

MADURAI KAMARAJ UNIVERSITY
University with Potential for Excellence

B.Sc., Biochemistry- Semester

**CHOICE BASED CREDIT
SYSTEM REVISED SYLLABUS**

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

B.Sc., BIOCHEMISTRY

Outcome of the Programme:

It serves as a basis to build a purely academic profile for further studies and research in Masters in Biochemistry. On successful completion of this course, one can apply for the Masters in Biochemistry. The degree holders can opt for further higher studies and career in various specializations of Biochemistry and Biotechnology.

Course Outcome:

Subject: Nutritional Biochemistry

Subject Code: SBCPC11

CO1	Cognizance of basic food groups viz. Carbohydrates, proteins and lipids and their nutritional aspects as well as calorific value
CO2	Identify and explain nutrients in foods and the specific functions in maintaining health.
CO3	Classify the food groups and its significance
CO4	Understand the effect of food additives
CO5	Describe the importance of nutraceuticals and pigments

Subject: Practical I -Nutritional Biochemistry

Subject Code: SBCPC1P

CO1	Estimate the important biochemical constituents in the food samples.
CO2	Prepare the macronutrients from the rich sources.
CO3	Determine the ash and moisture content of the food samples
CO4	Understand the effect of food additives
CO5	Extract oil from its sources



Subject: Part III - Health And Nutrition (NME)

Subject Code: SBCPS11

CO1	Understand about the importance of health and diet
CO2	Discuss about the classification properties and deficiencies of vitamins
CO3	Understand about sources and functions of fats and lipids on health
CO4	Detail about the different typed of minerals and its role in health
CO5	Relate the role of proteins and carbohydrates on health

Subject: Fundamentals of Biochemistry

Subject Code: SBCPF11

CO1	Define the terms frequently used in Biochemistry.
CO2	Explain the basics of biochemistry.
CO3	Identify the fundamental elements of biochemistry.
CO4	Write the basic principle applied in the biological field.
CO5	Determine the significance of biochemistry related concepts.

Subject: Cell Biology

Subject Code: SBCPC21

CO1	Explain the structure and functions of basic components of prokaryotic and eukaryotic cells, especially the organelles.
CO2	Familiarize the cytoskeleton and chromatin
CO3	Illustrate the structure, composition and Functions of cell membrane related to membrane transport
CO4	Elaborate the phases of cell cycle and cell division- Mitosis and meiosis and characteristics of cancer cells.
CO5	Relate the structure and biological role of extra cellular matrix in cellular interactions



Subject: Practical II Cell Biology

Subject Code: SBCPC2P

CO1	Identify the parts of microscope.
CO2	Preparation of Slides
CO3	Identify the stages of mitosis& meiosis
CO4	Visualize nucleus and mitochondria by Staining methods
CO5	Identify the spotters of cells, organelles and stages of cell division

Subject: Allied Biochemistry I I

Subject: Part IV- LIFE STYLE DISEASES

Subject Code: SBCPS21

CO1	Define Lifestyle diseases and describe the contributing factors
CO2	Enumerate the top lifestyle diseases and its impact on life.
CO3	Elaborate the treatment and prevention measures of Common lifestyle diseases.
CO4	Highlight the lifestyle diseases that affects the women's health
CO5	Illustrate the various measures for prevention of lifestyle diseases

Subject: Part IV- MICROBIAL TECHNIQUES

Subject Code: SBCPS22

CO1	Understand the growth of bacteria and to perform cell count
CO2	Acquire knowledge of microscope and its uses
CO3	Identify the microbes by staining methods
CO4	Culture microbes by various methods
CO5	Preserve foods at high and low temperature



Semester III**Subject: Metabolism****Subject Code: SBCJC31**

CO1	To understand the Bioenergetics
CO2	To understand the carbohydrate metabolism
CO3	To understand the lipid metabolism
CO4	To understand the amino acid metabolism
CO5	To understand the nucleic acid metabolism

Subject: Chemistry theory III**Subject Code: SCHJA31**

CO1	Understand the basics of Electrochemistry
CO2	Get a detailed idea about classification and properties of polymer
CO3	To know about the photochemistry and applications of photochemistry
CO4	Clear idea about coordination compounds
CO5	To gain the knowledge about pollution

Subject: Biology theory I (General biology)**Subject Code: SCHJA32**

CO1	To understand the thorough knowledge about Classification of microorganism.
CO2	To know about the classification of algae.
CO3	To know about the economic importance of gymnosperms
CO4	In depth knowledge about digestive, respiratory, reproductive system of Frog
CO5	In depth knowledge about digestive, respiratory, reproductive system of Man.

Semester IV**Subject: Microbiology****Subject Code: SBCJC41**

CO1	To know the structure of microorganism
CO2	To know the concept of bacteria nutrition
CO3	To learn about Microscope
CO4	To understand the key concept of applied microbiology
CO5	The student will be able to recognize and diagnose common infectious diseases

Subject: Major lab II**Subject Code: SBC8C4P**

CO1	To understand the analysis of the carbohydrates.
CO2	To understand how to estimate the proteins in the sample lowry's method
CO3	To get the knowledge about vitamins estimation
CO4	To know about the lipid analysis
CO5	To understand how to estimate the proteins by using biuret method



Subject: Chemistry theory -IV

Subject Code: SCHJA41

CO1	To get an idea about classification and biological functions of vitamins and importance of antibiotics
CO2	A clear understanding about the Thermodynamics.
CO3	In depth knowledge about Absorption
CO4	Get an idea about Principle and applications of chromatography
CO5	Students should be able to understand the chemical kinetics.

Subject: Chemistry lab-II

Subject Code: SCHJA4P

CO1	To enable the students to develop analytical skills.
CO2	The students should be able to do organic analysis
CO3	Able to detect the N, S halogens.
CO4	Identify the functional groups of carboxylic acid, phenol, aldehyde.
CO5	Identify the functional groups of ketones, ester, carbohydrates

Subject: Biology theory II (Basic and applied ecology)

Subject Code: SZYJA42

CO1	To understand the ecosystem concepts how basic ecological principles are applied to solve current important environmental issues;
CO2	How to utilize energy from natural resources.
CO3	Aware about pollutions different types of pollutions, causes of pollution and pollution management.
CO4	To increase students' awareness of population biology
CO5	To enhance students' critical thinking ability of human civilisation

Subject: Biology lab I

Subject Code: SZYJA4Q

CO1	Get an idea about vegetative and reproductive structure of sargassum
CO2	In depth knowledge about Monocot and dicot flower dissection
CO3	Get an idea about cockroach and frog digestive system and reproductive system and urogenital systems.
CO4	To understand the different types of blood cells
CO5	To understand the different types of muscles.

Semester V

Subject: Molecular biology

Subject Code: SBCJC51

CO1	Illustrate that fundamental of Molecular biology
CO2	Understand the fundamentals of DNA and replication
CO3	Understand and appreciate the diversity of life as it evolved over time by processes of mutation, selection and genetic change.
CO4	Students will learn Transcription and post trans transcriptional Modification, modulation of gene expression, operons



CO5	To provide adequate knowledge about Translational process tRna rRna ,transformation conjugation.
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Subject: Immunology

Subject Code: SBCJC52

CO1	To Understand the fundamentalls of Immunity, hostresistance, antigen antibody,cells of the immune system and memory specificity
CO2	Students will learn about the types of immunoglobulins
CO3	To know about the Antigen antibody interaction agglutination, precipitation, immunediffusion, electrophoresis
CO4	Students will get the detailed idea about Blood grouping
CO5	Illustrate the fundamentals of Hyper sensitivity reactions

Subject: Plant Biochemistry

Subject Code: SBCJC53

CO1	To understand the basic concepts of plant pigments
CO2	Acquire a detailed knowledge about photosynthesis, Light and dark reactions of photosynthesis C3, c4 cycle
CO3	Students will get the detailed idea about Essential of mineralnutrientsand Nitrogen fixation and sulphate assimilation.
CO4	The students know about the diverse group of plant growth regulators and synthetic growth hormones.
CO5	The students will be made equipped with the concepts of germination.

Subject: Biology theory III (Biodiversity and conservation)

Subject Code: SZYJA52

CO1	Understand what is meant by biodiversity and its value;
CO2	The role of hunting in biodiversity conservation.
CO3	Understand current threats to biodiversity
CO4	Recall the basic concepts of conservation practices;
CO5	Understand the role and principles of operation of different types of protected areas;

Subject: Endocrinology

Subject Code: SBCJS51

CO1	By the end of this course, the students should be able to: Examine and describe glands. Determine hormonal impact and syndromes. The student should be able to draw sectors in the glands
CO2	To get the knowledge about hypothalamus and pituitary hormones
CO3	An understanding about thyroid hormones
CO4	In depth knowledge about Gastro intestinal hormones
CO5	Student will get the idea about Adrenal steroids



Subject: NME

Subject Code: SCAJN51

CO1	Understanding of health
CO2	To know about the jaundice, cancer, heart diseases
CO3	To know about nosocomial diseases
CO4	Understanding of Diseases prevention, healthy habits,
CO5	To demonstrate the First aid

Subject: Medical Lab Technology

Subject Code: SBCJS51

CO1	To train the students for Blood test
CO2	To know about common fungal diseases
CO3	To train the students for E LISA Test
CO4	To know about the finger printing and DNA extraction
CO5	To understand the blood grouping

Subject: Bioinformatics

Subject Code: SBCJS52

CO1	To understand the internet basics, The concepts and applications of biological databases
CO2	Student will be able to understand database management systems
CO3	To understand the concepts of protein and nucleic acid analysis
CO4	To understand the concepts of commercial database
CO5	The guidelines of medical transcriptionist

Subject: Biotechnology

Subject Code: SBCJC61

CO1	Students Learnt about the technique of genetic engineering in plants and animals.
CO2	Gain know ledge on gene transfer methodologies
CO3	Gain know ledge on viral vector, yeast vector and transgenic animals
CO4	Learn about Microbial growth basic principles, operation of fermenters.
CO5	Learnt about the synthesis and production of novel proteins applications of recombinant proteins.

Subject: Clinical biochemistry

Subject Code: SBCJC62

CO1	Know about the significance of diagnostic bio chemistry. Understand about clinical metabolism
CO2	Students acquire knowledge about Disorders of carbohydrate metabolism
CO3	Students acquire knowledge about Disorders of lipid metabolism
CO4	Students acquire knowledge about Disorders of protein metabolism
CO5	To get to know about purine and pyrimidine metabolism



Subject: Major lab III

Subject Code: SBCJC62P

CO1	To analyse the blood parameters like sugar, urea, cholesterol, uric acid, creatinine, serum phosphorus.
CO2	To demonstrate the bleeding time, clotting time, prothrombin time
CO3	To train the students for urine analysis
CO4	To analyse the enzymes
CO5	To estimate the SGOT, SGPT, Amylase, urease, alkaline phosphatase.

Subject: Major lab IV

Subject Code: SBCJC6Q

CO1	To train the students for culture media preparation
CO2	To train the students for Gram staining methods
CO3	To demonstrate various chromatographic methods
CO4	To demonstrate SDS-PAGE
CO5	To demonstrate Immunodiffusion method

Subject: Food technology

subject Code: SBCJS51

CO1	To acquire knowledge about pasta, noodles, rice processing techniques
CO2	To understand the ripening
CO3	To know about fruit processing technologies.
CO4	To acquire skill about milk processing
CO5	To acquire skill about meat preservation and processing

Subject: Biology theory IV (cell biology)

Subject Code: SZYJA62

CO1	To Understand the structure and purpose of basic components of Prokaryotic and Eukaryotic cells.
CO2	To get the various cell organelles with their functions and actions
CO3	The relationship between cellular and genetic organization and biological functions
CO4	To understand the relationship between cellular and genetic organization and biological functions.
CO5	To get the idea about microscope.

Subject: Biology lab II

Subject Code: SZYJA6Q

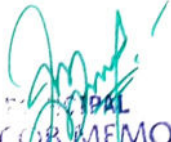
CO1	To acquire knowledge about compound microscope
CO2	To train the students for
CO3	To acquire knowledge about study of cell inclusions
CO4	To get the knowledge of smear technique.
CO5	To demonstrate histochemical staining methods



Subject: Endocrinology

Subject Code: SBCJS51

CO1	By the end of this course, the students should be able to: Examine and describe glands. Determine hormonal impact and syndromes. The student should be able to draw sectors in the glands
CO2	To get the knowledge about hypothalamus and pituitary hormones
CO3	An understanding about thyroid hormones
CO4	In depth knowledge about Gastro intestinal hormones
CO5	Student will get the idea about Adrenal steroids


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