SEMESTER I Course Code: 420C1A CORE-I: BIOMOLECULES

Learning Objectives

The objectives of this course are to

- Students will be introduced to the structure of biomolecules.
- The significance of carbohydrates in biological processes will be understood.
- The structure, properties and biological significance of lipids in the biological system will be studied.
- 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.
- Students will gain knowledge about the structures and functional roles of nucleic acids in the biological system.

Course Outcomes	CO1	Explain the chemical structure and functions of
		carbohydrates.
	CO2	Using the knowledge of lipid structure and function, explain
		how it plays a role in Signaling pathways
	CO3	Describe the various levels of structural organization of
		proteins and the role of proteins in biological system
	CO4	Apply the knowledge of proteins in cell-cell interactions.
	CO5	Applying the knowledge of nucleic acid sequencing in
		research and diagnosis.

Course Code: 420C1B CORE-II: BIOCHEMICAL TECHNIQUES

Learning Objectives

- To understand the various techniques used in biochemical investigation and microscopy.
- To explain chromatographic techniques, and their applications
- To explain electrophoretic techniques.
- To comprehend the spectroscopic techniques and demonstrate their applications in biochemical investigations.
- To acquire knowledge of radio labelling techniques and centrifugation.

Course Outcomes	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.

		Course Code: 420C1C
CORE-III: PRACTICAL I		
LABORATORY	COURSE O	N BIOMOLECULES AND BIOCHEMICAL TECHNIQUES
Learning Ol The objective	b jectives es of this cour	rse are to
• To insti about pr investiga	ll skill in stu rinciples and ation.	udents enabling them to apprehend the wider knowledge I techniques to be employed for the biomolecules under
• To incul macrom	lcate the kno olecules like	wledge of various isolation and purification techniques of DNA, RNA, Glycogen and Starch.
• To perf lactate a	orm colorim nd tryptopha	netric estimations to quantify important metabolites like an and minerals like calcium and iron from various sources.
To achieTo achie	eve training i eve training i	n subcellular fractionation and to identify them by markers. n various chromatographic techniques.
• To perfo different	orm the isolatial centrifug	ation and identification of the organelles of a cell using ation.
• To perform insight of	orm phytoche on phytocher	emical screening and quantification enabling them to give an nicals this will be useful for future research.
Course Outcomes	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-tuning 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.

		Course Coder 120E1A		
DISCIPLINE CENTRICELECTIVE I. MICRORIOLOGY AND IMMUNOLOGY				
DISCIPLINE	CENTRICE	LECTIVE-I; MICRODIOLOGI AND IMMUNOLOGI		
Learning Ol	ojectives			
The objective	es of this cour	rse are to		
 To approach and shap 	• To appreciate the classification of microorganisms based on their structure, size and shape with an insight into the ancient scriptures about microbes.			
• To unde culture c	• To understand the role of microorganisms in environment and also to learn the culture conditions.			
• To reco about co microor	• To recognize the possible contamination of foods by microorganisms, to learn about counteracting preservative measures and to know about probiotic nature of microorganisms.			
• To gain measure	• To gain knowledge on pathogenic mediation by microorganisms and preventive measures as well.			
• To comprehend the features of antimicrobial agents, their mechanism of action along with the side effects and also to explore natural remedial measures against microbes.				
• To be al	• To be able to exploit the various features of microorganisms for the beneficial			
industrial production.				
Course Outcomes	CO1	To classify by both ancient and modern modes different types of microorganisms and explain lifecycle 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-to- day's 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 antimicrobial 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		

Course Code: 420E1B GENERIC ELECTIVE-II: PHYSIOLOGY AND CELL BIOLOGY

Learning Objectives The objectives of this course are to

To understand the functions and activities of organs, tissues, or cells and of physical • and chemical phenomena involved in the human body.

Course Outcomes	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 gastro intestinal 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.

		SEMESTER II	
Course Code: 420C2A			
COREPAPER IV: ENZYMES AND ENZYME TECHNOLOGY			
Learning O	bjectives		
The objectiv	es of this co	urse are to	
• Studen	ts will be in	ntroduced to the theory and practice of enzymology.	
Mechan underst	nisms of ood	catalysis and factors affecting catalysis will be	
• The kir of inhibit their in	• 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		
Student and indu research	• Students will learn about the applications of enzymes in research, medicine, and industry, which will prepare them for careers in industrial and biomedical research		
• The con regulat	ntrol of met ion will be	abolic pathways and cellular responses through enzyme emphasized.	
Course Outcomes	CO1	Describe the catalytic mechanisms employed by enzymes.	
	CO2	Choose and use the appropriate methods to isolate and purify enzymes and check the purity of the enzyme.	
	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.	
	CO4	Explain allosterism and cooperativity and differentiate Michaelis- Menten kinetics from sigmoidal kinetics. 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.	

Course Code: 420C2B

CORE PAPER V: CELLULAR METABOLISM WITH CLINICAL CORRELATION-I

Learning Objectives

- Familiarize on blood glucose homeostasis
- Provide an insight into the metabolic pathway of glycogen, glycoprotein, mucopolysaccharide and peptidoglycan with clinical correlation where required.
- Inculcate knowledge on nucleotide metabolism and disorders associated with it.
- Provide a platform to understand the versatile role of PLP in amino acid degradation, formation of specialized products and disorders associated with ammonia detoxification.
- Educate on heme and Sulphur metabolism with associated clinical manifestation.

Course Outcomes	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 clinic a
		manifestation with reference to heme and sulphur metabolism.

Course Code: 420C2C

CORE PAPER VI: PRACTICAL -II

LAB COURSE IN ENZYMOLOGY, MICROBIOLOGY AND CELLBIOLOGY

Learning Objectives

- To inculcate skill line students enabling them to apprehend the wider knowledge about principles and techniques to be employed for the assay of enzyme sunder investigation.
- To inculcate the knowledge of isolation and purification techniques of enzymes using alkaline phosphatase as an example.
- To perform experiments to study the factors affecting enzyme activity.
- To achieve training in assay of enzymes
- To achieve training in basic microbiological techniques-preparation of culture, sterilization and staining methods.
- To perform the blood grouping test and to prepare blood smear to study different types of blood cells.
- To learn molecular biology techniques like Gel electrophoresis and blotting techniques.
- To introduce industrial visits that students may be aware of actual need of the industry and various opportunities available.

Course Outcomes	CO1	The student will be able to employ the relevant 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.

Course Code: 420E2A

DISCIPLINE CENTRIC ELECTIVE-III: ENERGY AND DRUG METABOLISM

Learning Objectives

The objectives of this course are to

- Familiarize on concepts of enthalpy, entropy, free energy, redox system, biological oxidation and high energy compounds.
- Provide an insight into the relationship between electron flow and phosphorylation.
- Inculcate knowledge on processes involved in converting light energy to chemical energy and associated food production by autotrophs.
- Provide a platform to understand the versatile role of Krebs cycle, transport of NADH across mitochondrial membrane and energetics.
- Educate on the various phases xenobiotic metabolism.

Course Outcomes	CO1	Appreciate their 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 xenobiotic.

Course Code: 420E2C

GENERIC ELECTIVE-IV: BIOSTATISTICS & DATASCIENCE

Learning Objectives

- To summarize the data and to obtain its salient features from the vast mass of original data.
- To understand the concept of various measures of dispersion.
- To understand the concepts of sampling and learning test of significance.
- To understand the concept of various attributes and relate to biological studies.
- To gain knowledge in SPSS, a software package which gives a perfect graphical representation and appropriate result for the data that has been entered.

Course Outcomes	CO1	Concepts of statistical population and sample, variables and attributes. Tabular and graphical representation of data based on variables.
	CO2	Conditions for the consistency and criteria for the independence of data based on attributes. Measures of central tendency, Dispersion, Skewness and Kurtosis.
	CO3	Learning different sampling methods and analyzing statistical significance.
	CO4	Understanding students t-test, ANOVA, Chi-square test to analyze the significance of various research.
	CO5	Learning operating systems, application programs and data analysis using SPSS Package.

Course Code: 420S2A

SKILL ENHANCEMENT COURSE I: NUTRITIONAL BIOCHEMISTRY

Learning Objectives

The objectives of this course are to

- To understand basic concepts involved in growth, health, nutrition, physiology and metabolism
- To discuss the concepts and applications of nutrition in correlation with biochemistry
- To define nutritional needs in healthy individual and modification of diet during illness.

Course Outcomes	CO1	Plan a balanced diet based on an individual's energy requirement, Assess nutritional status of an individual.
	CO2	Describe the biochemical, physiological and nutritional
		functions of macronutrients and their integrated role.
		Understand the role played by antinutritional factors
	CO3	Evaluate the functions of vitamins and minerals, and fluids
		and electrolyte balance in different physiological states and
		in sports persons.
	CO4	Identify nutritional deficiency conditions, its prevention and
		dietary management.
	CO5	Acquire knowledge about the importance of balanced diet
		and diet therapy.

SEMESTER III

Course Code: 520C3A CORE PAPER VII: CELLULAR METABOLISM WITH CLINICALCORRELATION-II

Learning Objectives

- Familiarize the degradation and synthesis of fatty acids.
- Provide an insight into the metabolic path way of fats, phospholipids and sphingolipid with clinical correlation.
- Inculcate knowledge on cholesterol and lipoprotein metabolism and disorder associated with it.
- Provide a platform to understand the biosynthesis of non-essential amino acids and interconversion of amino acids.
- Educate on fate of amino acids upon degradation and the associated in born error of amino acid metabolism.

Course Outcomes	CO1	Appreciate the modes of synthesis and degradation of fatty acids and will be able to justify the production biologically active substances from arachidonic acid.
	CO2	Gain knowledge on metabolism of compound lipids and its associated metabolic errors.
	CO3	Acquaint with cholesterol and lipoprotein metabolism along with clinical manifestation upon metabolic disturbance.
	CO4	Differentiate the diverse ways of interconversion of amino acids.
	CO5	Correlate the disturbance of metabolic reactions to clinical manifestations with reference to amino acid degradation.

Course Code: 520C3B					
	CORE PAPER VIII: CLINICAL BIOCHEMISTRY I				
Learning Objective	es				
The objective	es of this cour	rse are to			
• To unde	rstand the ne	ed and methods of various biological sample collection.			
• To explicitly understand the etiopathogenesis, symptoms and complications of Diabetes Mellitus and understand the relevant laboratory testing to evaluate the disease severity.					
• To unde associate	 To understand the hematological parameters to gauge pathological conditions associated with blood cells. 				
• To unde	rstand the va	rious disorders associated with electrolyte imbalance.			
• To unde	rstand the sc	ope of clinical biochemistry testing in Medical Laboratory.			
Course Outcomes 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 mellitus so as to modify the lifestyle and correlate the symptoms with underlying pathology based on diagnostic and prognostic markers.			
	CO3	To understand the anemia and evaluate clotting based on specific diagnostic markers and look for HBA1C variants.			
	CO4	To understand the clinical significance of electrolyte imbalance which is critical 0.			
	CO5	To understand the quality of testing clinical biochemistry parameters in laboratory with accuracy and precision using standard and updated methods.			

Course Code: 520C3C COREPAPER-IX: MOLECULAR BIOLOGY

Learning Objectives

- To introduce the students to the process of inheritance, concepts of genes, genome, chromatin and chromosomes.
- To impart a thorough understanding of the key events of molecular biology, including the mechanisms of DNA replication, transcription and translation along with DNA repair mechanisms.
- To provide a detailed understanding of post transcriptional and post translational modifications and processing of eukaryotic RNA and proteins
- To give a detailed explanation of transcriptional regulation with lac operon and tryptophan operon as examples
- To impart adequate information of the types of regulatory RNA along with key concepts of gene silencing.

Course Outcomes	CO1	Comprehend the organization of genomes, the molecular basis of DNA replication, recombination and transposition, the significance of these processes, the various ways in which the DNA can be damaged leading to mutations and lesions and the different ways in which they are repaired.					
	CO2	Gain knowledge about how genes are transcribed and translated in prokaryotes and eukaryotes and how these processes are regulated, recognize the nature of the genetic code and the various experimental approaches used to crack the code.					
	CO3	Acquire knowledge of the molecular basis of RNA processing and RNA splicing and the various human pathologies that can result from defects of RNA modification.					
	CO4	Comprehend the techniques of gene silencing and its applications.					
	CO5	Apply the knowledge they have gained in understanding the above vital life processes to enhancing their analytical and problem-solving skills and develop an interest to pursue high quality research.					

Course Code: 520C3D

CORE PAPER X: PRACTICAL-III LABORATORY COURSE ON CLINICAL BIOCHEMISTRY

Learning Objectives

- To instill skill in students enabling them to apprehend the wider knowledge about principles and techniques to be employed for the investigation of biological samples, clinical approach, normal values of biochemical constituents and clinical interpretations.
- To inculcate the knowledge of collection, preservation of blood sample and learning various hematological parameters and their significance.
- To perform experiments to assess liver functions. and also, to study the marker enzymes of liver.
- To evaluate lipid profile and assess their relation to cardiac function.
- To perform experiments to estimate blood glucose and glycosylated hemoglobin.
- To perform urine analysis, estimate BUN and clearance test to assess renal function.
- To learn basic immune techniques antigen-antibody reactions.
- To perform data analysis in using MS Excel.
- To introduce visit to hospital so that students may be aware of Phleobotomy, Collection and storage of specimen, Good laboratory practices, Automation and current methods adopted in the diagnostic labs.

earrent					
Course Outcomes	CO1	The student will be able to acquire knowledge and skill in hematology techniques. They will get familiar with methods and knowledge to interpret the electrolyte concentration in serum.			
	CO2	The student will be able to assess the Liver Function and interpret the biochemical investigation in a given clinical situation.			
	CO3	Skill to perform the Renal function test to assess the function of Kidney and report the abnormal parameters with reference range will be achieved by the student.			
	CO4	To estimate the blood glucose content and lipid profile, to evaluate the alterations and record the observation in accordance to reference range will be acquired by the student.			
	CO5	The Group Experiments will support them to acquire practical skills to work in health care sector and assist them to understand the automation process in clinical labs.			

Course Code: 520E3A DISCIPLINE CENTRIC ELECTIVE-V: CELL SIGNALLING

Learning Objectives

- To assimilate the concept of signal transduction, Signalling pathways, various types of receptors.
- To understand how the cell surface receptors use different downstream and upstream molecules to execute the signal transmission and exert a change in the metabolic and expression levels.
- To implicate the intricacy of interconnecting Signalling molecules that show diverse responses in various tissues.
- To assimilate the involvement of Signalling pathways and their components in hormonal action and correlate their involvement in physiological functions.
- To understand how cell cycle is regulated by the binding of Signalling molecules to receptors.
- To create an awareness of how mutations in Signalling pathways lead to cancer.

Course Outcomes	CO1	To understand and explain the basic concepts of cell communication and Signalling, types of receptors, significance of Signalling and their role in manipulating life processes.
	CO2	To review the onward transmission of signal via downstream Signalling 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.
	CO3	To understand the role of enzymes inactivating transcription factors by modification such as phosphorylation, proteolysis, removal from inhibitor.
	CO4	To appreciate the involvement of Signaling pathways in regulating cell cycle.
	CO5	To analyze the involvement of Signaling molecules in cancer progression.

Course Code: 520S3A SKILL ENHANCEMENT COURSE II: DISEASE AND PREVENTION

Learning Objectives

- To highlight the connection among nutrition, lifestyle and the complex science of preventing disease.
- To promote optimal metabolic health, building on input from several complementary disciplines.
- Goal is to encourage epidemiological research in nutrition, and to be able to define better targets and intervention programs.
- To understand diet drug- lifestyle interactions, that can address health complex issues.

Course Outcomes	CO1	Understand the risks of development of obesity, cardiovascular diseases and diabetes mellitus, their treatment and prevention.
	CO2	Effectively manage hypertension and renal diseases by making lifestyle and diet changes.
	CO3	Be aware of carcinogenic agents, treatment modalities in cancer-side- effects (if any), drug- food interactions, and also on diagnosis and prognosis of the disease.
	CO4	Prevent pre-mature ageing and age-related disorders/disease conditions
	CO5	Manage stress related gastrointestinal problems and gallstone formation.

SEMESTER IV					
	Course Code: 520C4A				
COREPAPER-XI: HORMONES					
Learning O	Learning Objectives				
The objectiv	es of this cou	urse are to			
• To understand the different types of hormones that are secreted by various organs and glandular tissues.					
• To get an overview of how these hormones make a change in the expression of proteins / metabolism of the cell and manage the life processes towards homeostasis.					
• To assir hormon	• To assimilate the involvement of Signaling pathways and their components in hormonal action and correlate their involvement in physiological functions.				
• To under body.	rstand how t	he hypothalamus-pituitary axis controls various activities of the			
• To unde cycle an	erstand the 1 id ovarian c	ole of hormones in spermatogenesis, oogenesis, menstrual ycle.			
• To kindle the ability of students to conceptualize the role of hormones in various physiological functions of the body.					
Course Outcomes CO1		To understand and explain the different types and basic concepts of Signaling, types of hormones, significance of Signaling in manipulating life processes.			
CO2		To review the intricacy of hormones on metabolism and how stringently the network is regulated in a coordinated fashion resulting in the biological outcome.			
CO3 To analyze the involvement of hormones in various clinic conditions like diabetes, metabolic syndrome, obesity an reproductive health issues.					
CO4 To apply the knowledge acquired in daily life and try t resolve problems and create an awareness of approache available to treat hormonal disorders.					
CO5 To critically analyze the underlying abnormality with the symptoms from childbirth till senescence.					

Course code: 520C4B					
	COREPAPER XII: CLINICAL BIOCHEMISTRY-II				
Learning Objectives The objectives of this course are to					
 To unde To unde various tandem To unde 	 To understand the Datghostic application of endymes in enhanced of elements of the enhanced of elements of the enhanced of the end of				
 various disorders associated. To understand the Renal function, tests to evaluate the various causes of kidney dysfunction and failure. To understand Signalling mechanism from cell surface to the nucleus by different pathways resulting in the biological outcome and critically evaluate the network between the hormones as regulatory messangers to this effect. 					
Course Outcomes	CO1	To appreciate and understand the role of enzymatic biomarkers to assess organ pathologies.			
	CO2	To conceive the role of inherited genes in inherited disorders of metabolism and methodologies pertaining to <i>in utero</i> diagnosis and post- natal screening.			
CO3		To understand and evaluate the functions of liver and to monitor the health of the organ based on specific laboratory tests and interpretations.			
	CO4	To understand and evaluate the functions of kidney and to monitor the health of the Renal system based on specific laboratory tests and interpretations.			
	CO5	To link the serum hormone levels and clinical symptoms with underlying hormonal disturbances.			

Course Code: 520C4C CORE COURSE: PROJECT WITH VIVA VOCE

Learning Objectives

- To orient the students for a research career, a research project should be conducted by the student.
- The student will be exposed to collect scientific articles, identify the research problems and acquire technical skills, evaluate and consolidate the data and prepare a dissertation based on the observations made.
- They may also be allowed to present the findings in a seminar/conference.
- The work has to be conducted in department/ any other research organizations under the guidance of the project supervisor identified in the department.

Course Code: 520E4A ELECTIVE-VI: PHARMACEUTICAL BIOCHEMISTRY

Learning Objectives

- To understand the different types of bioinformatics tools for drug discovery.
- To get an overview of how different bioinformatics tools aid in the process of target identification, drug screening and quantitative structure activity relationship.
- To assimilate the involvement of different metabolic pathways involved in drug metabolism and correlate their involvement in elimination process
- To understand the biochemical basis of drug action at the target tissue.
- To understand different phases in drug clinical trials and its assessment.

Course Outcomes	CO1	To understand and explain the basic concepts of drug discovery and drug development process.				
	CO2	To review the different software and computational tools which aid in the design of drugs and its rationalization.				
	CO3	To analyze the different stages of the drug discovery process with the target & hit identification, assays for drug screening and preclinical studies.				
	CO4	To understand the various phases of the clinical trials and the method of conduct of clinical trials.				

Course Code: 520S4A SKILL ENHANCEMENT COURSE: APPLIED BIOTECHNOLOGY

Learning Objectives

- To train the student in techniques related to the generation of recombinant DNA, screening and to incorporate skills essential for various types of sequencing.
- To introduce and also elaborate knowledge about wide varieties of vectors and their features in addition to their applications.
- To educate about the characteristics of cell culture, production of transgenic animals with relevant safety/ethics involved and patents as well.
- To inculcate practical knowledge on plant tissue culture, their propagation and exploitation of the techniques for crop improvement.

٠	То	theoretically	train	the	students	in	various	techniques	for	gene/protein
	mar	nipulation, soft	tware/	datał	bases with	futu	iristic per	spectives.		

Course Outcomes	CO1	To produce recombinant molecule, screen the products and also to identify/analyze various DNA sequences using different methods.				
	CO2	To clone gene of their interest for several downstream purposes with a robust comprehension about wide variety of applicable vectors.				
	CO3	To design animal cell culture protocols for transgenic applications with an acquaintance about ethical aspects. The students would also be enriched with ideas about intellectual property rights.				
	CO4	To successfully plan plant tissue culture, manipulate the cultures for commercially important plant products.				
	CO5	To exploit and apply the knowledge gained about the various laboratory techniques involving both DNA and protein manipulation along with software tools. The student will be persuaded to contemplate on upcoming technologies for futuristic benefits.				