J.J. College of Arts and Science (Autonomous), Pudukkottai

Department of Biochemistry

Course Outcomes – 2023 - 2024

M.Sc. Biochemistry – PSBC

Course Name - Basics of Biochemistry		Course Code - P1R3BCCC1	Knowledge Level
After completion of this course, students would be able to			
CO1	Explain the chemical structure and functions of carbohydrates.		K1, K2
CO2	Using the knowledge of lipid structure and function, explain how it plays a role in Signalling pathways.		K3, K4
CO3	Describe the various levels of structural organisation of proteins and the role of proteins in biological system.		K4, K5
CO4	Apply the knowledge of proteins in cell-cell interactions.		K3, K4
CO5	Applying the knowledge of nucleic acid sequencing in researchand diagnosis.		K2, K3, K4
Course Name - Biochemical and Molecular Biology Techniques		**Course Code – P1R3BCCC2**	**Knowledge Level**
After completion of this course, students would be able to			
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.		K1, K5
CO2	Demonstrate knowledge to implement the theoretical basis of chromatography in upcoming practical course work.		K3, K5
CO3	Demonstrate knowledge to implement the theoretical basis of electrophoretic techniques in research work.		K3, K5
CO4	Tackle more advanced and specialized spectroscopic techniques that are pertinent to research.		K1, K2 & K5
CO5	Tackle more advanced and specialized radioisotope and centrifugation techniques that are pertinent to research work.		K1, K2 & K5
Course Name - Physiology and Cell Biology		**Course Code - P1R3BCCC3**	**Knowledge Level**
After completion of this course, students would be able to			
CO1	Specifically understand the biological and chemical processes within a human cell		K1, K2, K5, K6
CO2	Identify and prevent diseases		K2, K3, K4, k5, K6
CO3	Understand defects in digestion, nutritional deficiencies and intolerances, and gastrointestinal pathologies.		K1, K2, K3, K4, K5, K6
CO4	Identify general characteristics in individuals with imbalances of acid- base, fluid and electrolytes.		K1, K2, K3, K4, K5, K6

CO5	Process the mechanism: the transmission of biochemical information between cell membrane and nucleus.	K1, K2, K5
Course Name – Microbiology and Immunology	**Course Code – P1R3BCDSE1**	**Knowledge Level**
After completion of this course, students would be able to		
CO1	To classify (by both ancient and modern modes) different types of microorganisms and explain life cycle of the microbes.	K1, K2 & K5
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-to- day's food consumption.	K1, K2 & K4
CO3	To understand the common pathogenic bacterial and fungi that cause toxic effects and also will be able to employ curative measures.	K1 & K2
CO4	To analyse various features of wide variety of antimicrobial agents along with their mode of action, in addition, being able to apprehend the valuable potentials of traditional and easily available herbs.	K2,K5 & K6
CO5	To apply knowledge gained in production of industrially important products as both pharmaceutical and nutraceutical.	K2, K4 & K5
Course Name - Soft Skill-1 (Bioinformatics)	**Course Code - P1R3AECC1**	**Knowledge Level**
After completion of this course, students would be able to		
CO1	Significant knowledge will be obtained basic concepts and tools of Bio informatics.	K1
CO2	utilize *"in silico"* knowledge for elucidating biomolecules.	K3
CO3	A thorough understanding of the Sequence alignment	K4
CO4	Understand the fundamental concepts Phylogenetic analysis-phylogenetic trees.	K4
CO5	Understand about the Basic concepts and perspectives of Systems Biology	K3
Course Name - Enzymology	**Course Code – P2R3BCCC4**	**Knowledge Level**
After completion of this course, students would be able to		
CO1	Describe the catalytic mechanisms employed by enzymes.	K1, K2 & K5
CO2	Choose and use the appropriate methods to isolate and purify enzymes and check the purity of the enzyme.	K1, K2, K3, K4 & K5
CO3	Analyze enzyme kinetic data graphically, calculate kinetic parameters, determine the mechanism of inhibition by a drug/chemical and analyze options for applying enzymes and their inhibitors in medicine.	K1, K2, K3 &K4
CO4	Explain allosterism and cooperativity and differentiate Michaelis - Menten kinetics from sigmoidal kinetics.	K1, K2, K5, K6

	The role played by enzymes in the regulation of vital cellular processes will be appreciated.	
CO5	Highlight the use of enzymes in industries and biomedicine.	K1, K2 & K3
Course Name - Cellular Metabolism	**Course Code - P2R3BCCC5**	**Knowledge Level**
After completion of this course, students would be able to		
CO1	**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.	K1, K2, K5
CO2	**CO2.** Gain knowledge on polysaccharide metabolism and glycogen storage disease.	K1, K2, K5
CO3	**CO3.** Acquaint with the making and braking of nucleotides.	K1, K2, K4
CO4	**CO4.** Differentiate the diverse reaction a particular amino acid can experience.	K1, K2, K3
CO5	**CO5.** Correlate the disturbance of metabolic reactions to clinical manifestations with reference to heme and sulphur metabolism.	K1, K2, K4, K5
Course Name – Clinical Biochemistry	**Course Code – P2R3BCCC6**	**Knowledge Level**
After completion of this course, students would be able to		
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	K2, K4 & K5
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.	K3, K4 & K5
CO3	To understand the diagnostic application of serum/plasma enzymes to correlate their levels with the organ pathologies associated with specific diseases.	K2, K3
CO4	To appreciate the role of pre and post-natal diagnosis leading to healthy progeny.	K3
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.	K2, K3, K4 &K5
Course Name - Practical-I	**Course Code - P2R3BCCC7P**	**Knowledge Level**
After completion of this course, students would be able to		
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.	K1, K2, K4

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.	K1, K2, K 3, K4
CO3	The student will be fine-tuning in handling the instruments like colorimeter, spectrophotometer and will be able to estimate the biomolecules and minerals from the given samples.	K1, K2, K4
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.	K1, K2, K3, K4 & K6
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.	K1, K2, K3, K4 & K6
Course Name - Practical-II	**Course Code – P2R3BCCC8P**	**Knowledge Level**
After completion of this course, students would be able to		
CO1	The student will be able to employ the relevant techniques forisolation and purification of enzymes and gain skill in kinetic studies which is essential for research activity.	K1, K2, K4
CO2	Student will acquire ability in performing enzyme assay, and explicate the methods that form the basis of enzyme characterization.	K1, K2, K4
CO3	Learn the Basic concepts in microbiology and cell biology which will be helpful for interdisciplinary research work.	K1, K3, K4
CO4	Students will be trained in separation techniques used in molecular Biology which will be supportive in their future research.	K1, K3, K4 & K6
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 ()	K1, K2, K3, K4 & K6
Course Name - Energy and drug metabolism	**Course Code - P2R3BCDSE2**	**Knowledge Level**
After completion of this course, students would be able to		
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.	K1,K2,K3,K4
CO2	Gain knowledge on role of mitochondria in the production of energy currency of the cell.	K1, K2, K5, K6
CO3	Acquaint with the process of photosynthesis.	K1,K2,K5

CO4	Comprehend on the diverse role of TCA cycle and the energy obtained on complete oxidation of glucose and fatty acid.	K1,K2,K4,K5
CO5	Correlate the avenues available to metabolize the xenobiotics.	K1, K2,K4,K5
Course Name – Nutritional Biochemistry	**Course Code – P2R3BCED1**	**Knowledge Level**
After completion of this course, students would be able to		
CO1	Plan a balanced diet based on an individual's energy requirement, Assess nutritional status of an individual.	K3, K4, K5
CO2	Describe the biochemical, physiological and nutritional functions of macronutrients and their integrated role. Understand the role played by antinutritional factors.	K1, K6
CO3	Evaluate the functions of vitamins and minerals ,and fluids and electrolyte balance in different physiological states and in sports persons.	K1- K6
CO4	Identify nutritional deficiency conditions , its prevention and dietary management.	K3, K4
CO5	Acquire knowledge about the importance of balanced diet and diet therapy.	K5, K6
Course Name - Soft Skill-II (Scientific Communications)	**Course Code - P2R3AECC2**	**Knowledge Level**
After completion of this course, students would be able to		
CO1	Students would have understood the concepts of research methods in Biological Sciences.	K2
CO2	Students would have learnt to design the Research Paper and arranging details in logical sequence	K3
CO3	Students would have become familiar with the Practice presentations	K2
CO4	Students would have learnt to prepare the PowerPoint poster presentation	K3
CO5	Students would have learnt the art of Oral Presentations Preparation.	K2

HEAD OF THE DEPARTMENT

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