



# Excël

## COLLEGE FOR COMMERCE AND SCIENCE



Approved by Government of TamilNadu & Affiliated with Periyar University, Salem  
Pallakapalayam, Komarapalayam, Namakkal Dt-637 303  
Tamilnadu, India  
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### 2021 -22 REGULATION

### DEPARTMENT OF BIOCHEMISTRY

<b>Programme Outcome(POs)</b>	
<b>PO1</b>	<b>Disciplinary knowledge:</b> Ability to understand fundamental concepts of Biochemistry; Ability to apply basic principles of chemistry to Biological Systems and Molecular Biology.
<b>PO2</b>	<b>Communication Skills:</b> Ability to speak and write clearly in English; Ability to listen to and follow scientific viewpoints and engage with them.
<b>PO3</b>	<b>Problem solving:</b> ability to closely observe the situation, and apply lateral thinking and analytical skills.
<b>PO4</b>	<b>Analytical reasoning:</b> Ability to evaluate the strengths and weaknesses in scholarly texts spotting flaws in their arguments; Ability to use critics and theorists to create a framework and to substantiate one's argument in one's reading of scientific texts.
<b>PO5</b>	<b>Team work /Time Management:</b> Ability to participate constructively in class room discussions; Ability to contribute to group work; Ability to meet a deadline.
<b>PO6</b>	<b>Scientific reasoning:</b> Ability to analyse, interpret and draw conclusions from quantitative/qualitative data; and critically evaluate ideas, evidence and experiences from an open-minded and reasoned perspective. Ability to formulate logical and convincing arguments.
<b>PO7</b>	<b>Self-directed learning:</b> Ability to work independently in terms of organizing laboratory, and critically analyzing research literature; Ability to postulate hypothesis, questions and search for answers.
<b>PO8</b>	<b>Digital literacy:</b> Ability to use digital sources, and apply various platforms to convey and explain concepts of Biochemistry
<b>PO9</b>	<b>Moral and ethical awareness/reasoning:</b> Ability to interrogate one's own ethical values and to be aware of ethical and environmental issues; Ability to read values inherited in society and criticism vis a vis, the environment, religion and spirituality as also structures of power
<b>PO10</b>	<b>Leadership readiness:</b> Ability to lead group discussions, to formulate questions related to scientific and social issues.



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### Programme Specific Outcome(PSOs)

<b>PSO1</b>	Comprehend the knowledge in the biochemical, analytical, bio statistical and computational areas
<b>PSO2</b>	Ability to understand the technical aspects of existing technologies that help in addressing the biological and medical challenges faced by humankind
<b>PSO3</b>	Acquiring analytical and hands-on skills to perform research in multi disciplinary environments
<b>PSO4.</b>	Use library search tools and online databases and sources to locate and retrieve scientific information about a topic and techniques related to biochemistry
<b>PSO5</b>	Enhance skills of analytical and critical thinking to analyze effectiveness of economic policies.



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### DEPARMENT OF BIOCHEMISTRY

### 2021 -22 REGULATION-COURSE OUTCOMES

Course Code	Course Title	Course Outcomes	
<b>SEMESTER-I</b>			
21UBC01	CORE I BASICS OF BIOCHEMISTRY	CO1	Summarize structures, isomerism and functions of different types of carbohydrates.
		CO2	Understand the nature of amino acids and proteins with their structure and their roles..
		CO3	Demonstrate about the lipids and lipoproteins along with their role.
		CO4	Explain the structure and properties of Nucleic acids and Nucleoproteins.
		CO5	Describe about source and importance of Vitamins.

#### Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	L	M	M	S	M	L	S	M	S
CO2	S	L	M	M	S	M	L	S	M	S
CO3	S	L	M	M	S	M	L	S	M	S
CO4	S	L	L	L	S	S	L	S	M	S
CO5	S	L	S	S	S	L	S	S	M	S

**S- Strong M-Medium L-Low**



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<b>21UCHA01</b>	<b>INORGANIC, ORGANIC AND PHYSICAL CHEMISTRY-I</b>	<b>CO1</b>	Illustrate the types of bonding and explain about classification and characteristic about hydrides.
		<b>CO2</b>	Discuss the radio activity, Nuclear Fission, Nuclear reactor.
		<b>CO3</b>	Understand about the basic concepts of covalent bond, electron displacement and stereoisomerism.
		<b>CO4</b>	Explain the concept of aromatic compounds and heterocyclic compounds.
		<b>CO5</b>	Gain knowledge about monomer, polymer natural and synthetic rubbers.

### Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	L	M	L	S	L	L	S	M	S
CO2	S	M	M	L	S	L	L	S	M	S
CO3	S	L	M	M	S	M	M	S	L	S
CO4	S	L	L	L	S	S	L	S	M	S
CO5	S	L	S	S	S	L	S	S	M	S

**S- Strong M-Medium L-Low**



### SEMESTER-II

<b>21UBC02</b>	<b>CORE II - TOOLS OF BIOCHEMISTRY</b>	<b>CO1</b>	Illustrate the cell fractionation techniques and clarify about the microscope handling.
		<b>CO2</b>	Disclose the chromatographic techniques for the separation components.
		<b>CO3</b>	Explain the principles of centrifugation techniques for the separation of components.
		<b>CO4</b>	Understand basic principles behind electrophoretic and spectroscopic techniques .
		<b>CO5</b>	Describe about the measurement and the applications of radioisotopes.

### Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	L	M	S	M	S	L	M	M	S
CO2	S	L	M	S	M	S	L	M	M	S
CO3	S	L	M	S	M	S	L	M	M	S
CO4	S	L	M	S	M	S	L	M	M	S
CO5	S	L	M	S	M	S	M	M	M	L

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<b>21UCHA02</b>	<b>INORGANIC, ORGANIC AND PHYSICAL CHEMISTRY-II</b>	<b>CO1</b>	Understand the basic concept of theories of atomic number concept, Pauling's theory, and biological role of hemoglobin.
		<b>CO2</b>	Understand the nature of carbohydrates and amino acids with their structure and their roles.
		<b>CO3</b>	Disclose the chromatographic techniques for the separation components and uses of antibiotics.
		<b>CO4</b>	Explain the rules of photo chemistry and phase rules.
		<b>CO5</b>	Understand the laws of electrochemistry and corrosion.

### Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
<b>CO1</b>	S	L	M	S	M	S	L	M	M	S
<b>CO2</b>	S	L	M	S	S	M	L	M	M	S
<b>CO3</b>	S	L	M	S	S	S	L	M	M	S
<b>CO4</b>	S	L	M	S	M	M	L	M	M	S
<b>CO5</b>	S	L	M	S	M	S	M	M	M	L

**S- Strong M-Medium L-Low**



### SEMESTER-III

21UBC03	CORE III – ENZYMES	CO1	Understand the basic features and classification of enzymes.
		CO2	Figure out the characteristics of active site and nature of enzyme catalysis.
		CO3	Understand the enzyme kinetics, enzyme inhibition and enzyme regulation with relevant examples.
		CO4	Demonstrate the coenzymes, allosteric enzymes and multienzyme complex.
		CO5	Explain the various immobilization techniques and application of enzymes in different fields,

### Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	L	M	M	M	S	M	S	S	S
CO2	S	L	S	S	S	S	M	S	S	S
CO3	S	L	S	S	S	S	S	S	S	S
CO4	S	L	M	S	M	S	S	S	S	S
CO5	S	L	S	S	S	S	S	S	S	S

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<b>21UBCS01</b>	<b>SBEC-I - CELL BIOLOGY</b>	<b>CO1</b>	Understand the structure and function of different types of cell.
		<b>CO2</b>	Succeed in understanding structural organization and role different organelles
		<b>CO3</b>	Expound the chromosomal organization.
		<b>CO4</b>	Analyze cell cycle and types of cell division.
		<b>CO5</b>	Describe the role of extracellular matrix and cell interactions

### Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
<b>CO1</b>	S	L	M	S	M	S	S	S	S	S
<b>CO2</b>	S	L	M	S	M	S	S	S	S	S
<b>CO3</b>	S	L	M	S	M	S	S	S	S	S
<b>CO4</b>	S	L	M	S	M	S	S	S	S	S
<b>CO5</b>	S	L	S	S	M	S	S	S	S	S

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### SEMESTER-IV

<b>21UBC04</b>	<b>CORE IV - INTERMEDIARY METABOLISM</b>	<b>CO1</b>	Understand the basic principles of metabolic pathways
		<b>CO2</b>	Comprehend carbohydrate metabolism and its regulation
		<b>CO3</b>	Give the big picture about the biological oxidation process
		<b>CO4</b>	Comprehend the concepts of lipid metabolism and amino acid metabolism and urea cycle.
		<b>CO5</b>	Understand concepts of nucleotide metabolism nucleic acid metabolism

### Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
<b>CO1</b>	S	L	S	S	M	S	M	S	S	S
<b>CO2</b>	S	L	S	S	M	M	M	S	S	S
<b>CO3</b>	S	L	S	S	M	M	M	S	S	S
<b>CO4</b>	S	L	S	S	M	M	M	S	S	S
<b>CO5</b>	S	L	S	S	M	S	M	S	S	S

**S- Strong M-Medium L-Low**



<b>20UBCS02</b>	<b>SBEC – II -PLANT BIOCHEMISTRY</b>	<b>CO1</b>	Understand the plant cell physiology
		<b>CO2</b>	Comprehend process of photosynthesis and photorespiration.
		<b>CO3</b>	Demonstrate nitrogen fixation in plants.
		<b>CO4</b>	Illustrate about the plant growth through seed germination and seed dormancy.
		<b>CO5</b>	Explain hormones and secondary metabolites of plants.

### Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
<b>CO1</b>	S	L	M	S	S	S	S	S	M	M
<b>CO2</b>	S	L	M	S	S	S	S	S	M	M
<b>CO3</b>	S	L	M	S	S	S	S	S	M	M
<b>CO4</b>	S	L	S	S	S	S	S	S	M	M
<b>CO5</b>	S	L	S	S	S	S	S	S	M	M

**S- Strong M-Medium L-Low**



### SEMESTER -V

<b>21UBC05</b>	<b>CORE V - CLINICAL BIOCHEMISTRY</b>	<b>CO1</b>	Understand clinical aspects of biochemistry.
		<b>CO2</b>	Describe about the blood components, blood coagulation system and Perform the hematology-based analysis.
		<b>CO3</b>	Acquire insight into disorders of carbohydrates and lipids metabolism
		<b>CO4</b>	Gain knowledge about various disorders of protein, nucleic acid and bilirubin metabolism.
		<b>CO5</b>	Comprehend different organ function tests and clinical enzymology.

### Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	L	M	S	S	S	S	S	M	M
CO2	S	L	M	S	S	S	S	S	M	M
CO3	S	L	M	S	S	S	S	S	M	M
CO4	S	L	S	S	S	S	S	S	M	M
CO5	S	L	S	S	S	S	S	S	M	M

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<b>21UBC06</b>	<b>CORE – VI MOLECULAR BIOLOGY</b>	<b>CO1</b>	Understand the replication process
		<b>CO2</b>	Comprehend basic principles and mechanism of transcription
		<b>CO3</b>	Understand translation process and post translational modification of proteins
		<b>CO4</b>	Understand the protein targeting and processing and regulation of gene expression in prokaryotes K
		<b>CO5</b>	Understand types and causes of mutation, and DNA repairing mechanisms

### Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
<b>CO1</b>	S	M	S	S	S	M	M	S	S	S
<b>CO2</b>	S	M	S	S	S	M	M	S	S	S
<b>CO3</b>	S	M	S	S	S	M	M	S	S	S
<b>CO4</b>	S	M	S	S	S	M	M	S	S	S
<b>CO5</b>	S	M	S	S	S	M	M	S	S	S

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<b>21UBC07</b>	<b>CORE VII - HUMAN PHYSIOLOGY</b>	<b>CO1</b>	Illustrate about digestive secretions and absorptive mechanisms
		<b>CO2</b>	Comprehend the process of gaseous exchange in tissues and lungs
		<b>CO3</b>	Obtain an insight about muscle physiology and cardiovascular system
		<b>CO4</b>	Understand urine formation and physiology of reproductive system
		<b>CO5</b>	Get an idea about neuron structure and sensory physiology

### Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
<b>CO1</b>	S	M	S	S	S	M	M	S	S	S
<b>CO2</b>	S	M	S	S	S	M	M	S	S	S
<b>CO3</b>	S	M	S	S	S	M	M	S	S	S
<b>CO4</b>	S	M	S	S	S	M	M	S	S	S
<b>CO5</b>	S	M	S	S	S	M	M	S	S	S

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<b>21UBCE01</b>	<b>ELECTIVE – I NUTRITIONAL BIOCHEMISTRY</b>	<b>CO1</b>	Describe energy content of various foods and nutritional significance of different biomolecules.
		<b>CO2</b>	Understand nutritional requirements and techniques to measure energy expenditure.
		<b>CO3</b>	Explain the effect protein energy malnutrition.
		<b>CO4</b>	Describe nutritional requirement, significance and deficiency disorders of dietary minerals.
		<b>CO5</b>	Obtain an insight about Regulation and standardization of foods in food industry.

### Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
<b>CO1</b>	S	M	S	S	S	M	M	S	S	S
<b>CO2</b>	S	M	S	S	S	M	M	S	S	S
<b>CO3</b>	S	M	S	S	S	M	M	S	S	S
<b>CO4</b>	S	M	S	S	S	M	M	S	S	S
<b>CO5</b>	S	M	S	S	S	M	M	S	S	S

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<b>21UBCS03</b>	<b>SBEC – II - GENETIC ENGINEERING</b>	<b>CO1</b>	Get an idea about the role of DNA manipulative enzymes and restriction enzymes used in rDNA technology.
		<b>CO2</b>	Advance their knowledge about the vectors suitable for rDNA technology.
		<b>CO3</b>	Understanding of various methods adapted for gene transfer and screening of recombinants.
		<b>CO4</b>	Obtain knowledge about advance techniques in genetic engineering.
		<b>CO5</b>	Understand applications of rDNA technology in various fields.

### Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
<b>CO1</b>	S	M	S	S	S	S	S	S	S	S
<b>CO2</b>	S	M	S	S	S	S	S	S	S	S
<b>CO3</b>	S	L	S	S	S	S	S	S	S	S
<b>CO4</b>	S	L	S	S	S	S	M	S	S	S
<b>CO5</b>	S	L	S	S	S	S	M	S	S	S

**S- Strong M-Medium L-Low**



### SEMESTER VI

<b>21UBC08</b>	<b>CORE – VIII – IMMUNOLOGY</b>	<b>CO1</b>	Understand basics of immune system and about the cells and organs of immune system.
		<b>CO2</b>	Describe the Antigen and Antibody structure and properties and obtain the knowledge about the hybridoma technology.
		<b>CO3</b>	Comprehend the antigen and antibody reactions and immunological techniques.
		<b>CO4</b>	Get a clear idea about the immunization and hypersensitivity reactions.
		<b>CO5</b>	Familiarize with complement system, autoimmunity and immunodeficiency disorders.

### Mapping with Programme Outcome

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
<b>CO1</b>	S	M	S	S	S	S	S	M	S	S
<b>CO2</b>	S	M	S	S	S	S	S	M	S	S
<b>CO3</b>	S	M	S	S	S	S	M	M	S	S
<b>CO4</b>	S	M	S	S	S	S	M	M	S	S
<b>CO5</b>	S	M	S	S	S	S	M	M	S	S

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<b>1UBC09</b>	<b>CORE – IX ENDOCRINOLOGY</b>	<b>CO1</b>	Gain knowledge about the basic terminologies , classification and mechanism of action of hormones and to demonstrate various types of second messengers and their action
		<b>CO2</b>	Understand hypothalamic and pituitary hormones
		<b>CO3</b>	Learn various functions of thyroid, parathyroid and pancreatic hormones along with their mechanism of action
		<b>CO4</b>	Demonstrate the biological functions and dysfunction of various GI tract hormones as well as adrenal gland hormones
		<b>CO5</b>	Understand about the male and female reproductive hormones and also gain knowledge about some local hormones.

### Mapping with Programme Outcome

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
<b>CO1</b>	S	M	M	M	S	S	S	S	M	M
<b>CO2</b>	S	M	M	M	S	M	S	S	M	M
<b>CO3</b>	S	M	M	M	S	S	S	S	M	M
<b>CO4</b>	S	M	M	M	S	S	M	S	M	M
<b>CO5</b>	S	M	M	M	S	S	S	L	M	M

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<b>21UBC10</b>	<b>PHARMACEUTICAL BIOCHEMISTRY</b>	<b>CO1</b>	Understand drug dosage, routes of administration and about bioavailability of drugs
		<b>CO2</b>	Understand about basic principles involved in pharmacokinetics
		<b>CO3</b>	Understand about the drug receptor interactions and acute poisoning.
		<b>CO4</b>	Describe the general principle of adverse drug reactions and acute poisoning
		<b>CO5</b>	Advance the knowledge on drug discovery process and ethical issues in drug discovery process and in preclinical toxicological studies

### Mapping with Programme Outcome

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
<b>CO1</b>	S	M	S	S	M	S	S	S	S	S
<b>CO2</b>	S	M	M	S	M	S	S	S	S	S
<b>CO3</b>	S	M	M	S	M	S	S	S	S	S
<b>CO4</b>	S	M	M	M	M	S	M	S	S	S
<b>CO5</b>	S	M	S	M	M	S	S	S	S	S

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<b>20UBCE02</b>	<b>INDUSTRIAL BIOCHEMISTRY</b>	<b>CO1</b>	Learn about the culture techniques for isolation of microbes from various sources and preserve the isolates.
		<b>CO2</b>	Gain basic knowledge about basic principles of fermentation and types of fermenters.
		<b>CO3</b>	Describe the microbial production of bioactive compounds such as organic acids, bacterial and fungal polysaccharides, antibiotics and vitamins.
		<b>CO4</b>	Learn about Industrial production of alcohol, alcoholic beverages, production of Single Cell Protein, bio ethanol and biogas production.
		<b>CO5</b>	Provide fundamental insights to exploit microbes for protecting environment.

### Mapping with Programme Outcome

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
<b>CO1</b>	S	L	S	S	M	S	S	S	S	S
<b>CO2</b>	S	L	S	S	M	S	S	S	S	S
<b>CO3</b>	S	M	S	S	M	S	S	S	S	S
<b>CO4</b>	S	M	S	S	M	S	S	S	S	S
<b>CO5</b>	S	M	S	S	M	S	S	S	S	S

**S- Strong M-Medium L-Low**



<b>21UBCS04</b>	<b>BIOINFORMATICS AND NANOTECHNOLOGY</b>	<b>CO1</b>	Understand basic principles and applications of bioinformatics in life science and get trained in database searching
		<b>CO2</b>	Acquire knowledge of biological databases for the sequence alignments and predicting the structures of bio molecules such as nucleic acids and proteins.
		<b>CO3</b>	Describe the different tools available for sequence alignment and predicting the structures
		<b>CO4</b>	Describe the different tools available for sequence alignment and predicting the structures.
		<b>CO5</b>	Describe history of nanotechnology, Properties of nanoparticles, types, synthesis of nanoparticles and the characterization of nanoparticles using Microscopy techniques such as SEM, TEM, AFM, and STM.

### Mapping with Programme Outcome

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
<b>CO1</b>	S	L	S	S	M	S	S	S	S	S
<b>CO2</b>	S	L	S	S	M	S	S	S	S	S
<b>CO3</b>	S	M	S	S	M	S	S	S	S	S
<b>CO4</b>	S	M	S	S	M	S	S	S	S	S
<b>CO5</b>	S	M	S	S	M	S	S	S	S	S

**S- Strong M-Medium L-Low**