

**MADURAI KAMARAJ UNIVERSITY**

*University with Potential for Excellence*

**M.Sc., Biochemistry- Semester**

**CHOICE BASED CREDIT  
SYSTEM REVISED SYLLABUS**

(This will be effective from the academic year 2018 – 2019 & 2023-2024)

**M.Sc., BIOCHEMISTRY**

**Subject: Basics Of Biochemistry**

**Subject Code: EBCPC11**

CO1	Students will be introduced to the structure of biomolecules.
CO2	The significance of carbohydrates in biological processes will be understood.
CO3	The structure, properties and biological significance of lipids in the biological system will be studied
CO4	Students will learn about the concepts of protein structure and their significance in biological processes and creatively comprehend the role of membrane components with their biological significance
CO5	Students will gain knowledge about the structures and functional roles of nucleic acids in the biological system

**Subject: Biochemical And Molecular Biology Techniques**

**Subject Code: EBCPC12**

CO1	Attain good knowledge in modern used in biochemical investigation and microscopy and apply the experimental protocols to plan and carry out simple investigations in biological research.
CO2	Demonstrate knowledge to implement the theoretical basis of chromatography in upcoming practical course work
CO3	Demonstrate knowledge to implement the theoretical basis of electrophoretic techniques in research work
CO4	Tackle more advanced and specialized spectroscopic techniques that are pertinent to research
CO5	Tackle more advanced and specialized radioisotope and centrifugation techniques



that are pertinent to research work

**Subject: laboratory course on biomolecules and biochemical techniques**

**Subject Code: EBCPC1P**

CO1	The student will be able to acquire knowledge and skill in the techniques used in the isolation, purification and estimation of different biomolecules that are widely employed in research
CO2	The students will get acquainted with Principle, Instrumentation and method of Performing UV absorption studies of DNA, Protein and interpreting the alteration occurred during the process of denaturation
CO3	The student will be fine-tune in handling the instruments like colorimeter, spectrophotometer and will be able to estimate the biomolecules and minerals from the given samples
CO4	The student, in addition to acquiring skill in performing various biochemical techniques can also learn to detect presence of phytochemicals and quantify them in the plant sample.
CO5	The students will develop skill in analytical techniques like subcellular fractionation, Paper, Column and Thin layer Chromatography and the group experiments will enable them to build learning skills like team work, Problem solving, Communication ability.

**Subject: Part III- Physiology And Cell Biology**

**Subject Code: EBCPC13**

CO1	specifically understand the biological and chemical processes within a human cell
CO2	identify and prevent diseases
CO3	understand defects in digestion, nutritional deficiencies and intolerances, and gastrointestinal pathologies
CO4	identify general characteristics in individuals with imbalances of acid- base, fluid and electrolytes.
CO5	process the mechanism: the transmission of biochemical information between cell membrane and nucleus



**Subject: Elective-I Microbiology & Immunology**

**Subject Code: EBCPT11**

CO1	To classify (by both ancient and modern modes) different types of microorganisms and explain life cycle of the microbes
CO2	To recognize the microorganisms involved in decay of foods and will be able to apply various counteracting measures. The students also will be able to relate the role of certain beneficial microbes in day-todays food consumption
CO3	To understand the common pathogenic bacterial and fungi that cause toxic effects and also will be able to employ curative measures
CO4	To analyze various features of wide variety of anti microbial agents along with their mode of action, in addition, being able to apprehend the valuable potentials of traditional and easily available herbs
CO5	To apply knowledge gained in production of industrially important products as both pharmaceutical and nutraceutical

**Subject: Part III Fundamentals of Forensic Science**

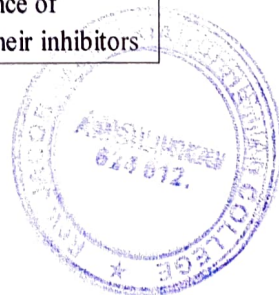
**Subject Code: EBCPT11**

CO1	understand knowledge about the basics of forensic science
CO2	explain the crime scene management, forensic analysis of blood, chemicals, explosives and fingerprints
CO3	apply the knowledge on forensic Science in crime detection
CO4	illustrate the techniques involved in crime scene management and offender identification
CO5	analyze the evidences from the crime scene and give possible suggestions to the judicial

**Subject: Part I- Enzymology**

**Subject Code: EBCPC21**

CO1	Students will be introduced to the theory and practice of enzymology.
CO2	Mechanisms of catalysis and factors affecting catalysis will be understood
CO3	The kinetics of enzyme catalyzed reactions in the absence and presence of inhibitors will be studied and the options for applying enzymes and their inhibitors





	in medicine will be analyzed.
CO4	Students will learn about the applications of enzymes in research, medicine, and industry, which will prepare them for careers in industrial and biomedical research.
CO5	The control of metabolic pathways and cellular responses through enzyme regulation will be emphasized

**Subject: Part II- Cellular Metabolism**

**Subject Code: EBCPC22**

CO1	Appreciate the modes of synthesis and degradation of glucose and will be able to justify the pros and cons of maintain the blood sugar level
CO2	Gain knowledge on polysaccharide metabolism and glycogen storage disease
CO3	Acquaint with the making and braking of nucleotides
CO4	Differentiate the diverse reaction a particular amino acid can experience
CO5	Correlate the disturbance of metabolic reactions to clinical manifestations with reference to heme and sulphur metabolism

**Subject: lab course in enzymology, microbiology and cell biology**

**Subject Code: :EBCPC2P**

CO1	The student will be able to employ there level and techniques for isolation and purification of enzymes and gain skill in kinetic studies which is essential for research activity
CO2	Student will acquire ability in performing enzyme assay, and explicate the methods that form the basis of enzyme characterization.
CO3	Learn the Basic concepts in microbiology and cell biology which will be helpful for interdisciplinary research work.
CO4	Students will be trained in separation techniques used in molecular Biology which will be supportive in their future research
CO5	Industrial visits will provide the students with an opportunity to learn practically through interaction, working methods and employment practices. Students will have an exposure to Industrial standard and current work practices



**Subject: Part III- Clinical Biochemistry**

**Subject Code: EBCPC23**

CO1	To appreciate the biological significance of sample collection and awareness of the diagnostic/screening tests to detect common noncommunicable diseases so as to understand role of laboratory investigations for biochemical parameters and understand the disorders associated with blood cells
CO2	To understand the etiology of metabolic diseases like diabetes and atherosclerosis and avoid such lifestyle disorders by healthy eating and correlate the symptoms with underlying pathology based on diagnostic and prognostic markers
CO3	To understand the diagnostic application of serum/plasma enzymes to correlate their levels with the organ pathologies associated with specific diseases.
CO4	To appreciate the role of pre and post-natal diagnosis leading to healthy progeny.
CO5	To link the serum hormone levels and clinical symptoms with underlying hormonal disturbances. To review the onward transmission of signal via downstream signaling molecules from cell surface to the nucleus by different pathways by comparing and contrasting them and critically evaluate the network between them resulting in the biological outcome

**Subject: Part III- Energy and Drug Metabolism**

**Subject Code: EBCPT21**

CO1	Appreciate the relationship between free energy and redox potential and will be able to justify the role of biological oxidation and energy rich compounds in maintaining the energy level of the system
CO2	Gain knowledge on role of mitochondria in the production of energy currency of the cell
CO3	Acquaint with the process of photosynthesis
CO4	Comprehend on the diverse role of TCA cycle and the energy obtained on complete oxidation of glucose and fatty acid
CO5	Correlate the avenues available to metabolize the xenobiotics



**Subject: Eukaryotic Gene Expression**

**Subject Code: EBCJC33**

CO1	Study the discovery of DNA as genetic material, DNA replication, transcription, DNA repair and translation.
CO2	Analyse coding and non-coding regions of eukaryotic genome and their importance..
CO3	Exposure with the importance of E. coli lac operon, PCR, expression vectors and their importance in Biotechnology.
CO4	students will learn the regulation of biological processes and the significance of such regulation in maintaining life.
CO5	Students will also understand special features of genetic code and the molecular mechanisms involved in RNA processing and RNA splicing

**Subject: Immunochemistry**

**Subject Code: EBCJC31**

CO1	Understanding the functions and mechanisms of action of different components of the immune system
CO2	Insight into the components of immune system
CO3	Understanding the development of the immune cells
CO4	Understanding the diseases associated with the immune system and strategies to combat any infection or altered self.
CO5	Using this knowledge in the processes of immunization, antibody engineering, vaccine development, transplantation and cancer therapy

**Subject: Biostatistics and Bioinformatics**

**Subject Code: EBCJC32**

CO1	Introduction to fundamentals of computers, types of operating systems, concept of networking
CO2	Introduction to biological databases, their identification and data mining
CO3	Understanding principles of algorithms that drive bioinformatics softwares
CO4	The students will acquire training in different areas of bioinformatics related to various biological databases such as protein databases, nucleic acid databases, metabolic pathway databases
CO5	Prediction of structures of nucleic acids and proteins, Annotation of data, generation and analysis of high-throughput data





**Subject: Advanced Biochemistry**

**Subject Code: EBCJC3P**

CO1	Isolation of chromosomal DNA
CO2	Restriction digestion of DNA and separation of DNA fragments by Agarose gel electrophoresis.
CO3	Demonstration of Western Blotting
CO4	Determination of molecular weight of protein/enzyme using gel filtration
CO5	Ouchterlony double immunodiffusion (DID)

**Subject: Communicative English For Career Development**

**Subject Code: TENJN31**

CO1	Ability to comprehend both the written and spoken texts. Ability to frame questions and answer them. Ability to write/speak grammatically correct sentences.
CO2	Ability to write a paragraph around a topic sentence, write descriptions and dialogues. Use of telephone etiquettes with correct usage of tense and voice pattern.
CO3	Ability to write coherent paragraphs with wide range of vocabulary.
CO4	Awareness of the art of personal letter/email writing without grammatical errors.
CO5	Ability to participate in short group conversations. Ability to use collocations, fixed and semifixed expressions.



**Subject: Eukaryotic Gene Expression**

**Subject Code: EBCJC41**

CO1	Understanding the environment-human body interaction
CO2	Understanding the effects of pollutants and global warming
CO3	obtain knowledge on basic principles and technologies of various contaminants and their management by means of biological approaches.
CO4	Know about the principles underpinning the application of biosciences to the environment.
CO5	Students learn how pollutants and global warming affect the body's physiological and metabolic processes.

**Subject: cell biology**

**Subject Code: EBCJC42**

CO1	To appreciate the biological significance of sample collection and awareness of the diagnostic/screening tests to detect common non communicable diseases so as to understand role of laboratory investigations for biochemical parameters and understand the disorders associated with blood cells
CO2	To understand the etiology of metabolic diseases like diabetes and atherosclerosis and avoid such lifestyle disorders by healthy eating and correlate the symptoms with underlying pathology based on diagnostic and prognostic markers
CO3	To understand the diagnostic application of serum/plasma enzymes to correlate their levels with the organ pathologies associated with specific diseases.
CO4	To appreciate the role of pre and post-natal diagnosis leading to healthy progeny.
CO5	To understand the serum hormone levels and clinical symptoms with underlying hormonal disturbances.



  
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