	S	S	S	S	M

PO- Programme outcome, CO- Course outcome**S- Strong, M- Medium, L- Low (may be avoided)**

**NON-MAJOR ELECTIVE PAPER - 1
HEALTH AND NUTRITION**

SEMESTER-III

CREDITS-2

CATEGORY-CORE ELECTIVE

NO.OF. HOUR/WEEK-2

TOTAL HOURS-30

COURSE CODEE: CNBC34

SEMESTER	COURSE NAME	COURSE CRETIDS	COURSE OUTCOMES
III	Non major Health and nutrition	02	<p>CO1- Realizing the fact “Food as medicine” Classify carbohydrates and analyzes their sources and function in the body.</p> <p>CO2- Classify fats and analyzes their sources and functions in the body.</p> <p>CO3- Identify and explain Proteins in Foods and the specific functions in maintaining health.</p> <p>CO4-Identify the types of Vitamins and their biomedical significance of vitamins present in food.</p>

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	M
CO2	S	S	S	S	S
CO3	M	S	S	S	M
CO4	M	M	S	S	M

PO- Programme outcome, CO- Course outcome

S- Strong, M- Medium, L- Low (may be avoided)

CORE PAPER – PLANTBIOCHEMISTRY**SEMESTER-4****CREDITS-3****CATEGORY-****NO.OF. HOUR/WEEK-3****TOTAL HOURS-39****COURSE CODEE: CPBC41**

SEMESTER	COURSE NAME	COURSE CRETIDS	COURSE OUTCOMES
IV	Core Paper - PLANT BIOCHEMISTRY	03	CO1 - Students can understand the plant physiology CO 2-Obtaining the knowledge of events of photosynthesis CO 3-Acquire fundamental knowledge of functions of growth hormones CO 4- Gain knowledge on the mechanism of nitrogen fixation CO5 To learn the responses of plants to the stress

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	M
CO2	S	S	S	S	S
CO3	M	S	S	S	M
CO4	M	M	S	S	M
CO5	S	S	S	S	M

PO- Programme outcome, CO- Course outcome**S- Strong, M- Medium, L- Low (may be avoided)**

CORE PRACTICAL-II**SEMESTER-4****CREDITS-4****CATEGORY-****NO.OF. HOUR/WEEK-3****TOTAL HOURS-39****COURSE CODEE: CPBC42**

SEMESTER	COURSE NAME	COURSE CRETIDS	COURSE OUTCOMES
IV	Core practical-II Major practical-II	04	<p>CO 1-Students can use analytical balance and weigh, calculate and prepare normal, molar and percentage solutions.</p> <p>CO 2-Estimate phosphorus and protein using colorimetric method.</p> <p>CO 3- Learn the working of colorimeter device.</p> <p>CO 4-Concept of Stock Solution and Working standard solution.</p> <p>CO5 – Gain the knowledge on isolation of Biomolecules like starch ,casein and albumin.</p>

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	S	M
CO2	M	M	M	M	S
CO3	M	M	M	M	M
CO4	M	M	S	S	M
CO5	S	S	S	S	M

PO- Programme outcome, CO- Course outcome**S- Strong, M- Medium, L- Low (may be avoided)**

**SKILL BASED SUBJECT
PAPER - 1
FIRST AID**

SEMESTER-4

CREDITS-2

CATEGORY-CORE ELECTIVE

NO.OF. HOUR/WEEK-3

TOTAL HOURS-30

COURSE CODE: CSBC43

SEMESTER	COURSE NAME	COURSE CRETIDS	COURSE OUTCOMES
IV	First Aid	02	CO1- Summarize the importance of first aid. CO2 – Analyze the symptoms and treatment for various medical emergencies. CO3- Illustrate the causes and effects of Poisoning and its treatment. CO4- Identify the causes and treatment for various aches in the body.

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	M	M
CO2	S	S	S	S	S
CO3	S	S	S	S	M
CO4	M	S	S	S	S

PO- Programme outcome, CO- Course outcome

S- Strong, M- Medium, L- Low (may be avoided)

SEMESTER V CORE PAPER - 5 ENZYMES AND INTERMEDIARY**METABOLISM****SEMESTER-V****CREDITS-6****CATEGORY-CORE****NO.OF. HOUR/WEEK-6****TOTAL HOURS-75****COURSE CODEE: CBC51**

SEMESTER	COURSE NAME	COURSE CREDITS	COURSE OUTCOMES
V	CorePaper – 5Enzymes and Intermediary Metabolism	06	<p>CO1- Acquire Fundamental knowledge in relevant principles of enzyme.</p> <p>CO2- Mechanism of enzyme kinetics, enzyme catalysis emphasizes on capability of the students to work in a group and gather the information.</p> <p>CO3- Illustrate the reactions of carbohydrate metabolism. Summarize the steps involved in ATP formation</p> <p>CO4 -Identify the steps involved in oxidation of fatty acids.</p> <p>CO5 -Obtain knowledge on the metabolism of amino acids.</p> <p>CO6- Formation of urea Summarize the steps involved in purine and pyrimidine synthesis</p> <p>CO7 -Biosynthesis and degradation of triacyl glycerol and phospholipids.</p> <p>CO8-Biosynthesis and degradation of Cholesterol.</p>

Cos	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	S	M
CO2	S	S	S	M	S
CO3	M	S	M	M	M
CO4	M	M	M	S	M
CO5	S	S	M	S	M
CO6	S	S	S	M	S
CO7	M	M	S	S	M
CO8	S	S	M	S	M

PO- Programme outcome, CO- Course outcome**S- Strong, M- Medium, L- Low (may be avoided)**

CORE PAPER - 6 MOLECULAR BIOLOGY**SEMESTER-V****CREDITS-5****CATEGORY-CORE****NO.OF. HOUR/WEEK-6****TOTAL HOURS-75****COURSE CODEE: CBC52**

SEMESTER	COURSE NAME	COURSE CRETIDS	COURSE OUTCOMES
V	Core Paper – 6 Molecular Biology	05	<p>CO1 -Infer the central dogma of molecular biology,</p> <p>CO2- show how DNA acts as vehicle of inheritance through experimental evidences</p> <p>CO3- Outline the steps involved in replication and explain the events, enzymology, fidelity and inhibitors of replication in prokaryotes.</p> <p>CO4 - Summarize the process of prokaryotic transcription Define genetic code and show how it can be deciphered</p> <p>CO5 Relate genetic code to translation process and explain protein biosynthesis</p> <p>CO6 -Illustrate the regulation of gene expression in prokaryotes using lac and trp operon Gain knowledge on gene mutation.</p> <p>CO7 - DNA Repair mechanisms</p>

Cos	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	S	M
CO2	S	S	S	M	S
CO3	M	S	M	M	M
CO4	M	S	M	M	M
CO5	M	S	M	M	M
CO6	S	S	S	M	M
CO7	M	M	S	S	S

PO- Programme outcome, CO- Course outcome**S- Strong, M- Medium, L- Low (may be avoided)**

CORE PAPER - 7 PHYSIOLOGY AND NUTRITION**SEMESTER-V****CREDITS-4****CATEGORY-CORE****NO.OF. HOUR/WEEK-6****TOTAL HOURS-78****COURSE CODEE: CBC53**

SEMESTER	COURSE NAME	COURSE CRETIDS	COURSE OUTCOMES
v	Core Paper – 7 Physiology and Nutrition	04	<p>CO1- Gain knowledge about the various types of RBC and WBC cells.</p> <p>CO2- Different types of blood groups and basic structure and functions of heart.</p> <p>CO3 -Illustrate the Mechanism of digestion and absorption of macromolecules.</p> <p>CO4-To acquire the knowledge about the structure and functions of kidney, nephron and mechanism of urine formation.</p> <p>CO5- Realizing the fact that “Food as medicine”, describe the significance of carbohydrates, lipids and proteins and analyze their sources and functions in the body.</p> <p>CO6- Identify the types of vitamins and their biomedical significance of vitamins present in food.</p> <p>CO7 - Analyze the biological importance of major and minor trace elements (Minerals) in the food</p>

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	M	M
CO2	S	M	M	S	M
CO3	S	M	M	S	M
CO4	S	M	M	M	M
CO5	S	M	M	M	M
CO6	M	M	M	S	S
CO7	S	S	M	S	M

PO- Programme outcome, CO- Course outcome

S- Strong, M- Medium, L- Low (may be avoided)

MOLECULAR ENDOCRINOLOGY

SEMESTER-V

CREDITS-3

CATEGORY-skill based

NO.OF. HOUR/WEEK-5

TOTAL HOURS-65

COURSE CODE: CEBC54

SEMESTER	COURSE NAME	COURSE CRETIDS	COURSE OUTCOMES
V	Elective Paper -1 Molecular Endocrinology	03	CO1 -Follow good laboratory practices . CO2- Prepare reagents for experiments. CO3-Examine urine and stool sample for normal and abnormal constituents CO4-Estimate Hemoglobin and other hematological parameters. perform blood grouping. CO5-Acquire knowledge on culturing microorganisms.

Cos	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	L
CO2	S	S	S	S	M
CO3	S	S	S	S	M
CO4	S	S	S	S	S
CO5	S	S	S	S	S

PO- Programme outcome, CO- Course outcome

S- Strong, M- Medium, L- Low (may be avoided)

MEDICAL LAB TECHNOLOGY

SEMESTER-V

CREDITS-3

CATEGORY-Skill based subject

NO.OF. HOUR/WEEK-3

TOTAL HOURS-75

COURSE CODEE: CSBC55

SEMESTER	COURSE NAME	COURSE CRETIDS	COURSE OUTCOMES
V	Medical lab Technology	03	<p>CO1 Examine the usage of statistical tools like measure of central tendency and measure of dispersion.</p> <p>CO 2 Understand the definition of biostatistics and its scope.</p> <p>CO 3 Ascertain the methods and importance of data collection and presentation.</p> <p>CO4 Gain the types of correlation Positive and Negative.</p> <p>CO5 Gain the Knowledge of Standard deviation.</p>

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	S
CO2	S	S	S	S	S
CO3	L	M	M	S	S
CO4	S	S	S	S	S
CO5	S	S	S	S	S

PO- Programme outcome, CO- Course outcome

S- Strong, M- Medium, L- Low (may be avoided))

Clinical Biochemistry

SEMESTER-VI

CREDITS-6

CATEGORY-CORE

NO.OF. HOUR/WEEK-5

TOTAL HOURS-65

COURSE CODE: CBC61

SEMESTER	COURSE NAME	COURSE CRETIDS	COURSE OUTCOMES
Semester VI	Core Paper – 8 Clinical Biochemistry	06	<p>CO1 Understand the blood glucose regulation.</p> <p>CO2 Describe the pathophysiology and molecular basis of Diabetes mellitus.</p> <p>CO3 Acquire knowledge on the clinical features on Glycosuria, Ketosis, Fructosuria & Galactosemia.</p> <p>CO4 Analyze the genetic diseases like phenyl ketonuria, cystinuria, albinism, hypo and hyperuricemias, obesity and fatty liver.</p> <p>CO5 Explain the physiopathological and biochemical markers of the liver function tests.</p> <p>CO6- Examine the gastric contents. Practical knowledge on FTM analysis.</p> <p>CO7 -Categorize the use of enzymes and Isozymes in assessment of liver damage, bone disorders and myocardial infarction damage, bone disorders and myocardial infarction.</p> <p>CO8 - Discuss the basic requirements and tools employed in Clinical Biochemistry.</p>

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	S	S	S	S	S
CO3	S	S	S	S	S
CO4	M	S	S	S	S
CO5	S	S	S	S	S

CO6	M	S	S	S	S
CO7	M	S	M	S	S
CO8	S	M	S	M	S

PO- Programme outcome, CO- Course outcome S- Strong, M- Medium, L- Low (may be avoided)

Biotechnology

SEMESTER-VI

CREDITS-6

CATEGORY-core

NO.OF. HOUR/WEEK-5

TOTAL HOURS-65

COURSE CODE: CBC62

SEMESTER	COURSE NAME	COURSE CRETIDS	COURSE OUTCOMES
Semester VI	Core Paper – 9 Biootechnology	06	<p>CO1- Methods, their application in pharmaceutical industry.</p> <p>CO2 -Apply the basic rDNA technique to produce transgenic animal.</p> <p>CO3- Discuss gene transfer methods, their application in pharmaceutical industry, cloning and its importance.</p> <p>CO4 - Design plants based on rDNA techniques.</p> <p>CO5 -Describe the methods employed for DNA amplification, gene therapy and antisense RNA therapy.</p> <p>CO6 -Discuss the basic requirements and tools employed in genetic engineering process.</p>

Cos	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	S
CO2	S	S	S	S	S
CO3	L	M	M	S	S
CO4	S	S	S	S	S

CO5	S	S	S	S	S
CO6	M	S	S	M	S

PO- Programme outcome, CO- Course outcome

S- Strong, M- Medium, L- Low (may be avoided)

Immunology

SEMESTER-VI

CREDITS-3

CATEGORY-ELECTIVE

NO.OF. HOUR/WEEK-5

TOTAL HOURS-65

COURSE CODE: CEBC63

SEMESTER	COURSE NAME	COURSE CRETIDS	COURSE OUTCOMES
Semester VI	Internal Elective Paper - 2 Immunology	03	<p>CO1 A wide knowledge on the immunity, cells and organs of immune system.</p> <p>CO2 Illustrate the structure and classification of antibodies.</p> <p>CO3 Enlightenment of antigen and antibody interaction during infection.</p> <p>CO4 Exposure to mechanisms involved during allergic reactions.</p> <p>CO5 Acquire knowledge on the principles, methodology involved in immunological techniques.</p>

Cos	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	S
CO2	S	S	S	S	S
CO3	S	S	S	S	S
CO4	S	S	S	S	M
CO5	S	S	S	S	S

PO- Programme outcome, CO- Course outcome

S- Strong, M- Medium, L- Low (may be avoided)

Pharmaceutical Biochemistry

SEMESTER-VI

CREDITS-3

CATEGORY-Elective

NO.OF. HOUR/WEEK-5

TOTAL HOURS-65

COURSE CODE: CEBC64

SEMESTER	COURSE NAME	COURSE CREDITS	COURSE OUTCOMES
semester VI	Elective Paper - 2 Pharmaceutical Biochemistry	03	CO1-Understand the chemistry of drug molecules CO2- Illustrate the drug distribution and absorption mechanism CO3-Gain the knowledge of drug delivery systems CO4- Prepare the plants in traditional medicine CO5 -Examine urine and stool sample for normal and abnormal Constituents.

Cos	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	M	M
CO2	S	S	S	S	L
CO3	S	S	S	S	S
CO4	S	S	S	S	S
CO5	S	S	S	S	S

PO- Programme outcome, CO- Course outcome

S- Strong, M- Medium, L- Low (may be avoided)

SKILL BASED SUBJECT PAPER - Research Methodology

SEMESTER - VI

CREDITS-3

CATEGORY-Skill based subject

NO.OF. HOUR/WEEK-3

TOTAL HOURS-75

COURSE CODEE:CSBC65

SEMESTER	COURSE NAME	COURSE CRETIDS	COURSE OUTCOMES
Semester VI	Skill Based Subject – Research Methodology	03	CO1-Able to understand basics of research. CO2 -Illustrate importance of research paper CO3- Can able the principles of scientific research CO4 -Understand The importance and collection of data CO5- Examine the usage of stastical tools.

Cos	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	M	M
CO2	S	S	S	S	L
CO3	S	S	S	S	S
CO4	S	S	S	S	S
CO5	S	S	S	S	S

PO- Programme outcome, CO- Course outcome

S- Strong, M- Medium, L- Low (may be avoided)

Practical -III

SEMESTER-VI

CREDITS-5

CATEGORY-CORE

NO.OF. HOUR/WEEK-5

TOTAL HOURS-65

COURSE CODE: CPBC66

SEMESTER	COURSE NAME	COURSE CRETIDS	COURSE OUTCOMES
Semester VI	Core Practical – III Practical-III Enzymology and Biomolecules	05	CO1- Identify and enumerate the total count of erythrocytes and leukocytes. CO2-Differentiate leukocytes and calculate their total count. CO3-Define and determine the erythrocyte sedimentation rate, packed cell volume. CO4-Mean corpuscular volume and relate their clinical implications. CO5- Utilize sphygmomanometer to determine the blood pressure. CO6 -To learn about assay of activity of alkaline phosphatase in serum. CO7-To gain knowledge of preparation of media liquid,solid and slant.

Cos	PO1	PO2	PO3	PO4	PO5
------------	------------	------------	------------	------------	------------

CO1	S	S	S	M	S
CO2	S	S	S	S	S
CO3	S	S	S	S	M
CO4	M	M	S	S	S
CO5	S	S	S	S	S
CO6	S	S	S	M	S
CO7	M	M	S	S	S

PO- Programme outcome, CO- Course outcome

S- Strong, M- Medium, L- Low (may be avoided

Practical -IV

SEMESTER-VI

CREDITS-3

CATEGORY-CORE

NO.OF. HOUR/WEEK-5

TOTAL HOURS-65

COURSE CODE: CPBC67

SEMESTER	COURSE NAME	COURSE CRETIDS	COURSE OUTCOMES
Semester VI	Core Practical - IV Hematology, Microbiology and Urinalysis	03	<p>CO1 -Identify and enumerate the total count of erythrocytes and leukocytes.</p> <p>CO2- Differentiate leukocytes and calculate their total count.</p> <p>CO3- Define and determine the erythrocyte sedimentation rate, packed cell volume and mean corpuscular volume and relate their clinical implications</p> <p>CO4 -Utilize sphygmomanometer to determine the blood pressure</p> <p>CO5-Qualitatively analyze the normal and abnormal constituents of urine sample.</p>

Cos	PO1	PO2	PO3	PO4	PO5
CO1	S	M	M	M	M

CO2	S	S	S	S	L
CO3	S	S	S	S	S
CO4	S	S	S	S	S
CO5	S	S	S	S	S

PO- Programme outcome, CO- Course outcome

S- Strong, M- Medium, L- Low (may be avoided)