Department of Biochemistry

Board of Studies Meeting

The minutes of the 22nd meeting of Board of Studies held on 26.10.2026 at 10.00 a.m. through google meet.

Members Present:

S.No.	Name	Category
1.	Dr. Gowri S Professor and Head, Department of Biochemistry, Dr. N.G.P. ASC	Chairman
2.	Dr. Subramaniam Selvakumar Assistant Professor, Department of Biochemistry Bharathiar University, Coimbatore	VC Nominee
3.	Dr. K. Chandrakumar Assistant Professor, Department of Bioenergy Tamil Nadu Agricultural University, Coimbatore	Subject Expert
4.	Dr. V. M. Berlin Grace Professor, Department of Biotechnology, Karunya Institute of technology and Sciences, Coimbatore	Subject Expert
5.	Dr. N. Kannikaparameswari, Professor in Biochemistry	Member
6.	Dr. T. Indhumathi, Professor in Biochemistry	Member
7.	Dr. K. Rajathi, Professor in Biochemistry	Member
8.	Dr. D. Pradeepa, Associate Professor in Biochemistry	Member
9.	Mrs. S. Divya Priya, Assistant Professor in Biochemistry	Member
10.	Dr. G. Lalitha, Assistant Professor in Biochemistry	Member
11.	Dr. N. Kuppuchamy, Head, Dept of Tamil	Co-opted member
12.	Dr. A. Hazel Verbina, Head, Dept of English	Co-opted member
13.	Dr. K. Girija S, Head, Dept of Physics	Co-opted member
14.	Dr. S. Uma, Head, Department of Computer science	Co-opted member
15.	Dr. D. Sridevi, Head, Department of Food Science and Nutrition	Co-opted member
16.	Ms. Shirley Sreena PG - Biochemistry	Student Representative- PG
17.	Ms. Nethra Sree UG – Biochemistry	Student Representative- UG

The HoD and Chairman of the Department of Biochemistry welcomed and introduced all the members and requested them for their support and contribution for the development of academic standard and enrichment of the syllabus.

Further, Chairman informed the inability of the following members to attend the meeting and requested to grant leave of absence.

1. Mrs. Anbusudha – Alumni Member

After brief discussion the items of the agenda were taken one by one for discussion and the following resolutions were passed.

22.1. To review and approve the minutes of the previous meeting held on 02.04.2026.

The chairman of the Board presented the minutes of the previous meeting held on 02.04.2026 and requested the members to approve. After brief discussion the following resolution was passed.

Resolution:

Resolved to approve the minutes of the previous meeting held on 02.04.2026

The items of the agenda were taken one by one for discussion and the following resolutions were passed.

22.2. To review and approve the scheme, regulations and syllabus for the Semester II for the students admitted in UG and PG from academic year 2026-27 onwards.

The Chairman presented the detailed syllabi for the second semester of the UG and PG programmes for students admitted during the academic year 2026–2027. The members deliberated on the proposed modifications and suggested necessary revisions. The details of the changes made are presented below:

Course code	course	Reason
M.Sc. Biochemistry Semester II		
26BCP2CA	Immunology	Dr. Selvakumar suggested to include Concept of Ojas (Essence of Immunity) in Ayurveda, AI tools in epitope mapping and computational vaccine design to connect traditional concepts of immunity with modern immunological knowledge and introduce emerging computational approaches in vaccine research and development.
26BCP2CB	Metabolism	Dr. Berlin Grace suggested to include Dhatvagnipaka in Ayurveda and Tissue Metabolism, Artificial intelligence in cellular metabolic pathway reconstruction to integrate traditional Ayurvedic concepts with modern metabolic science and create awareness of emerging AI applications in understanding and analyzing cellular metabolic processes.
26BCP2CC	Microbial Biochemistry	Dr. Chandrakumar suggested to include Artificial Intelligence in microbial growth prediction and fermentation optimization, AI-based optimization of fermentation conditions and bioreactor monitoring, Indigenous practices of composting, organic manure preparation and traditional soil fertility management to develop awareness of emerging technologies and their applications in industrial microbiology, while promoting sustainable agricultural practices and

		environmental conservation and to create awareness of sustainable agriculture and the practical applications of microbes.
26BCP2CD	Genetics and Molecular Biology	Dr. Ayyavu Mahesh suggested to molecular mechanisms of Mitochondrial DNA Heteroplasmy and its role in human genetic disorders, AI-based prediction of DNA mutations and their impact on protein function to enhance understanding of genetic variations and their role in human diseases while introducing modern computational tools for analyzing mutations and predicting their functional effects.
B.Sc. Biochemistry Semester II		
26BCU2CA	Enzymology	Dr. Selvakumar suggested to include Basic use of AI tools (AlphaFold) in enzyme structure prediction and design, Traditional fermentation and biocatalysis in Indian systems (Ayurvedic Asavas and Arishtas) to introduce modern computational approaches in enzyme research and highlight the scientific relevance of traditional Indian fermentation practices in industrial and applied enzymology.
26BCU2CB	Microbiology	Dr. Selvakumar suggested to include artificial intelligence in microbiology: Applications in microbial identification, disease diagnosis and pathogen detection to create awareness of emerging AI technologies in improving microbial analysis, rapid disease diagnosis, and accuracy in clinical and environmental microbiology.

Resolution:

Resolved to approve the syllabus for the semester II for students admitted to UG and PG programmes for the academic year 2026–2027.

22.3. To review and approve syllabus for the Semester IV for students admitted in UG and PG from the academic year 2025-26 onwards.

The Chairman presented the detailed syllabus for students admitted in the academic year 2025–2026. The members deliberated in detail on the modifications required. The details of the changes made were presented below:

M.Sc. Biochemistry		
Course code	**course**	**Reason**
Semester IV		
25BCP4CA	Bioethics and Biosafety	Dr. Berlin Grace suggested to include Artificial Intelligence in Biosafety Risk Assessment and Monitoring of Genetically Modified Organisms (GMOs), Patent Process to introduce emerging AI applications in assessing biological risks, predicting potential environmental impacts and strengthening the safe use and monitoring of genetically modified organisms.

25BCP4CB	Endocrinology and Developmental Biology	Dr. Selvakumar suggested to include Neuroendocrine regulation from an ayurvedic perspective to highlight traditional perspectives on the regulation of physiological processes and their relevance to modern endocrinology.
B.Sc. Biochemistry Semester IV		
25BCU4CA	Intermediary Metabolism	Dr. Chandrakumar suggested to include AI in Metabolic Pathway Analysis to develop awareness of modern computational approaches for understanding metabolic pathways and analysing complex cellular metabolic processes.
25BCU4CB	Nutritional Biochemistry	Dr. Berlin Grace suggested to include Artificial intelligence for decoding diet-gut microbiome-health interactions, Traditional food practices and nutritional well-being, Glycan Therapy to enhance understanding of the relationship between diet, gut health and nutritional well-being while introducing emerging therapeutic approaches and the importance of traditional food practices.

Resolution:

Resolved to approve the syllabus for the fourth semester for students admitted to UG and PG programmes for the academic year 2025–2026.

22.4. To review and approve syllabus for the Semester VI for students admitted in UG from the academic year 2024-25 onwards.

The Chairman presented the detailed syllabus for the semester VI for students admitted in the academic year 2024–2025.

Resolution:

Resolved to retain the existing syllabus of the 2023–2024 batch without any modification for students admitted for the academic year 2024–2025.

22.5. To review and approve Self-Study courses offered in the semester III for 2026-2027 Batch UG and PG students.

The Chairman presented the detailed syllabus for the proposed Self-Study courses offered in the Semester III for 2026-2027 Batch UG and PG students.

New courses introduced

Code	Name of the course
26BCUSSA	Forensic Biology

26BCUSSB	Scientific Writing in Health Research
26BCPSSA	Principles of Downstream Techniques in Bioprocessing
26BCPSSB	Herbal Product Technology and Regulatory Science

Resolution:

Resolved to approve the syllabus for Self-Study courses offered in the Semester III for 2026-2027 Batch UG and PG students.

Item 22.6: To consider and approve the changes in the syllabus for 26BCU2IA: Drug Biochemistry course offered in Semester II for M.Sc. Chemistry students admitted during the academic year 2026–2027.

The Chairman presented the detailed syllabus for 26BCU2IA: Drug Biochemistry for M.Sc. Chemistry students admitted during the academic year 2026–2027.

The details of the changes made are presented below:

M.Sc. Chemistry		
Course code	**course**	**Reason**
	Semester II	
26BCP2EA	Drug Biochemistry	Dr. Chandrakumar suggested to include Traditional Indian systems of medicine (Ayurveda and Siddha) sources, Parkinson's disease - Causes, symptoms, treatment Alzheimer disease - Causes, symptoms, treatment Applications of artificial intelligence in anticancer drug development to create awareness of traditional Indian medicinal knowledge, improve understanding of major neurodegenerative disorders and their management, and introduce emerging AI applications in anticancer drug discovery and development.

Resolution:

Resolved to approve the syllabus for the semester II for M.Sc. Chemistry students admitted during the academic year 2026–2027.

Item 21.7: To consider and approve the changes in the syllabus for 25BCU4IA: IDC Biochemistry II – Essentials of Biochemistry and 26BCU4IP: IDC Biochemistry Practical for B.Sc. Food Science and Nutrition students admitted during the academic year 2025–2026.

The Chairman presented the detailed syllabus for 25BCU4IA: IDC Biochemistry II – Essentials

of Biochemistry and 25BCU4IP: IDC Biochemistry Practical for B.Sc. Food Science and Nutrition students admitted during the academic year 2025–2026.

Resolution:

Resolved to retain the existing syllabus of 2024-25 batch without any modification for the students admitted during the academic year 2025-26.

Item 22.8: To consider and approve NPTEL equivalent courses for credit transfer and Skill courses brought forward by the Chairman and the members of the board.

NPTEL course	Equivalent course in curriculum
1.Research Methodology (12 weeks) 2.Biostatistics and Design of Experiments (8 weeks)	26BCP3CA: Biostatistics and Research Methodology
1.Host -Pathogen Interaction (Immunology) -12 Weeks 2.Immunology -12 weeks	25BCU5CC: Immunology

The Board members suggested to include Animal Tissue culture and genomics and proteomics courses under skill courses

Resolution:

Resolved to approve the suggested NPTEL course for Credit transfer and skill courses.

Item 22.9: To approve the panel of examiners for question paper setting and evaluation of answer scripts for the even semester of the academic year 2026-2027.

The Chairman presented the panel of examiners for QP setting, QP Scrutiny and conduct of practical and theory examinations for the academic year 2026-2027.

Resolution:

Resolved to approve the panel of examinations for QP setting, QP Scrutiny and conduct of practical and theory examinations are submitted to CoE for exam related work.

Finally, the Chairman thanked all the members for their cooperation and contribution in enriching the syllabus with active participation in the meeting and sought the same spirit in the future also. The meeting was closed with formal vote of thanks proposed by Dr. S. Gowri, Head and Chairman – Biochemistry BoS.

26.10.2026

(Dr. S. Gowri)

BoS Chairman/HoD
Department of Biochemistry
Dr. N. G. P. Arts and Science College
Coimbatore – 641 048

Syllabus Revision
M.Sc. Biochemistry

Faculty: Biosciences **Board: Biochemistry**
Semester: II **Course Code/ Name: 26BCP2CA Immunology**

Unit	Existing	Changes
I	Cells of Immune System and Immune Responses Cells of Immune System: Hematopoiesis, hematopoietic growth factors, Regulation of hematopoiesis, clinical uses of stem cells. Lymphoid cells and myeloid cells, CD antigens and membrane molecules of immune cells. Development, maturation, activation and differentiation of T-cells and Bcells, adhesion molecules. Immune Responses: Humoral and cell-mediated immune responses, primary and secondary immune responses, Clonal selection theory.	Concept of Ojas (Essence of Immunity) in Ayurveda.
II	Antigens, Immunoglobulins and Antigen Recognition Antigens: B-cell epitopes, T-cell epitopes, antigenicity and immunogenicity, factors influencing immunogenicity, Haptens, adjuvants; Immunoglobulins: Structure and functions, Isotype, allotypes, Idiotypes; Classes, Immunoglobulins super family. Organization and expression of immunoglobulin genes, generation of antibody diversity. Class switching. T-cell receptor and its diversity. Antigen Recognition: MHC-Genetic organization and inheritance, Antigen processing and presentation (Cytosolic and Endocytic pathway).	
III	Complement, Cytokines, Cytotoxicity, Immune Responses to Infections and AIDS Complement system: components of complement activation and its biological consequences – classical, alternative and lectin pathways. Cytokines: IL, IFN, TNF, CSF- role in immune regulation, Cytokine receptors, Cytokine antagonists. Cell mediated immunity: CTL mediated cytotoxicity, NK cell mediated toxicity. Primary and secondary immunodeficiency diseases. AIDS: Structure of HIV, destruction of T cells, CD4+/CD8+ ratio, immunity to HIV virus, AIDS vaccine.	
IV	Hypersensitivity, Autoimmunity, Animal Models, Transplantation and Cancer immunology Hypersensitivity reactions: Type I, II, III & IV. Autoimmunity - organ specific (Hashimoto's thyroiditis) and systemic (Rheumatoid arthritis, Systemic lupus erythematosus) diseases. Experimental Animal Models: inbred strains, SCID mice, nude, knockout mice. Transplantation immunology: Immunologic basics of Graft rejection, MHC antigens in transplantation and HLA tissue typing, Immunosuppressive therapy. Cancer immunology: Immune response to tumors, Immunological surveillance of cancer, Cancer immunotherapy.	
V	Vaccines and Immunotechniques Vaccines: Active and passive immunization, recombinant vector vaccines, DNA vaccines, synthetic peptide vaccines, multivalent subunits vaccines, COVID 19 vaccine. Immunotechniques: Hybridoma technology - Introduction, Antibody engineering (production of monoclonal antibodies). Agglutination, precipitation, immune-diffusion, immunoelectrophoresis, ELISA, RIA, western blot, Avidin – biotin mediated immunoassay. Immunohistochemistry – immunofluorescence, immunoferritin technique. Fluorescent immunoassay, fluorescence activated cell sorting (FACS). Cytokines assay: ELISPOT. Lymphocytes transformation test (LTT); Lymphoblastoid cell lines. Chemiluminescence.	AI tools in epitope mapping and computational vaccine design.

PERCENTAGE OF SYLLABUS REVISED: 4 %

COURSE FOCUS ON:

☑	Skill Development		Entrepreneurial Development
☑	Employability		Innovations
	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

Syllabus revision

M.Sc. Biochemistry

Faculty: Biosciences **Board: Biochemistry**

Semester: II **Course Code/ Name: 26BCP2CB: Metabolism**

Unit	Existing	Changes
I	**Bioenergetics, ETC and Oxidative Phosphorylation** Enthalpy, Entropy, Spontaneous and non-spontaneous thermodynamic reaction, equilibrium constant and concept of free energy, Free energy change in a reaction, Importance of coupled process in living things, Phosphoryl group transfers and ATP, Biological Oxidation -Reduction reactions. Electron Transfer reaction in Mitochondria: Components of ETC and its organization, Sequence of Electron Transport. Oxidative Phosphorylation: ATP synthase- Structure and Mechanism of action, Inhibitors of ETC, Uncouplers, P/O ratio, Mitochondrial Transport systems - Glycerophosphate shuttle system, Malate-aspartate shuttle system.	Dhatvagnipaka in Ayurveda and Tissue Metabolism
II	**Pathway regulation, analysis and Carbohydrate Metabolism** Pathway Regulation: Regulation of Intermediary metabolism, Role of regulatory enzymes, Energy charge. Strategies for pathway analysis: Single step and Multistep pathway analysis. Glycolysis and gluconeogenesis: Pathway, Key enzymes and Co-ordinate regulation. Pyruvate dehydrogenase complex and the regulation of this enzyme through reversible covalent modification. The citric acid cycle and regulation. The pentose phosphate pathway, Glucuronic acid pathway. Metabolism of glycogen and regulation. Metabolism of galactose and fructose. The glyoxylate cycle, Cori cycle, Anaplerotic reactions, Futile cycles and their applications.	
III	**Lipid Metabolism** Lipid metabolism: Lipogenesis-Biosynthesis of long chain fatty acid, Fatty acid synthase complex, Control of acetyl CoA carboxylase, Role of hormones, Effect of diet on fatty acid biosynthesis. Biosynthesis of triacylglycerol and phospholipids. Biosynthesis and degradation of cholesterol and its regulation. β Oxidation of fatty acids, Regulation of fatty acid metabolism. Ketogenesis and Ketolysis. Composition and synthesis of lipoproteins and their transport in the body. Biosynthesis of Prostaglandins, Thromboxanes and Leukotrienes.	
IV	**Metabolism of Amino acids and Integrated Metabolism** Amino acids metabolism: An overview on Gamma-glutamyl cycle. An overview Methionine as methyl donor (SAM pathway). An overview & regulation of urea cycle. Biosynthesis of Alphaketoglutarate family, Pyruvate family. 3- Phosphoglycerate family, Aspartate family and Aromatic amino acid family. Allosteric regulation of glutamine synthase. Integration of metabolism: Three forms of energy storage, Metabolism in a multicellular organism, Metabolic interaction among major organ systems-Brain, Muscle, Heart, Adipose tissue and Liver.	Artificial intelligence in cellular metabolic pathway reconstruction
V	**Porphyrin and Nucleic acids metabolism** Porphyrin metabolism: Biosynthesis and degradation of heme, chlorophyll and cytochrome and their regulation. Nucleic acid metabolism: Pathways of purines and pyrimidines biosynthesis (both de novo and salvage pathways) and degradation. Regulation of purine biosynthesis: PRPP aminotransferases. Regulation of pyrimidine biosynthesis: Aspartate carbamoyltransferase.	

PERCENTAGE OF SYLLABUS REVISED: 5 %

Course Focus On:

☑	Skill Development		Entrepreneurial Development
☑	Employability		Innovations
	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

Syllabus revision
M.Sc. Biochemistry

Faculty: Biosciences Board: Biochemistry
Semester: II Course Code/ Name: 26BCP2CC-Microbial Biochemistry

Unit	Existing	Changes
I	Microbial Nutrition, Medium, Growth and Measurement Microbial Nutrition: nutritional requirements and uptake of nutrients by microbial cells; Transport of sugars into bacterial cell– the bacterial phosphotransferase system. Transport of non-PTS sugars. Membrane bound transport systems- E.coli lactose permease, Beta-methyl galactoside system. Nutritional groups of microorganisms (autotrophs, heterotrophs and mixotrophs). Growth media: synthetic, complex, selective, enrichment and differential media. Microbial Growth- different phases of growth in batch cultures, synchronous, continuous and biphasic growth. Factors influencing microbial growth. Methods for measuring microbial growth. Bacterial Cell cycle.	Artificial Intelligence in microbial growth prediction and fermentation optimization.
II	Microbial Energy and Synthesis Biology Energy yielding metabolism: carbohydrates– EMP, HMP, TCA– importance in bacteria. Phosphoketolase pathway, ED pathway, characteristics of electron transport in bacteria. Bacterial Chemotaxis and quorum sensing. Biosynthesis of cell wall– peptidoglycan, teichoic acid, lipids; biosynthesis of straight and branched chain fatty acids, unsaturated fatty acids and cyclopropane fatty acids. Synthesis of triacylglycerols, phospholipids, glycolipids and polyisoprenoids. Aminoacid synthesis in microbes. Metabolism of purines and pyrimidines.	
III	Fermentation Technology Fermentation technology: Principles of fermentation, surface, submerged and solid-state fermentations. Batch, fed batch, semi-continuous and continuous culture techniques. Strain improvement for better yield, Downstream processing. Design and construction of Bioreactors Monitoring and control of bioreactor: Online and off line control, Controlling systems: Temperature, flow rate, pressure, pH, DO, gas analysis. Types of fermentors: Waldhof, tower, cylindroconical, air-lift, deep-Jet, cyclone column, packed tower and rotating disc fermenter. Types of reactions in fermentations.	AI-based optimization of fermentation conditions and bioreactor monitoring
IV	Environmental and Agricultural Technology Genetically modified organisms. Production of biogas from agricultural wastes. Production of bio-insecticides from bacteria and fungi. Bio fertilizers - bacteria and blue-green algae. Use of microbes in mineral beneficiation and oil recovery. Environmental Microbiology: Microbiology of food-food spoilage, controlling food spoilage, types of food borne diseases, microbiology of fermented food, Applied environmental microbiology- water purification and sanitary analysis. Waste water treatment. Bio-degradation, bioremediation and bio- augmentation.	Indigenous practices of composting. organic manure preparation and traditional soil fertility management
V	Industrial and Pharmaceutical Biotechnology Production of antibiotics: source, production, recovery and uses of penicillin, tetracycline, streptomycin, amoxicillin. Production of bacterial and fungal polysaccharides; Commercial production of xanthan gum. Single cell protein production and application. Microbial production of Primary metabolites: organic acids (Acetic acid, lactic acid, and citric acid), Organic solvents (acetone, butanol, ethanol, glycerol). Alcoholic beverages (Beer, Wine and Brandy Amino acids (glutamic acid, lysine, threonine, phenylalanine) and Vitamins (B12, B2, and vitamin-C). Enzymes amylase, proteases, streptokinase.	

PERCENTAGE OF SYLLABUS REVISED: 8.27 %

COURSE FOCUS ON:

☑	Skill Development		Entrepreneurial Development
☑	Employability		Innovations
	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

Syllabus Revision
M.Sc. Biochemistry

Faculty: Biosciences Board: Biochemistry
Semester: II Course Code/ Name: 26BCP2CD Genetics and Molecular biology

Unit	Existing	Changes
I	**Genetics** Mendelian Principles: Segregation, Independent Assortment, Dominance relations, Multiple alleles, Incomplete dominance, Over dominance. Gene interaction, Epistasis, lethal genes, Sex determination and sex linkage, linkage, crossing over and chromosome mapping. Chromosomal theory of inheritance, Chromosomal aberrations and evolutions, Extrachromosomal Inheritance, maternal effects. Introduction to Population genetics, gene frequency, factors affecting gene frequency, Hardy-Weinberg Law. Genetic drift, Pedigree analysis and genetic counselling, Eugenics. Fine structure of Gene, cistron, recon, Structures of Eukaryotic and Prokaryotic genes. Experimental evidence for DNA as the genetic material.	Molecular Mechanisms of Mitochondrial DNA Heteroplasmy and Its Role in Human Genetic Disorders.
II	**Replication and Recombination** Replication in prokaryotes: Replication in circular chromosomes- Cairns model, rolling circle model. Eukaryotic replication, replication fidelity. Replication in RNA virus (retroviruses). Inhibitors of replication. DNA recombination: Homologous recombination: Holliday Model and Rec BCD pathway. Site-specific recombination: Lambda phage integration, and excision rearrangement. Transposition: Prokaryotic transposition, conservative and replicative transposition. Eukaryotic transposable elements: Retro-Transposons, DNA -Transposons	
III	**Transcription and Translation** Transcription: coding strand, template strand, sense strand and antisense strand, promotor, DNA dependent RNA polymerase, role of Pribnow box, template binding, prokaryotic transcription, Rhodependent and independent transcription, posttranscriptional processing in prokaryotes, alternative splicing, RNA editing.Nuclear export of mRNA- mRNA stability. Inhibitors of transcription Eukaryotic transcription, post-transcriptional modifications of eukaryotic RNAs, RNA splicing, introns and splicing reactions, exons and enhancers Genetic code: deciphering of the genetic code, Salient features, prokaryotic and eukaryotic protein biosynthesis: initiation, elongation, translocation and termination, polysomes, Regulation of translation, Inhibitors of translation, Post translational modification of proteins	
IV	**Gene Regulation** Regulation of gene expression in prokaryotes: operon model- lac, trp, araBAD operons, Riboswitches, Heat shock response in *E.coli,* Flagellar variation in salmonella; Lux Operon and quorum sensing, Two component systems in nutrient sensing. Regulation of gene expression in eukaryotes: Britten-Davidson model, transcriptional regulation. C-value paradox, repetitive DNA. Genes controlling yeast mating types, Xenopus 5S rRNA in oocytes, Silk fibroin gene, Drosophila sex determination, Chicken globin genes and Environmental gene regulation	
V	**DNA Damage and Repair** Mutagenesis: Spontaneous and Induced mutations – Physical and Chemical mutagenesis, Molecular mechanisms of mutagenesis – Transition, Transversion, Frame Shift, missense and nonsense mutations. Detection of mutations: CLB Method and attached X method. DNA repair – Direct reversal repair, double strand break repair in mammals, Excision repair - base and nucleotide excision repair, mismatch repair, recombination repair, SOS response and mutagenic repair	AI-Based Prediction of DNA Mutations and Their Impact on Protein Function.

PERCENTAGE OF SYLLABUS REVISED: 6%

COURSE FOCUS ON:

☑	Skill Development		Entrepreneurial Development
☑	Employability		Innovations
	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

Syllabus revision
B.Sc. Biochemistry

Faculty: Biosciences **Board: Biochemistry**

Semester: II **Course Code/ Name: 26BCU2CA Enzymology**

Unit	Existing	Changes
I	**Introduction to Enzymes** Introduction –Definition, IUB Classification of enzymes, numbering and nomenclature (Class and subclass with one example). Units of enzyme activity – katal, International Unit (IU). Concept of active sites, enzyme specificity- Group specificity, optical specificity. Theories of enzyme catalysis Lock and Key model and Induced fit model. Enzyme as proteins Structure: Primary, Secondary, Tertiary and Quaternary structure with reference to examples.	
II	**Coenzymes and Regulatory enzymes** Coenzymes, Cofactors: Definition, Structure and functions of TPP, NAD, NADP, FAD, FMN and Coenzyme A, metal cofactor. Regulatory enzymes: Isoenzymes - Lactate dehydrogenase and creatine phosphokinase. Allosteric enzymes - properties, types, models, Aspartate transcarboxylase. Ribozymes, Abzymes. Multienzyme Complex: Pyruvate dehydrogenase.	
III	**Enzyme Kinetics** Enzyme Kinetics: Effect of pH, temperature, substrate concentration, product concentration and enzyme concentration on enzyme activity, Turn over number of enzymes. Michaelis-Menten equation. Lineweaver-Burk plot (only for single substrate catalysed reaction), Eadie-Hofstee and Hanes plot. Determination of Km and Vmax.	
IV	**Enzyme Inhibition, Bi-substrate reactions and enzymatic catalysis** Enzyme Inhibition: Reversible-competitive, non-competitive and un-competitive inhibition. Irreversible inhibition and feedback inhibition. Bisubstrate reactions: sequential- ordered and random,ping-pong reactions. Enzymatic catalysis: Significance of activation energy, General acid base catalysis, covalent catalysis (chymotrypsin and lysozyme).	
V	**Enzyme Applications** Isolation of enzymes, criteria of purity. Immobilized Enzymes methods & applications. Industrial uses of enzymes: production of glucose from starch, cellulose and dextrans, use of lactase in dairy industry. Diagnostic (AST, ALT, creatine kinase, alkaline and acid phosphatases) applications of enzymes. Enzymes as Biosensors – Calorimetric biosensors, Potentiometric biosensors. Enzyme Engineering: Artificial Enzymes.	Basic use of AI tools (AlphaFold) in enzyme structure prediction and design. Traditional fermentation and biocatalysis in Indian systems (Ayurvedic Asavas and Arishtas).

PERCENTAGE OF SYLLABUS REVISED: 4 %

Course Focus On:

☑	Skill Development	☑	Entrepreneurial Development
☑	Employability		Innovations
	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

Syllabus revision
B.Sc. Biochemistry

Faculty: Biosciences Board: Biochemistry

Semester: II Course Code/ Name: 26BCU2CA Microbiology

Unit	Existing	Changes
I	Introduction Definition, History and scope of Microbiology, Classification of microorganisms. Microscopy- Principles, types and applications of Microscopy. Simple and compound microscope, Dark field, Phase contrast, Fluorescence and Electron microscopy, Confocal Microscope. Microbiological staining techniques: Simple staining, Negative staining, Gram staining, Acid fast staining, capsule staining, flagella staining, endospore staining	
II	**Microbial nutrition and growth** Role of Carbon, nitrogen, hydrogen, oxygen, sulfur and phosphorous, nutritional classification of microorganisms. Nutritional uptake by cell - facilitated diffusion, active transport, group translocation, Media Preparation, types of media, Physical conditions required for microorganisms – temperature, atmosphere, pH, pressure. Microbial growth and measurement. Pure culture techniques – tube dilution, pour plate, spread and streak plate methods. Anaerobic culture methods – Wright's tube, Roll tube, Mclntosh - Fildes anaerobic jar, Gaspak, Anaerobic chamber (glove box), incubator. Principle, classes, and applications of Biosafety cabinets	
III	**Sterilization and Disinfection** Principles and methods of sterilization: dry heat, moist heat, filtration, radiation, tyndallization, Pasteurization, ultrasonication, Physical and Chemical methods of sterilization: disinfection sanitization, antisepsis sterilant and fumigation, Phenol coefficient test – Sterility testing	
IV	**Antibiotics and mode of action** Antimicrobial spectrum of antibiotics and mode of action of the following antibiotics: a) Antibacterial - Penicillin, streptomycin and tetracyclines b) Antifungal – Nystatin, griseofulvin and cycloheximide c) Antiviral - Acycloguanosine (acyclic nucleoside) and remdesivir. chromosomal mutation and plasmid-borne multiple drug resistance	
V	Microbes & Pathogenic diseases Normal human micro flora, host - parasitic interaction, epidemics, exo and endotoxins. Air borne diseases: Aetiology, symptoms and prevention of Tuberculosis, Diphtheria, Poliomyclitis, Influenza, SARS, and Covid-19. Food and Waterborne diseases: Aetiology, symptoms and pathogenesis of Typhoid, Cholera, Bacillary dysentery, and Hepatitis. Direct contact disease: Aetiology and symptoms of Rabies. Fungal disease: Aetiology, symptoms, and prevention of mucormycosis. Molecular methods to study complex microbial communities, Functional Metagenomics.	Artificial Intelligence in Microbiology: Applications in Microbial Identification. Disease diagnosis and Pathogen Detection

PERCENTAGE OF SYLLABUS REVISED: 5%

Course Focus On:

☑	Skill Development	☑	Entrepreneurial Development
☑	Employability		Innovations
	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

Syllabus revision
B.Sc. Biochemistry

Faculty: Biosciences **Board: Biochemistry**

Semester: IV Course Code/ Name: : 25BCU4CA Intermediary Metabolism

Unit	Existing	Changes
I	Bioenergetics & Electron transport chain Bioenergetics: - Free energy and the laws of thermodynamics; Role of high- energy compounds as energy currency of the cell; free energy of hydrolysis of ATP and other organophosphates. The basic metabolic pathways - anabolic, catabolic and amphibolic pathways.Electron transport chain: - Role of respiratory chain in mitochondria; in energy capture; respiratory control. Oxidative phosphorylation: - Mechanism of oxidative phosphorylation; Chemiosmotic theory; uncouplers of oxidative phosphorylation.	
II	**Carbohydrate Metabolism** Glycolysis: - Pathways and energetics; Oxidation of pyruvate to acetyl CoA. TCA Cycle: Pathway and energetics; Gluconeogenesis; Glycogenesis and glycogenolysis. Pentose Phosphate Pathway (HMP shunt). Cori Cycle, Glucuronic Acid Cycle. Metabolism of other hexoses:- Fructose and galactose. Case studies.	
III	Lipid Metabolism Blood lipids. Oxidation of fatty acids: - Carnitine cycle; beta oxidation, alpha oxidation and omega oxidation. Biosynthesis of propionyl CoA. Biosynthesis of saturated fatty acids. Biosynthesis of unsaturated fatty acids: - Monounsaturated and polyunsaturated fatty acids. Biosynthesis and degradation:- Lecithin, cholesterol. Case studies.	
IV	Amino acid Metabolism Detoxification of Ammonia- Urea Cycle. Catabolism of amino acid: Oxidative deamination, non–oxidative deamination, transamination, amino acid decarboxylation, Metabolism of amino acid: Glycine, methionine, phenyl alanine, tyrosine, Leucine, lysine. Metabolic disorders: Maple syrup Urine Disease, Phenylketouria, tyrosinemia, homocystinuria. Interrelation between carbohydrates, fat and protein metabolism.	
V	**Nucleic Acid Metabolism** Nucleic acid: Metabolism of purines: de-novo synthesis, salvage pathways; catabolism of purine. Metabolism of pyrimidines - de novo synthesis, salvage pathways; catabolism of pyrimidine. Biosynthesis of deoxy ribonucleotides.	AI in Metabolic Pathway Analysis

PERCENTAGE OF SYLLABUS REVISED: 2%

Course Focus On:

☑	Skill Development		Entrepreneurial Development
☑	Employability		Innovations
	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

Syllabus revision
B.Sc. Biochemistry

Faculty: Biosciences **Board: Biochemistry**

Semester: II **Course Code/ Name: 25BCU4CB Nutritional Biochemistry**

Unit	Existing	Changes
I	**Introduction to Food and nutrition** Function of foods and its relation to nutrition and health, Essential nutrients, Analysis of food composition, Food habits and food groups. Antioxidants in Foods. Required dietary allowance (RDA) for different age groups. ~~Carcinogens and Food additives,~~ Fetal origin of Adulthood Diseases (FOAD). Microbiomes- Gut microbiota, Prebiotics, Probiotics.	Artificial intelligence for decoding diet-gut microbiome-health interactions
II	**Energy Metabolism** Measurement of energy expenditure: Direct & Indirect calorimetry. Definition of RQ, BMR and BMI, factors affecting RQ, BMR and BMI. Thermogenic effects of foods and factors affecting thermogenic effect. Energy requirements of men and women and factors affecting energy requirements. Role of dietary fibers in health.	
III	**Dietary Carbohydrates, lipids and Health** Physiological role and nutritional significance of carbohydrates and lipids. Carbohydrates - Chemical composition and importance, Glycemic index of foods and its uses, Artificial sweeteners. Sources and physiological functions of Essential fatty acids, Saturated fatty acids, Monounsaturated fatty acids and Polyunsaturated fatty acids, Omega 3 and omega 6 fatty acids and ratio. Phospholipids, Triacylglycerols and Cholesterol in the body.	
IV	Dietary Proteins, Vitamins, Minerals and Health Primary nutritional diseases: Essential and non-essential amino acids – their role in growth and development. Protein energy malnutrition (Marasmus and Kwashiorkar), Starvation, Techniques for the study of starvation. Protein metabolism in prolonged fasting. Protein sparing treatments during fasting. Basic concept of high protein low caloric weight reduction diets. Calcium, Phosphorus and Iron - Distribution in the body digestion, Sources, RDA, Absorption, Utilization, Transport, Excretion, Balance, Deficiency, Toxicity. Calcium: Phosphorus ratio, Role of iron in prevention of anemia. Importance of Iodine in human metabolism.	
V	**Clinical Nutrition** Role of diet and nutrition in prevention and treatment of diseases: Dental Caries, Lactose Intolerance, Galactosemia and Glycogen Storage Diseases, Fluorosis, Atherosclerosis and Rheumatic disorders. Vitamin deficiency disorders, Hypervitaminosis, Nutritional anaemias. Conditional nutritional disorders: Disorders of gastrointestinal tract, liver, biliary tract, pancreas, heart and Diabetes, Obesity.	Traditional food practices and nutritional well-being, Glycan Therapy

PERCENTAGE OF SYLLABUS REVISED: 6 %

Course Focus On:

☑	Skill Development	☑	Entrepreneurial Development
☑	Employability	☑	Innovations
☑	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

Syllabus Revision
M.Sc. Biochemistry

Faculty: Biosciences Board: Biochemistry
Semester: IV Course Code/ Name: 25BCP4CA: Bioethics and Biosafety

Unit	Existing	Changes
I	Introduction to Biosafety Introduction to Bio-safety; Different levels of Bio-safety; Basic Laboratory and Maximum Containment Laboratory; Containments-Types; Biological weapons; The Cartagena Bio- safety protocol (CAB); Role of IBSC; Guidelines for rDNA research activities; General guidelines for research in transgenic plants; Role of RCGM; Assessment of risks associated with GMO; General issues related to environmental release of transgenic plants, animals and microorganisms; Role of GEAC; Good Laboratory Practices (GLP) and Good Manufacturing Practices (GMP). Artificial Intelligence in Biosafety Risk Assessment and Monitoring of Genetically Modified Organisms (GMOs).	Artificial Intelligence in Biosafety Risk Assessment and Monitoring of Genetically Modified Organisms (GMOs).
II	Bioethics Principles and Practices Introduction to Bioethics; Four main principles of bioethics; Animal Right to life, Animal research; Ethical, Legal and Social Implications (ELSI) of Human Genome Project; Ethical issues related to research in embryonic stem cell research and cloning. Case studies in human and animal research. (Three R's in research).	
III	Introduction to Intellectual Property Rights (IPR) – Global concepts Definitions: Physical and Intellectual Property, Tangible and Intangible Property; General Agreement on Trade and Tariff (GATT); TRIPS; World Trade Organizations (WTO); Establishment and functions of GATT, WTO and WIPO; WTO- Guidelines and Summits.	
IV	IPR applications Different types of intellectual property rights (IPR): Patents, Trade mark, Trade secret, Copy right and Geographical Indications; Requirement of patentability; Compulsory licenses; Case studies in patent, trademark, trade secret, copyright, Traditional Knowledge in biotechnological areas.l	
V	Patent application Patent application; Rules governing patents; Patent related cases: Licensing of Flavr Savr™ tomato as a model case; Bio- piracy case studies on patents (Basmati rice, Turmeric, and Neem); Indian Patent Act, 1970; Recent amendments, Biodiversity act of 2002I	Patent Process

PERCENTAGE OF SYLLABUS REVISED: 6 %

COURSE FOCUS ON:

☑	Skill Development	☑	Entrepreneurial Development
☑	Employability	☑	Innovations
☑	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

Syllabus Revision
M.Sc. Biochemistry

Faculty: Biosciences Board: Biochemistry
Semester: IV Course Code/ Name: 25BCP4CB: Endocrinology and Developmental Biology

Unit	Existing	Changes
I	Homeostasis and Signal Transduction Hormones and homeostasis: Neuroendocrine Integration in homeostasis. Classes of chemical messengers. Hormone secretion. Transport and clearance. Neuroendocrine regulation -Feedback control of secretion. Signal transduction: Plasma membrane receptors, Adenylate kinase, Role of G Proteins, protein kinases, tyrosine kinases, MAPK, inositol phosphates, diaceyl glycerol and calcium. Steroid hormone and thyroid hormone receptors. Neuroendocrine regulation from an ayurvedic perspective.	Neuroendocrine regulation from an ayurvedic perspective.
II	Hypothalamic, Pituitary, pineal and pancreatic hormones The endocrine hypothalamus- Hypophysiotropic hormones- Chemistry & biochemical functions. Pituitary gland- Hormones of the pituitary gland, Chemistry & biochemical functions. Growth Factors- PGDF, EGF, IGF-II and erythropoietin; Pineal gland- Hormones of the pineal gland- Chemistry& biochemical functions; Thyroid gland- Thyroid hormones- Chemistry and Biochemical functions; Pancreas- Insulin/ glucagon, Somatostatin– chemistry and biochemical functions.	
III	Adrenal, Neuro and Reproductive hormones Adrenal gland- Hormones of Adrenal gland- Chemistry and biochemical functions; Gastrointestinal hormones-cholecystokinin, substance P, neuroendocrine control of GI Neurohormones- The brain- Renin-Angiotensin and Urotensin,Opioid peptides – endorphins; enkephalins. Hormones of female reproductive system: ovarian steroid hormones- Chemistry & biochemical functions, Hormonal changes during pregnancy and lactation Hormones of Male reproductive system: Source, synthesis, chemistry and metabolism of Androgens Hormones involved in calcium metabolism.	
IV	Fertilization, Embryonic development in plants and animals Developmental Biology - an overview: Introduction of animal development: Development among unicellular eukaryotes –Acetabularis, Naegleria. The origins of sexual reproduction; Fertilization: structure of gametes, recognition of sperm and egg –action at distance and contact of gametes Early Embryonic Development in animals: Blastula formation, Types of Cleavage, Gastrulation and formation of germ layers in animals. Early Embryonic Development in plants: Gametogenesis, Fertilization, Embryo sac development and double fertilization in plants.	
V	Organogenesis and Cell death and regeneration Organogenesis in animals – an overview: Tissue organization and stem cells; development of nervous system, mesodermal and endodermal organs. Organogenesis –vulva formation in Caenorhabditis elegans; Cell death and regeneration: Concept of regeneration; programmed cell death, necrosis, aging and senescence.	

PERCENTAGE OF SYLLABUS REVISED:5 %

COURSE FOCUS ON:

☑	Skill Development		Entrepreneurial Development
☑	Employability		Innovations
	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

Syllabus revision
M.Sc. Chemistry

Faculty: Biosciences
Semester: II

Board: Biochemistry
Course Code/ Name: 26BCP2EA: -Drug Biochemistry

Unit	Existing	Changes
I	**Pharmacology and Pharmacokinetics** Pharmacology: Classification of drugs, sources, Routes of drug administration: sublingual, buccal, oral, rectal, intravenous, intramuscular, subcutaneous, transdermal, inhalational and topical administration. Pharmacokinetics: drug absorption, drug distribution, drug biotransformation (role, formation, and phases), drug excretion: quantitative pharmacokinetics, bioavailability, drug clearance.	Traditional Indian systems of medicine (Ayurveda and Siddha) sources
II	**Pharmacodynamics** Drug receptors: Types, classification, drug-receptor interaction, Agonist, antagonist, Inverse agonist, partial agonist. Dose-response relationships (graded and quantal). Adverse effects of drugs. Factors affecting drug safety and efficacy	
III	**Antidepressant drugs and neurodegenerative diseases** Antidepressant drugs: Mechanism of action and therapeutic uses of tricyclic antidepressants and monoamine oxidase inhibitors. Treatment of neurodegenerative diseases: Parkinson's disease – ~~Introduction,~~ Monoamine oxidase inhibitors. Alzheimer disease - ~~Mode of action~~ Galantamine, rivastigmine. Hypnotic drug – zolpidem or zaleplon	Parkinson's disease - Causes, symptoms, treatment Alzheimer disease - Causes, symptoms, treatment
IV	**Drugs for peptic ulcer, inflammation, thyroid disorders and Diabetes** Anti-peptic ulcer drugs: H2 receptor antagonists and inhibitors of Proton pump. Anti-inflammatory drugs: Mechanism of action, therapeutic uses, pharmacokinetics, and adverse effects of Anti-inflammatory drugs -aspirin and colchicine. Antimicrobial drugs – Sulfonamides trimethoprim, penicillin, aminoglycosides, and bacterial resistance. Thyroid and anti- thyroid drugs, Insulin, and oral anti- diabetic drugs.	
V	**Anticancer drugs** Anticancer drugs: Mode of action and its mechanism - Cyclophosphamide & methotrexate. Antibiotics (Dactinomycin & Bleomycin), microtubule inhibitor (Vincristine & Vinblastine). Patenting of Drug, Marketing, and Computer aided drug design.	Applications of artificial intelligence in anticancer drugs development

PERCENTAGE OF SYLLABUS REVISED: 10%

Course Focus On:

☑	Skill Development		Entrepreneurial Development
☑	Employability		Innovations
	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

New course
B.Sc. Biochemistry

Faculty: Biosciences **Board: Biochemistry**
Semester: III **Course Code/ Name: 26BCUSSA: Forensic Biology**

Unit	Existing
I	Introduction to forensic science and crime Introduction Global History and Scope, Need and Development Principles, emphasizing on Specific contribution of Scientists in the field of Forensic Science. Definition of crime, characteristics of crime, classification of crimes, A brief ideas about White collar crime, professional crime, organized crime, present scenario of crime in India. Structure and function of State and regional Forensic Science Laboratory, Importance of FSL, National and International scenario of FSL, facilities provided in forensic science laboratory.
II	Domains in forensic science Branches of Forensic Science, Police officers, Prosecution, Judicial Officers and Medico legal expert etc. Role and Qualifications of forensic scientists. Code of conduct for forensic scientists, Ethical issue in Forensic Science, professional standards for practice of Criminalistics, sanction against expert for unethical conduct.
III	Biological evidence Nature and importance of biological evidence. Collection and preservation of common biological evidences. Significance and origin of hair evidence. Transfer, persistence and recovery of hair evidence. Structure of human hair. Comparison of hair samples. Morphology and biochemistry of human hair. Comparison of human and animal hair. Importance of pollen grains, wood and diatoms in Forensic science
IV	Common body fluids Collection and preservation of blood evidence. Distinction between human and non-human blood- Origin determination. Forensic characterization of bloodstains. Typing of dried stains. Blood enzymes and proteins. Semen. Forensic significance of semen. Collection, evaluation and tests for identification of semen. Individualization on the basis of semen examination. Composition, functions and Forensic significance of saliva, sweat, urine, fecal stains, milk and vomit. Tests for their identifications
V	Bloodstain Bloodstain characteristics. Impact bloodstain patterns. Cast -off bloodstain patterns. Projected bloodstain patterns. Contact bloodstain patterns. Blood trails. Bloodstain drying times. Documentation of bloodstain pattern evidence. Crime scene reconstruction with the aid of bloodstain pattern analysis

Course Focus On:

☑	Skill Development		Entrepreneurial Development
☑	Employability		Innovations
	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

New course
B.Sc. Biochemistry

Faculty: Biosciences
Board: Biochemistry
Semester: III
Course Code/ Name: 26BCUSSB: Scientific Writing in Health Research

Unit	Existing
I	Argument Matrix and Background Development Fundamentals and principles of scientific writing in health research. Identification of research problems, objectives and research questions. Preparation of an argument matrix to organise research arguments, evidence and supporting literature. Critical evaluation and synthesis of scientific literature. Techniques for developing the background and rationale of a research article. Identification of research gaps, significance and relevance of the study. Structuring the introduction and establishing the need for the research
II	Reference Management and Research Methods Introduction to reference management tools and their applications in scientific writing. Organisation and management of references using Zotero. Importing references from scientific databases and online sources. In-text citations, bibliography preparation and citation styles. Principles of writing the Materials and Methods section. Description of research design, sampling techniques and experimental procedures. Reporting laboratory protocols, instruments, reagents and statistical methods. Reproducibility, transparency and accuracy in methodological reporting.
III	Results Presentation and Data Sharing Principles of scientific data organization, analysis and interpretation. Preparation and presentation of tables, graphs, charts and figures. Writing the Results section with clarity, accuracy and logical sequence. Reporting statistical findings and significant observations. Data management, storage, preservation and sharing policies. Open data practices, data repositories and responsible data accessibility.
IV	Discussion and Additional Manuscript Components Principles of writing an effective Discussion section. Interpretation of research findings in relation to study objectives and existing literature. Comparison of findings with previous studies. Explanation of scientific significance, implications and applications of research outcomes. Identification of study limitations and recommendations for future research. Formulation of informative research titles and preparation of structured and unstructured abstracts. Selection of appropriate keywords for indexing and literature retrieval. Preparation of acknowledgements, author contributions, funding statements and conflict-of-interest declarations.
V	Publication Ethics and Manuscript Submission Principles of publication ethics and responsible research conduct. Plagiarism, self-plagiarism, duplicate publication, data fabrication and falsification. Authorship criteria, contributorship and conflicts of interest. Ethical Requirements for Human Participant Research, Animal Studies, Microbial and Recombinant DNA Research. Selection of appropriate journals based on scope, readership, indexing and publication standards. Manuscript formatting, cover letter preparation and submission procedures. Peer-review process and responding to reviewers&; comments. Scientific writing style, clarity, conciseness and technical terminology.

Course Focus On:

☑	Skill Development		Entrepreneurial Development
☑	Employability		Innovations
	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

New course
M.Sc. Biochemistry

Faculty: Biosciences Board: Biochemistry
Semester: III Course Code/ Name: 26BCP2EA: Principles of downstream Techniques in bioprocessing

Unit	Existing
I	Introduction to Downstream Processing and Product Release Meaning, objectives and stages of downstream processing, from product recovery to formulation and packaging. Types of bioproducts and the properties that influence separation-method selection. Basic concepts of mass balance, yield, recovery, purity, process economics, scale-up and good manufacturing practice.
II	Cell Harvesting, Solid–Liquid Separation and Cell Disruption Principles of sedimentation, flocculation, filtration and centrifugation for separating cells and suspended solids. Overview of industrial filtration and centrifuge systems. Reasons for disrupting cells to recover intracellular products, common mechanical, physical, chemical and enzymatic methods, and factors affecting product stability and debris removal.
III	Product Isolation, Concentration and Membrane-Based Separation Principles of solvent extraction, aqueous two-phase extraction, adsorption and precipitation. Membrane techniques such as microfiltration, ultrafiltration, nanofiltration, reverse osmosis and diafiltration. Their use in clarification, concentration, desalting and buffer exchange, including membrane selectivity, fouling and process limitations.
IV	Purification by Chromatography and Product Polishing Basic chromatographic concepts and the principles of ion-exchange, size-exclusion, affinity, hydrophobic-interaction and reversed-phase chromatography. Selection of operating conditions and resins. Product polishing, purity assessment, removal of residual impurities, crystallization, drying, lyophilization, formulation, storage and quality-control considerations.
V	Process Integration, Quality Assessment and Industrial Applications Combining unit operations into a suitable downstream process train. Calculating recovery, overall yield and purification factor. Examples involving enzymes, recombinant proteins, antibiotics, organic acids and other bioproducts. Process challenges, quality assurance, contamination control, safe solvent use, effluent management, sustainability and emerging integrated or continuous processing approaches.

Course Focus On:

☑	Skill Development		Entrepreneurial Development
☑	Employability		Innovations
	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

New course
M.Sc. Biochemistry

Faculty: Biosciences Board: Biochemistry
Semester: III Course Code/ Name: 26BCPSSB: Herbal product technology and regulatory science

Unit	Existing
I	Herbal products Herbs as raw materials: Herbal drug preparation, Source of Herbs Selection, Identification and authentication of herbal materials. Processing of herbal raw material, Indian Systems of Medicine: Basic principles involved in Ayurveda, Siddha, Unani and Homeopathy.Adulteration of Herbal raw material, Ethnobotanical Foundations and GMP in Herbal Therapeutics
II	Ayurvedic formulation & Standardization Preparation of Ayurvedic formulations viz Aristas and Asavas, Preparation of Gjutika and Bhasma, Standardisation of Asavas, Arishtas, Ghutika & Bhasma, Herbal formulations: Conventional herbal formulations like syrups, mixtures, powders, capsules, tablets, creams and ointments. Extraction & Phytochemical Screening of active constituents from herbs, Standardization of Herbal drugs using - UV-Vis, TLC, HPLC, HPTLC methods
III	Nutraceuticals Nutraceuticals: General aspects, Market, growth, scope, Nutraceutical products for Diabetes, cardiovascular diseases & Cancer, Nutraceuticals for Skin & hair, Nutraceuticals for oral hygiene, Mechanisms of Action and Bioavailability of Nutraceuticals in Disease Prevention and Wellness. Adverse reactions related to plants and foods such as allergy, intolerance, toxicity.
IV	Raw materials of herbal products Herbal Cosmetics and Excipients, Sources and classification of raw materials of herbal origin, Raw material such as fixed oils, waxes, Raw material as Gums & Colours, Raw materials as sweeteners, flavours & perfumes. Novel dosage forms - phytosomes, liposomes, nano formulations, their composition, Role of Molecular Markers such as DNA, Fingerprinting rbcL, matK and SCAR marker in quality control of botanicals and formulations
V	Quality Control Methods and Regulatory issues WHO, AYUSH, and ICH guidelines on quality control, stability, and shelf-life studies of herbal medicines, Herbal Pharmacopeias, Monographs and Books on Quality standards, Patenting aspects of Traditional Knowledge: Definition of the terms: Patent, IPR & Bioprospecting. Good Manufacturing Practice of Indian systems of medicine: Components of GMP (Schedule – T), Regulatory Issues - Regulations in India (ASU DTAB, ASU DCC), Regulation in US (DSHEA) and Regulation in Europe (EMA).

Course Focus On:

☑	Skill Development	☑	Entrepreneurial Development
☑	Employability	☑	Innovations
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	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

ATTENDANCE OF THE TWENTY SECOND BOARD OF STUDIES MEETING

Faculty: Bioscience
Venue: Fist Room

Name of Board: Biochemistry
Date:22/10/2026, Time: 10.00 a.m.

The following members were present for the board of studies meeting

S. NO.	NAME	DESIGNATION	SIGNATURE
1	Dr. Gowri. S, Professor and Head, Department of Biochemistry, Dr. N.G.P. Arts and Science College, Coimbatore.	Chairman	Present
2	Dr. Subramaniam Selvakumar, Assistant Professor, Department of Biochemistry, Bharathiar University, Coimbatore.	VC nominee	Present
3	Dr. K. Chandrakumar, Associate Professor, Department of Plant Molecular Biology and Bioinformatics, Tamil Nadu Agricultural University, Coimbatore.	Subject Expert	Present
4	Dr. V. M. Berlin Grace, Professor, Department of Biotechnology, Karunya Institute of technology and Sciences, Coimbatore	Subject Expert	Present
5	Dr. Ayyavu Mahesh, Director, Centre for Stem Cell and Cancer Genomics, AMI BioScience, Coimbatore-641004.	Industrial Expert	Present
6	Mrs. Anbusudha, Vice Principal Chandrakanthi Public school, Coimbatore	Alumni	Absent
7	Dr. N. Kannikaparameswari Professor in Biochemistry, Dr. N.G.P. ASC	Member	Present
8	Dr. T. Indhumathi Professor in Biochemistry, Dr. N.G.P. ASC	Member	Present
9	Dr. K. Rajathi Professor in Biochemistry, Dr. N.G.P. ASC	Member	Present
10	Dr. D. Pradeepa, Associate Professor in Biochemistry, Dr. N.G.P. ASC	Member	Absent
11	Mrs. S. Divya Priya, Assistant Professor in Biochemistry, Dr. N.G.P. ASC	Member	Present

12	Mrs. G. Lalitha, Assistant Professor in Biochemistry, Dr. N.G.P. ASC	Member	Present
13	Dr. N. Kuppuchamy Head, Department of Tamil, Dr. N.G.P. ASC	Co-opted Member	Present
14	Dr. A. Hazel Verbina, Head, Department of English, Dr. N.G.P. ASC	Co-opted Member	Present
15	Dr.K.Girija Head, Department of Physics, Dr. N.G.P. ASC	Co-opted Member	Present
16	Dr.S.Uma Department of Computer Science, Dr.N.G.P. ASC	Co-opted Member	Present
17	Dr.D. Sridevi Head, Department of Food Science and Nutrition	Co-opted Member	Present
18	Ms. Shirley Sreena	Student Representative -PG	Present
19	Ms. S Nethrashree	Student Representative-UG	Present

Date: 22/10/2026

(Dr. S. Gowri)
Chairman, BoS Biochemistry

BoS Chairman/HoD
Department of Biochemistry
Dr. N. G. P. Arts and Science College
Coimbatore – 641 048