



Dr. N.G.P. ARTS AND SCIENCE COLLEGE

(An Autonomous Institution, Affiliated to Bharathiar University, Coimbatore)

Approved by Government of Tamil Nadu and Accredited by NAAC A++ Grade (3rd Cycle- 3.64 CGPA)

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BoS

17th

Department of Biochemistry

Board of Studies Meeting

The minutes of the 17th meeting of Board of Studies held on 04.04.2024 at 10.00 am at the Innovation Centre.

Members Present:

S.No.	Name	Category
1	Dr. Gowri. S	Chairman
2	Dr. Kalaiselvi Senthil, Associate professor, Department of Biochemistry, Biotechnology and Bioinformatics, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore	Subject Expert
3	Dr. D. Amirtham Associate Professor (Biochemistry) Department of Plant Biotechnology CPMB & B Tamil Nadu Agricultural University, Coimbatore	Subject Expert
4	Dr. E. Santhini Senior Scientific Officer- B/ Technical Manager Centre of Excellence for Medical Textiles The South India Textile Research Association Coimbatore-641014	Industrial Expert
5	Dr. S. Vadivel HOD of Clinical Biochemistry and Quality Control System, K.G. Hospital, Coimbatore- 641018	Alumni member
6	Dr. N. Kannikaparameswari, Professor in Biochemistry	Member
7	Dr. T. Indhumathi, Professor in Biochemistry	Member
8	Dr. K. Rajathi, Professor in Biochemistry	Member
9	Dr. D. Pradeepa, Assistant Professor in Biochemistry	Member
10	Mrs. S. Divya Priya, Assistant Professor in Biochemistry	Member
11	Mrs. G. Lalitha, Assistant Professor in Biochemistry	Member
12	Dr. K. Swathi, Assistant Professor in Biochemistry	Member
13	Dr. M. Kaviya, Assistant Professor in Biochemistry	Member
14	Dr. R. Sowrirajan, Head, Dept of Mathematics	Co- opted member
15	Dr. N. Kuppuchamy, Head, Dept of Tamil	Co-opted member
16	Dr. A. Hazel Verbina, Head, Dept of English	Co-opted member
17	Dr. M. Suganthi, Head, Dept of Chemistry	Co-opted member
18	Ms. Vidhya Shree PG - Biochemistry	Student Representative- PG
19	Ms. Yashmitha. R UG - Biochemistry	Student Representative- UG

The HoD and Chairman of the Department of Biochemistry welcomed and introduced all the members and appreciated them for their continuous 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. Dr. M.G. Sridhar - Subject Expert
2. Dr. A. Vijaya Anand – VC Nominee

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

Item 17.1: To review and approve the minutes of the previous meeting held on 16-10-2023.

The chairman of the Board presented the minutes of the previous meeting held on 16-10-2023 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 16-10-2023.

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

Item 17.2: To consider and approve the syllabi for I semester for the students admitted in UG and PG during the academic year 2024-2025.

The chairman presented the detailed scheme and Regulation for the students admitted for the academic year 2024-25 and syllabus for the I semester. The members deliberated in detail about the modification required. After discussion it is unanimously decided to adopt the following changes.

Changes Made:

UG Biochemistry

Course Code	Course	Reason
24BCU1CA	Biomolecules	Dr. Kalaiselvi Senthil suggested to include Homopolysaccharides (Starch, glycogen and Cellulose), Heteropolysaccharides (Hyaluronic acid, Chondroitin sulphate and Heparin) in unit I, Simple and mixed triglycerides. Characterization of fats – iodine value, saponification value, acid number, acetyl number, polensky number, Reichert-Meissel number in Unit II, renaturation of proteins in unit III and Properties of DNA – Hypochromic effect, melting temperature, viscosity in unit IV to

		get exposure on Biomolecules and their physical and chemical properties
24BCU1CB	Cell biology	Dr. Kalaiselvi Senthil suggested to include Special types of chromosomes and organization of chromatin in Unit II, Uniport, symport and Antiport in Unit IV to understand cell biological process.

PG Biochemistry

Course Code	Course	Reason
24BCP1CB	Biochemical techniques and Instrumentation	Research oriented topics on Tissue homogenization, Disruption of tissues and cells were introduced in Unit II as per the suggestion by Dr. Vadivel.
24BCP1CC	Enzymes and Enzyme Technology	Entrepreneurial and innovation-based topic on Strategies and Challenges for the Development of Engineered Enzymes in the Food Industry was included in Unit V as per the suggestion by Dr. Santhini
24BCP1CD	Cellular Biochemistry	Unit II Growth factors, Matrix Metalloproteinases, Occluding junctions, Anchoring junctions, Communicating junctions, Raf pathway were introduced as per the suggestions received from Dr. Santhini to expose the students to crucial research topics in the area of cell biology.
24BCP1DA	Cancer Biology, Diagnosis and therapy	Research oriented topics viz., Apoptosis in Unit I and cancer Genetics in Unit II were included as per the Dr. Amirtham

New Courses Introduced:

Course Code	Course	Reason
-	-	-

Courses Removed

Course Code	Course	Reason
-	-	-

After discussion the following resolution was passed.

Resolution:

Resolved to approve the above modification and adopt the revised syllabus for

students admitted for the academic year 2024-25.

Item 17.3: *To consider and approve the syllabi for III semester for the students admitted in UG and PG during the academic year 2023-2024.*

The chairman presented the detailed scheme and Regulation for the students admitted for the academic year 2023-24 and syllabus for the I semester. The members deliberated in detail about the modification required. After discussion it is unanimously decided to adopt the following changes.

Changes Made:

Course Code	Course	Reason
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New Courses Introduced:

Course Code	Course	Reason
-	-	-

Courses Removed

Course Code	Course	Reason
-	-	-

After discussion the following resolution was passed.

Resolution:

Resolved to retain the existing syllabus of 2022-23 batch without any modification for the students admitted for the academic year 2023-24.

Item 17.4: *To consider and approve the changes in the syllabi for V semester for the students admitted during the academic year 2022-23.*

The Chairman presented the detailed syllabus for the IV semester for the students admitted for the academic year 2022-23. The details of changes made also presented as follows:

Changes Made:

B.Sc. Biochemistry		
Course	Code	Reason
223BC1A5CA	Genetics and Molecular Biology	Advanced topics viz., Genes and Pedigrees in a Population. Genetic Testing (Prenatal & Postnatal),

		Transposons and Genetic disorders were introduced by Dr. Santhini
223BC1A5CB	Plant Biochemistry	The topics focusing on converting knowledge into research and entrepreneurial skill sets, Structure, function and mechanisms of action of phytochromes, cryptochromes and Phototropins, Biotic and Abiotic stress in Unit I, Role of Photosynthetic pigments Inhibitors of Photosystems in Unit II, Gene manipulation of nitrogen fixation genes, Soil less Culture: Hydroponics, Aeroponics and Aquaponics in Unit III, Floral Development in Unit IV, Lignin, Applications of secondary metabolites - Drug development, Biopesticides and Biofertilizers were suggested by Dr. Amirtham
223BC1A5CC	Immunology	Structure of antibodies, Monoclonal and Polyclonal Antibodies in Unit I, Electro chemiluminescence, CMIA (Chemilumiscence Microparticle Immuno Assay), Immuno turbidometry. MMF (Microphenolic acid assay), Coomb's test in Unit II, Infectious diseases and Vaccines Pandemic disease - Influenza and COVID 19, endemic disease - Malaria epidemic disease – AIDS and immune responses for the diseases – case studies HERD immunity in Unit IV were included as per the suggestions received from Dr. Kalaiselvi Senthil to enhance the practical knowledge and to adopt the students to global challenges.
223BC1A5DB	Environmental Biochemistry	Hydrological cycle and Global Water Balance in Unit I was introduced by Dr. Amirtham as per the current trends.
223BC1A5GA	Generic Elective: Organic Farming: Principles and Practices	Dr. Amirtham and Dr. Kalaiselvi insisted to remove the content of Unit II (Land and Water Management) and application-oriented topics viz Organic farm and nutrient management, Land preparation - Tools and Technique, Preparation of seed bed, manuring, sowing, watering and raising of seedling were included in .

New Courses Introduced:

Course code	Course	Reason
223BC1A5DC	Dairy Biochemistry	Elective Skill and Job oriented course to expose the students to Dairy Industry
223BC1A5DA	Blood Biochemistry and Hematology	Elective Skill and Job oriented course to expose the students to blood banking practices
223BC1A5SA	Recombinant DNA Technology	Skill Enhancement course on recombinant DNA technology focuses on enables the production of genetically modified organisms, gene therapy, creation of genetically modified animals, and the production of enzymes, hormones, and vaccines in place of Genetic Engineering which is a broader term used to describe all the techniques that can be used for the alteration and

		modification of DNA
223BC1A5CP	Plant Biochemistry	To upgrade the skills of the students in the field of Plant Biochemistry techniques and DBT star Status recommended practical were introduced
223BC1A5CQ	Immunology and Molecular Biology	To upgrade the skills of the students in the field of Immuno and molecular Techniques and DBT star Status recommended practical were introduced

Courses Removed: NIL

Course code	Course	Reason
193BC1A5DB	Principles of Biotechnology	The course moved to 6th semester
193BC1A5DA	Developmental Biology	The course moved to 3 rd Semester
193BC1A5CP	Genetics and Molecular Biology, Microbiology, Plant and clinical Biochemistry	The course contents are moved to the respective semesters

After discussion the following resolution was passed with the above changes and modifications.

Resolution:

Resolved to approve the syllabus for the V semester for the students admitted for the academic year 2022-23.

Item 17.5: *To consider and approve value added courses brought forward by the Chairman and the members of the board.*

The following Value-Added Certificate Course are to be offered in the semester

1. Spirulina Production and E commerce
2. Pharmacovigilance
3. Computer Aided Drug Designing
4. Medical Terminologies

Resolution:

Resolved to approve the Value-Added Certificate Course for the academic year 2024-2025.

Item 17.6: *To approve the panel of examiners for question paper setting and evaluation of answer scripts for the even semester of the academic year 2024-2025.*

The Chairman presented the panel of examiners for QP setting, QP Scrutiny and conduct of practical and theory examinations for the academic year 2024-2025.

Resolution:

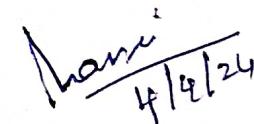
Resolved to approve the panel of examinations for QP setting, QP Scrutiny and conduct of practical and theory examinations are submitted to CoE for exam related work.

Item 17.7: To consider and approve any other item brought forward by the Chairman and the members of the board.

No other item was brought forward.

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.

04.04.2024


(Dr. S. Gowri)

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

**Syllabus revision
B.Sc. Biochemistry**

Faculty: Biosciences

Semester: I

Course Code/ Name: 24BCU1CA - Biomolecules

Board: Biochemistry

Unit	Existing	Changes
I	Carbohydrates Introduction to biological macromolecules. Carbohydrate - Definition, classification. Structure, properties & chemical reactions of monosaccharide. Structure and Properties of disaccharides – Maltose, Lactose and Sucrose. Polysaccharides – structure & biological functions of Homo & Hetero polysaccharides. Occurrence, importance and the structure of sugar derivatives - amino sugars, bacterial cell wall polysaccharides - peptidoglycan.	Homopolysaccharides (Starch, glycogen and Cellulose) & Heteropolysaccharides (Hyaluronic acid, Chondroitin sulphate and Heparin).
II	Lipids Definition, classification and physico-chemical properties of lipids. Storage lipids: Fatty acids - types, nomenclature & properties. Structural lipids - phospholipids, glycolipids & sphingolipids. Structure and functions of steroids - cholesterol. Eicosanoids - an overview.	Simple and mixed triglycerides Characterization of fats – iodine value, saponification value, acid number, acetyl number, polensky number, Reichert-Meissie number.
III	Amino acids and Proteins Classification and general properties of amino acids. Chemical reactions of amino acids due to carboxyl groups and amino groups. Peptide bond - structure and properties. Structure and biological importance of glutathione, synthetic peptides – polyglutamic acid. Protein - classification and Physico-chemical properties. Organization of protein Structure – Primary (Insulin), Secondary (Keratin, Collagen), Tertiary (Myoglobin) & Quaternary structure (Hemoglobin). Denaturation of proteins.	renaturation of proteins.
IV	Nucleic acids Structures of Purines, Pyrimidines, Nucleosides and Nucleotides. Properties of nucleic acids. DNA double helical structure, A, B & Z forms. Denaturation & renaturation of DNA. Structure and functions of mRNA, tRNA, rRNA, snRNA, snoRNA, miRNA, siRNA. Chemical reactions of RNA and DNA with acid and alkali, color reactions of DNA and RNA.	Properties of DNA – Hypochromic effect, melting temperature, viscosity.
V	Minerals, Vitamins, Water, pH & Buffers Micro and Macro Minerals - Clinical Significance. Vitamins – Definition, classification. Fat soluble (Vitamin A, D, E, K) and Water-soluble vitamins (Vitamin B Complex & Vitamin C) - sources, functions and deficiencies, hypervitaminosis. Water: Structure, Physical properties of water, weak interaction in aqueous solutions. pH – Introduction, buffers, Henderson-Hasselbalch equation, biological buffer system.	

PERCENTAGE OF SYLLABUS REVISED: 7.45 %

COURSE FOCUS ON:

<input checked="" type="checkbox"/>	Skill Development	Entrepreneurial Development
<input checked="" type="checkbox"/>	Employability	Innovations
<input checked="" type="checkbox"/>	Intellectual Property Rights	Gender Sensitization
<input checked="" type="checkbox"/>	Social Awareness/ Environment	Constitutional Rights/ Human Values/ Ethics

**Syllabus Revision
B.Sc. Biochemistry**

Faculty: Bioscience
Semester: I
Course Code/ Name: 24BCU1CB / Cell Biology

Board: Biochemistry

Unit	Existing	Changes
I	Introduction to cell Biology An overview of cells: origin and evolution of cells and cell theory. Classification of cells: prokaryotic (Archaea and Eubacteria) and eukaryotic cells (animal and plant cells). Comparison of cells: microbial, plant, and animal cells. Cells as experimental models: prokaryotic and eukaryotic cells. Exceptions to cell theory: Mycoplasma, Viruses, Virioids, prions.	-----
II	Structure and functions of different cell organelles Endoplasmic Reticulum: RER-Brief Overview of translational and Posttranslational transport of proteins, SER-Lipid Synthesis, Brief overview of Export of proteins from ER. Structure and functions: Golgi apparatus, Ribosomes, Nucleus, Nuclear envelope, Nuclear-pore complex, RER, SER, Lysosomes, Lysosomal storage disease, Glyoxysomes, Mitochondria, Chloroplast and Peroxisomes.	Chromosomes- Structure, Types and functions, Special types of chromosomes – lamp brush chromosomes, polytene chromosomes. Organization of chromatin – histones, nucleosome concept, formation of chromatin structure.
III	Cytoskeleton proteins: Structure and organization: Actin filaments. Microfilament polymerization: tread milling and role of ATP. Non-muscle myosin. Intermediate filament proteins: assembly and intracellular organization. Assembly, organization and movement: cilia and flagella	
IV	Cell wall, extracellular matrix, cell membrane and transport Cell wall and cell matrix proteins: prokaryotic and eukaryotic cells. Structure and function: capsule. Interactions: Cell-matrix and cell-cell. Junctions: adherence, tight and gap, desmosomes, hemi-desmosomes, focal adhesions and plasmodesmata. Cell signaling and receptors (overview). Cell membrane: fluid mosaic model. Transport across membrane: Osmosis, diffusion, active and passive transport, and ion channels	uniport, symport and antiport
V	Cell division, cycle and death Structure and function: Nucleus and chromosomes Cell division: Mitosis and Meiosis (prokaryotes and eukaryotes). Cell cycle: phases of cell cycle (eukaryotic cell cycle, restriction point and checkpoints- overview). Cell death: apoptosis and necrosis (overview). Transformed cells: salient features. Stem cells and maintenance of adult Tissues, Embryonic Stem cells and Therapeutic cloning.	Moved to Unit II

PERCENTAGE OF SYLLABUS REVISED: 15 %

COURSE FOCUS ON:

<input checked="" type="checkbox"/>	Skill Development	Entrepreneurial Development
<input checked="" type="checkbox"/>	Employability	Innovations
	Intellectual Property Rights	Gender Sensitization
	Social Awareness/ Environment	Constitutional Rights/ Human Values/ Ethics

**Syllabus revision
M.Sc. Biochemistry**

Faculty: Biosciences

Semester: I

Course Code/ Name: 24BCP1CB / Biochemical techniques and Instrumentation

Board: Biochemistry

Unit	Existing	Changes
I	Spectroscopic techniques Principle, instrumentation, and applications of Colorimetry, UV-Visible, FTIR, IR, Fluorescence spectrophotometry, Turbidimetry, Luminometry and Flame emission spectrometry, Electron Spin Resonance, Nuclear Magnetic Resonance, Mass and Raman Spectroscopy.	
II	Centrifugation techniques and Microscopy Principle, technique and applications of preparative ultracentrifugation, differential centrifugation, density gradient centrifugation (caesium chloride and sucrose density gradients) and analytical ultracentrifugation. Basic principles, instrumentation, and applications of Microscopes: Light and Compound, Fluorescence, Phase contrast, Scanning electron microscopy (SEM), Transmission electron microscopy (TEM) and Confocal	Tissue homogenization. Disruption of tissues and cells. Centrifuges – Principle, applications, and types. Differential centrifugation, density gradient centrifugation of tissues and cells, Preparative and analytical ultracentrifugation
III	Chromatographic techniques Principle, technique and applications of paper, TLC, HPTLC, column, affinity, ion exchange, gel filtration, hydrophobic interaction, and adsorption chromatography. Principle, components, limitations and applications of GC, GC-MS, HPLC, RPHPLC, LCMS.	
IV	Electrophoresis and Blotting techniques Principle, technique and applications of paper, Gels Electrophoresis: Agarose, Native and SDS - PAGE, Isoelectric focusing, 2D PAGE, Denaturing gels, 3D Electrophoresis and applications. Electrophoresis in DNA sequencing, Peptide mapping, N-terminal sequencing of proteins, Next generation sequencing. Principle, technique, and applications of western, southern, and northern blotting. Chemiluminescence and Phosphorimaging	
V	Biophysical and Radio-isotopic methods Principles and applications of X-ray diffraction, ORD and circular dichroism, Types of radiation, half-life and units of radioactivity, Applications of radioisotopes in disease diagnosis. Detection and measurement of radioactivity – Principle, instrumentation and applications of Liquid scintillation counter and Geiger-Muller counter. Autoradiography and its applications.	

PERCENTAGE OF SYLLABUS REVISED: 11.4 %

COURSE FOCUS ON:

<input checked="" type="checkbox"/>	Skill Development	<input checked="" type="checkbox"/>	Entrepreneurial Development
<input checked="" type="checkbox"/>	Employability	<input checked="" type="checkbox"/>	Innovations
<input checked="" type="checkbox"/>	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

**Syllabus Revision
M.Sc. Biochemistry**

Faculty: Bioscience

Semester: I

Course Code/ Name: 24BCP1CC / Enzymes and Enzyme Technology

Board: Biochemistry

Unit	Existing	Changes
I	<p>Classification, Purification and Active Site Classification of enzymes, isolation and purification of enzymes, criteria of purity, specific activity, molecular weight determination. Active site: structure, determination of active site amino acids, Investigation of 3D Structure of Active site. Models of enzyme substrate binding: Lock and key model and Induced Fit model. Coenzymes and cofactors in enzyme catalysed reaction. Multi-enzyme complex- Pyruvate dehydrogenase, fatty acid synthase. Measurement of enzyme activity: two-point assay, kinetic assay, using radio-labelled substrates</p>	-----
II	<p>Enzyme Kinetics and Inhibition Kinetics of single substrate enzyme catalysed reactions: Michaelis-Menten equation, importance of V_{max}, K_m, K_{cat} and specificity constant (K_{cat}/K_m), turnover number, Lineweaver-Burk plot, Eadie- Hofstee plot, Hanes-Woolf plot and Eisenthal and Cornish-Bowden plot. Kinetics of Allosteric enzymes: MWC and KNF models, Hill' equation coefficient. Sequential and non-sequential bisubstrate and multi-substrate reactions. Enzyme inhibition- types and kinetics. Simple problems related to enzyme kinetics.</p>	Derivation and Significance of MM Equation
III	<p>Mechanism of Enzyme Action and Regulation Enzyme specificity, Significance and Evaluation of activation energy. Mechanism of enzyme action: general acid-base catalysis, covalent catalysis, proximity and orientation effects, Strain and Distortion theory, mechanism of serine proteases - chymotrypsin, lysozyme, and ribonuclease. Metal activated enzymes and metalloenzymes. Role of metal ions in carbonic anhydrase, superoxide dismutase, carboxy peptidase. Regulation of enzyme activity-covalently modified regulated enzymes, allosteric enzymes, isozymes.</p>	-----
IV	<p>Industrial and Clinical uses of Enzymes Enzyme applications in food and allied industries: sources of industrial enzymes, thermophilic enzymes, amylases, glucose isomerases, cellulose degrading enzymes, lipases, proteolytic enzymes in meat and leather industry, detergents and cheese production. Clinical enzymology: Enzymes as thrombolytic agents, anti-inflammatory agents, and digestive aids. Therapeutic use of asparaginase, streptokinase. Enzymes and isoenzymes in diagnosis: LDH, CK, transaminases, phosphatases, amylase and cholinesterase.</p>	Applications of Enzymes in Industry and Clinical Diagnosis Enzymes and Isoenzymes in Diagnosis: Lactate Dehydrogenase, CK and Choline esterase.
V	<p>Immobilized Enzymes and Biosensors Immobilized enzymes: various methods of immobilization, kinetics and applications of immobilized enzyme. Biosensors: Principle, technique and mechanism of Biosensors - Calorimetric biosensors, potentiometric biosensors, Amperometric biosensors, optic biosensors, and immune-sensors. Enzyme engineering: Artificial enzymes. Abzymes and synzymes, Antioxidant enzymes.</p>	Strategies and Challenges for the Development of Engineered Enzymes in the Food Industry.

PERCENTAGE OF SYLLABUS REVISED: 15 %

COURSE FOCUS ON:

<input checked="" type="checkbox"/>	Skill Development	<input checked="" type="checkbox"/>	Entrepreneurial Development
<input checked="" type="checkbox"/>	Employability	<input checked="" type="checkbox"/>	Innovations
<input checked="" type="checkbox"/>	Intellectual Property Rights		Gender Sensitization
<input checked="" type="checkbox"/>	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

**Syllabus Revision
M.Sc. Biochemistry**

Faculty: Bioscience

Semester: I

Course Code/ Name: 24BCPCD / Cellular Biochemistry

Board: Biochemistry

Unit	Existing	Changes
I	Membrane Biology Biomembrane structure - fluid mosaic model. Membrane lipids - fluidity, Asymmetry phase transition, Liposomes, Scott Syndrome. Membrane proteins-Types, Orientation, Mobility-Experiments, flippases, proteins in RBC membrane, Bacteriorhodopsin, Porins-aquaporin. RBC ghosts, solubilization of proteins, lipid anchored proteins. Carbohydrates- cell surface carbohydrates-Lectins	-----
II	Membrane Transport Membrane transport - Overview, Passive diffusion, Facilitated diffusion in erythrocytes. Carriers and Ion-Channels. Ion cone, Gradients, Uniporter Catalyzed transport. Active transport systems-Transport process driven by ATP-Ion Pumps: Calcium ATPase, Na ⁺ K ⁺ ATPase, Gastric H ⁺ K ⁺ ATPase, ATPases that transport peptides and drugs, ABC superfamily- Bacterial PM permeases, Mammalian MDR proteins: Transport process driven by light and ion gradients. Co-transport by Symporters and antiporters. Group translocation, Osmosis and Receptor mediated endocytosis.	
III	Energy metabolism and Cytoskeleton Mitochondria- Reduction potentials, electron transport chain Overview, Complexes, Q-cycle, Cyt-C oxidase complex, Translocation of Protons and the establishment of a proton motive force, Machinery for ATP formation. Chemiosmotic mechanism, APT Synthase Experiments, Inhibitions of Oxidative phosphorylation, Uncouplers. Microtubules - Organization and dynamics, Kinesin and dynein. Microfilaments- Actin- Structures, Assembly, Myosin. Cilia and Flagella- Structure and functions, Intermediate filaments. Striated muscle- structure, excitation- contraction.	-----
IV	Cell-Cell and Cell-matrix adhesion: An overview. Cell-Cell, interaction: ECM; Collagen, hyaluronan & proteoglycans, laminin, integrins and fibronectins. Cell-Cell adhesion- CAMs Specialized junctions- Desmosomes, Gap junctions, Adhesion molecules- Cadherins, Connexins. Cell-Cell signaling- Signaling molecules and their receptors: functions of cell surface receptors, pathways of intracellular signal transduction, second messengers. (G-protein coupled receptors, receptor tyrosine kinases. Ras. MAP kinases.	Growth factors, Matrix Metalloproteinases Occluding junctions, Anchoring junctions, Communicating junctions. Raf pathway
V	Protein targeting, degradation and cell cycle Post-translational modifications in prokaryotes and eukaryotes, role of signal peptide, role of endoplasmic reticulum and Golgi apparatus. Protein Targeting- signal sequence hypothesis, Targeting of proteins to different compartments Mitochondria, ER, plasma membrane, lysosomes, peroxisomes and chloroplast. translocation, heat shock proteins, molecular chaperons, glycosylation, SNPs and SNAREs, bacterial signal sequences, mitochondrial, chloroplast and nuclear protein transport, endocytosis-viral entry, ubiquitin tagged protein destruction, Sumoylation. Cell Cycle: Overview and its phases. Regulation of cell cycle and regulatory proteins (Cyclins and CDKCs). Studies of frog oocyte maturation and the discovery of Cyclins. Cell cycle control and check points in yeast and mammalian cells.	

PERCENTAGE OF SYLLABUS REVISED: 8 %

COURSE FOCUS ON:

<input checked="" type="checkbox"/>	Skill Development	<input checked="" type="checkbox"/>	Entrepreneurial Development
<input checked="" type="checkbox"/>	Employability	<input checked="" type="checkbox"/>	Innovations
<input checked="" type="checkbox"/>	Intellectual Property Rights		Gender Sensitization
<input checked="" type="checkbox"/>	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

**Syllabus Revision
M.Sc. Biochemistry**

Faculty: Biosciences

Semester: I

Course Code/ Name: 24BCP1DA / CANCER BIOLOGY, DIAGNOSIS AND THERAPY

Unit	Existing	Changes
I	Introduction Introduction: Cancer cell-morphology and growth characteristics. Metastasis and cytoskeleton. Types of growth- hyperplasia, dysplasia, anaplasia and neoplasia. Types and prevalence of cancer. Nomenclature of neoplasms, classification based on origin/organ. Differences between benign and malignant tumors.	Apoptosis
II	Carcinogenesis Cancer epidemiology and endocrinology. Cancer causing agents-radiation, viruses, chemicals. Multistep carcinogenesis: Initiation, Promotion, Progression. Para-neoplastic syndromes. Mutation-definition, significance, rates and frequency. Mutagenic agents. Molecular basis of mutagenesis: induced and spontaneous mutations, crossing over and segregation. Mutation Types-addition, deletion, inversion, reciprocal, translocation, insertional translocation and frame shift mutations. Chemical carcinogenesis- genetic and epigenetic carcinogens, pro- carcinogens and co-carcinogens, promoters and initiators, testing for carcinogenicity, Ames test. Aberrant metabolism during cancer development.	Cancer genetics
III	Tumor Markers and Signal Transduction Oncogenes - RNA and DNA tumor viruses, retroviruses and viral oncogenes and abrupt activation. Src and Ras gene, mechanism and characteristic of cell transformation. Molecular mechanism of oncogenesis- protooncogenesis, oncoproteins, tumor suppressor genes involved in cancer. Radiation- effect of ionizing radiations on DNA, chromosomal aberrations. Cancer Markers: Genetic basis of cancer, use of tumor markers in detection and monitoring of cancer. Signal transduction in cancer: cell-cell interactions, cell adhesion, invasion and metastasis, VEGF signaling and angiogenesis; role of transcription factors. Growth factors-EGF, TNF- α and TGF- β and growth factor receptors. Free radicals and antioxidants in cancer. Diet and cancer.	
IV	Cell Cycle and Cancer Cell Cycle Regulation cancer: control of the cell cycle - cyclins and CDKs, and tumor suppressor genes p53, p21Rb, BRAC1 and BRAC2. Telomeres, and Immortality; Epigenetics- role of DNA methylation in gene silencing- epigenetic silencing of tumor - suppressor genes. Death signaling pathways-mitochondrial and death receptor pathways, (Intrinsic extrinsic pathways). Mechanism and Impact of apoptosis.	
V	Cancer Diagnosis and Cancer Therapy, Stem Cells and Cancer Bioremediation: Principles and methods of cancer diagnosis - biochemical, genetic, cytotoxic, cell growth and viability tests. Diagnosis of cancer by histopathology, MRI scans, PET scan, cytogenetics test, karyotype, FISH. Strategies of anticancer drug therapy- chemotherapy, gene therapy, immuno therapy, radiotherapy and surgical therapy. Principles of cancer biomarkers and their applications.	

PERCENTAGE OF SYLLABUS REVISED: 8%

Course focuses on :

<input checked="" type="checkbox"/>	Skill Development	Entrepreneurial Development
<input checked="" type="checkbox"/>	Employability	Innovations
	Intellectual Property Rights	Gender Sensitization
	Social Awareness/ Environment	Constitutional Rights/ Human Values/ Ethics

**Syllabus revision
B.Sc Biochemistry**

Faculty : Biosciences

Semester: V

Board: Biochemistry

Course Code/ Name: 223BC1A5CA / Genetics and Molecular Biology

Units	Existing	Changes
I	<p>Genetics Mendelian inheritance experiments and laws -mono-, di- and tri-hybrid crosses. Concept of gene - Allele, multiple alleles, pseudo allele, polymorphism, and lethal alleles. Extensions of Mendelian principles - Codominance, Incomplete dominance, Gene interactions, Pleiotropy, genetic versus environmental effects, Linkage and crossing over. Sex linked inheritance.</p>	
II	<p>Population Genetics and Genetic Disorders Gene pool, Gene frequency and factors influencing allele frequency. Maternal inheritance. Chromosomal aberrations, karyotyping. Genes and Pedigrees in a Population. Genetic Testing (Prenatal & Postnatal) Genetic Disorders- Sickle cell anaemia, Down Syndrome, Thalassemia.</p>	Genes and Pedigrees in a Population. Genetic Testing (Prenatal & Postnatal) Genetic Disorders- Sickle cell anaemia, Down Syndrome, Thalassemia.
III	<p>Replication and Transcription DNA Sequences - Highly repetitive, moderately repetitive, and unique DNA sequences, Cot value. DNA as genetic material - experimental evidences. Semi conservative mechanism - Meselson and Stahl experiment. Mechanism and enzymology of replication in prokaryotes. Inhibitors of replication. Prokaryotic transcription - Role of RNA polymerases and sigma factor, initiation, elongation and termination (Rho - dependent and independent). Inhibitors of transcription, post transcriptional modifications in prokaryotes and eukaryotes. RNA as genetic material - Retroviruses, reverse transcription.</p>	
IV	<p>Genetic Code and Translation Genetic Code - definition, deciphering and salient features of genetic code. Wobble hypothesis. Prokaryotic protein biosynthesis - Translational activation of Amino acids, initiation, elongation and termination of protein synthesis. Inhibitors of protein biosynthesis. Comparison of protein biosynthesis in prokaryotes with eukaryotes. Post-translational modification of proteins. Role of signal peptide. Basic concept of one gene - one enzyme hypothesis. Transposons- Types, Characteristics and Functions.</p>	Transposons- Types, Characteristics and Functions.
V	<p>Mutation, DNA Repair and Regulation of Gene expression Concept of mutation and mutagens – Physical, chemical and biological mutagens. Concept of missense, nonsense, point mutation, transition, transversion, and frameshift mutation. DNA repair mechanism – Direct /UV, Excision, Mismatch repair and SOS response. Gene expression in prokaryotes - Concept of Lac operon and trp Operon</p>	

PERCENTAGE OF SYLLABUS REVISED: 15 %

COURSE FOCUS ON:

<input checked="" type="checkbox"/>	Skill Development		Entrepreneurial Development
<input checked="" type="checkbox"/>	Employability		Innovations
	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

Syllabus Revision
B.Sc. Biochemistry

Faculty: Bioscience

Semester: V

Course Code/ Name: 223BC1A5CB / Plant Biochemistry

Board: Biochemistry

Unit	Existing	Changes
I	<p>Unit I Plant Cell and Physiology of Plants Plant cell – Structure and functions of subcellular organelles. Diffusion and Osmosis in plants and their significance. Mechanism of water absorption, Ascent of sap. Transpiration - types, mechanism of transpiration and factors affecting transpiration. Stress response in plants.</p>	Structure, function and mechanisms of action of phytochromes, cryptochromes and phototropins Biotic and Abiotic stress
II	<p>Unit II Photosynthesis and photorespiration Photosynthetic apparatus, pigments – chlorophyll, carotenoids and phycobilin. Light reactions, two kinds of chemical system – photo system I and II, cyclic and non-cyclic phosphorylation. Evidences in support of light reaction – Hill's reaction, Arnon's work and Emerson effect. Calvin's cycle (C3 plants), Hatch – Slack cycle (C4 cycle) and CAM plants. Photorespiration.</p>	Role of Photosynthetic pigments Inhibitors of Photosystems
III	<p>Unit III Cycles of elements and Plant Nutrition Nitrogen cycle: Ammonification, nitrification, nitrate reduction and denitrification. Nitrogen fixation- symbiotic and non-symbiotic nitrogen fixation. Sulphur cycle and phosphorus cycle. Biological functions of essential elements and their deficiency symptoms in plants: Macronutrients - Carbon, Hydrogen, Oxygen, Nitrogen, Sulfur, Phosphorus, Calcium, potassium, Magnesium and Iron. Micronutrients - Manganese, Boron, Copper, Zinc, Molybdenum and Chlorine.</p>	Gene manipulation of nitrogen fixation genes Soil less Culture: Hydroponics, Aerophonics and Aquaponics
IV	<p>Unit IV Plant growth regulators and Biochemistry of Plant development Chemistry, biosynthesis, mode of action and physiological effects of auxins, gibberellins, cytokinins, abscisic acid and ethylene. Plant growth inhibitors and retardants. Biochemistry of seed dormancy, seed germination, fruit ripening and Senescence. Phytochrome, photoperiodism in flowering and vernalization.</p>	Floral Development
V	<p>Unit-V Secondary metabolites and defense mechanism Nature, distribution and biological functions of alkaloids, terpenes, flavonoids, poly phenols, tannins and plant steroids. Toxins of plant origin. Basic methods to identify the secondary metabolites. Secondary metabolites in defense mechanism - Polyamines, Brassinosteroids, Jasmonic acid and Salicylic acid – structural and functional characteristics.</p>	Lignin Applications of secondary metabolites - Drug development, Biopesticides and Biofertilizers.

PERCENTAGE OF SYLLABUS REVISED: 20.3%

COURSE FOCUS ON:

<input checked="" type="checkbox"/>	Skill Development	Entrepreneurial Development
<input checked="" type="checkbox"/>	Employability	Innovations
	Intellectual Property Rights	Gender Sensitization
	Social Awareness/ Environment	Constitutional Rights/ Human Values/ Ethics

Syllabus Revision
B.Sc. Biochemistry

Faculty: Biosciences

Semester: V

Course Code/ Name: 223BC1A5CC / Immunology

Board: Biochemistry

Unit	Existing	Changes
I	Cells of the Immune system History of Immunology, Innate and Acquired immunity, antibody and cell mediated immune response, primary and secondary lymphoid organs, structure of T, B and NK cell, Receptors on the lymphocytes, structure and function of Neutrophils, Eosinophils and Basophils, Macrophages-Phagocytosis and inflammation.	
II	Antigen, Antibodies Complement and Cytokines Antigen-properties, specificity, cross reactivity, antigenicity, Immunogenicity, antigen determinants, Haptens, adjuvants, self-antigen [MHC]. Antibodies-properties, classes, sub classes, and functions of Immuno-globulins. Complement pathways, cytokines: IFN, TNF, CSF and its functions.	Structure of antibodies, Monoclonal and Polyclonal Antibodies
III	Assays based on Antigen and Antibodies interactions Antigen and antibody interaction- precipitation reaction-Precipitation in gel: Immune diffusion -Oudin, Oahley-Fulthope procedure, radial immune-diffusion and Ouchterlony procedure, Immuno-electrophoresis and Electro immune-diffusion; Agglutination: Hemagglutination, Agglutination inhibition, Widal test; Principle and application: RIA, ELISA, Fluorescent antibody technique, chemiluminescence.	Electro chemiluminescence, CMIA (Chemilumiscense Microparticle Immuno Assay), Immuno turbidometry. MMF (Microphenolic acid assay) Coomb's test
IV	Hypersensitivity, Autoimmune disease, Cancer immunology and Transplantation Immunology Allergy and Hypersensitivity – type – I, II, III and IV their clinical manifestation. Auto Immune diseases – Rheumatoid arthritis - Myasthenia gravis. Cancer immunology: Tumor: Lymphoid tumor, Resistant to tumors: NK Cells, Tumor immuno therapy. Transplantation- Allograft rejection, graft Vs Host reaction, Immuno-suppressors- mechanism of graft rejection. Immunity to bacteria & Virus	
V	AIDS, Influenza virus and Vaccines Immunity to bacteria & Virus, Influenza virus and disease, corona virus, immune response to influenza and coronavirus. AIDS; Structure, destruction of T cells, immunity to HIV virus, AIDS vaccine. Vaccination: Passive and active immunization, basic aspects of immune responses to vaccines, Recombinant vaccines, DNA vaccines, mRNA vaccine, Influenza vaccine and COVID 19 vaccine, Benefits and adverse effects of vaccination	Infectious diseases and Vaccines Pandemic disease - Influenza and COVID 19, endemic disease - Malaria epidemic disease – AIDS and immune responses for the diseases – case studies HERD immunity

PERCENTAGE OF SYLLABUS REVISED: 20 %

COURSE FOCUS ON:

<input checked="" type="checkbox"/>	Skill Development	Entrepreneurial Development
<input checked="" type="checkbox"/>	Employability	Innovations
	Intellectual Property Rights	Gender Sensitization
	Social Awareness/ Environment	Constitutional Rights/ Human Values/ Ethics

Syllabus Revision
B.Sc. Biochemistry

Faculty: Biosciences

Semester: V

Course Code/ Name: 223BC1A5DB / Environmental Biochemistry

Board: Biochemistry

Unit	Existing	Changes
I	Environmental features Environmental components: Atmosphere, structure and chemical composition of atmosphere, Internal structure of the Earth, rocks and their classification. Minerals and their classification. Classification of trace elements, mobility of trace elements, biogeochemical cycles and hydrological cycle. Global Water Balance. Soil formation, soil profile, soil classification, soils of India.	Hydrological cycle and Global Water Balance
II	Ecology Fundamentals of Ecology: Definition, subdivisions. Ecosystems: concept of ecosystems, aquatic ecosystem, terrestrial ecosystem, Energy flow in ecosystems, nutritional flux. Food chains, Food web, ecotone, edge effects, ecological habitat & niche, ecological pyramids and ecosystem stability. Hydrocarbons, substituted hydrocarbons, oil pollution surfactants. Environmental Policy.	Pollution Carbon foot Print- ecology & Conservation. Carbon Credits Environmental Sample Collection and Processing; Environmental pollution, Sampling of air, soil and water pollutants.
IV	Environmental laws & Pollution Global environmental issues and International laws: Global warming, Green house effect, ozone depletion, acid rains, hazardous waste, CITES etc. Important environmental treaties signed by India. Earth's carbon cycle, carbon sequestration, sustainable development. Water quality parameters- pH, Dissolved Oxygen (DO), Chemical Oxygen demand (COD); Biological Oxygen demand (BOD); Environmental Sample Collection and Processing; Environmental pollution, Sampling of air, soil and water pollutants. Carbon foot Print ecology & Conservation, Carbon Credits	International initiatives to control global warming. Environmental Policies in India
V	Bioremediation and Technology Bioremediation: Introduction and types of bioremediation, bioremediation of surface soil and sludge, bioremediation of subsurface material, Phytoremediation In situ and Ex-situ technologies, Phytoremediation. Chemical toxicology: Biochemical effects of heavy metals (Pb, As, Hg, Cd), pesticides, insecticides, herbicides, weedicides, larvicides, Biocontrol of plant pathogens; Integrated pest management-practical implementation, Role of biotechnology in management of resources; Uses of Technology; Microbes in Human Welfare	-----

PERCENTAGE OF SYLLABUS REVISED: 20 %

COURSE FOCUS ON:

<input checked="" type="checkbox"/>	Skill Development	Entrepreneurial Development
<input checked="" type="checkbox"/>	Employability	Innovations
	Intellectual Property Rights	Gender Sensitization
<input checked="" type="checkbox"/>	Social Awareness/ Environment	<input checked="" type="checkbox"/> Constitutional Rights/ Human Values/ Ethics

**Syllabus revision
B.Sc. Biochemistry**

Faculty: Biosciences

Semester: V

Course Code/ Name: 223BC1A5GA - Generic Elective: Organic

Farming: Principles and Practices

Board: Biochemistry

Unit	Existing	Changes
I	Introduction to Organic Farming Organic farming: definition, concept, principles. Difference between conventional and organic farming. Relevance of organic farming in global and Indian scenario, future prospects. SWOT analysis of Indian organic farming.	
II	Land and Water management Land use patterns, minimum tillage, shelter zones, pasture management, various agro-forestry systems, different cropping systems, crop rotation, organic livestock production.	Organic Farm and Nutrient Management Organic Farm Management - Land preparation - Tools and Technique, Preparation of seed bed, manuring, sowing, watering and raising of seedling
III	Nutrient Management Organic residues, organic manures, composting, vermicomposting, green manures and biofertilizers, Indigenous liquid organic manures.	
IV	Plant Protection and Production Indigenous liquid formulations for crop production and plant protection. Weed management, disease prevention and management, insect pest management practices. Urban farming systems: concept and use of vertical farming, roof-top farming.	
V	Marketing and economy of organic farming Block chain technology. Marketing and export potential, inspection, certification, labeling and accreditation procedures for organic farming and organic produce. Socio-economic impact of organic farming. Field visit.	

PERCENTAGE OF SYLLABUS REVISED: 30 %

COURSE FOCUS ON:

<input checked="" type="checkbox"/>	Skill Development	Entrepreneurial Development
<input checked="" type="checkbox"/>	Employability	Innovations
	Intellectual Property Rights	Gender Sensitization
	Social Awareness/ Environment	Constitutional Rights/ Human Values/ Ethics

Syllabus Revision (New Course)
B.Sc. Biochemistry

Faculty: Biosciences

Board: Biochemistry

Semester: V

Course Code/ Name: 233BC1A5CQ / Immunology and Molecular Biology Practical

S.No	Particulars
1.	Single radial immunodiffusion
2.	Double radial immunodiffusion
3.	Immuno electrophoresis
4.	Lymphocyte separation
5.	Rheumatoid Arthritis test
6.	Isolation of chromosomal DNA from E. coli cells and its Quantification. (DBT Practical)
7.	Isolation of total RNA from Yeast cells and its Estimation .(DBT Practical)
8.	Separation of DNA by agarose gel electrophoresis. (DBT Practical)
9.	Amplification of a DNA fragment by PCR. (DBT Practical)
10.	Transformation of E. coli cells with plasmid DNA.(DBT Practical)
11.	Demonstration of Western Blotting and Northern Blotting. (DBT Practical)
12.	Restriction digestion (RFLP).(DBT Practical)

COURSE FOCUS ON:

<input checked="" type="checkbox"/>	Skill Development	<input checked="" type="checkbox"/>	Entrepreneurial Development
<input checked="" type="checkbox"/>	Employability	<input checked="" type="checkbox"/>	Innovations
<input checked="" type="checkbox"/>	Intellectual Property Rights		Gender Sensitization
	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

Syllabus Revision (New Course)
B.Sc. Biochemistry

Faculty: Biosciences

Board: Biochemistry

Semester: V

Course Code/ Name: 223BC1A5CP/ Core Practical V: Plant Biochemistry

S.No	Particulars
13.	Qualitative Analysis of phytoconstituents from medicinal plants
14.	Estimation of reducing sugars (fructose) by Nelson-Somogyi method from fruits
15.	Determination of protein by Lowry's method
16.	Isolation, Estimation of Chlorophyll, and separation by TLC
17.	Estimation of starch from potato by Anthrone method
18.	Estimation of free amino acids by Ninhydrin method
19.	Determination of total crude fat/oil by Soxhlet method
20.	Estimation of Total Phenols by Folin Ciocalteau Reagent
21.	Qualitative tests for oil
22.	Determination of alpha amylase activity/proteinases/lipases from germinating seed
23.	Determination of in vivo nitrate reductase activity from leaf tissue
24.	Isolation of genomic DNA from plant tissue (DBT Star)
25.	Preparation of plant tissue culture Media, Sterilization and Initiation of Callus culture.
26.	Demonstration of Micropropagation and Regeneration
27.	Hydroponics

COURSE FOCUS ON:

<input checked="" type="checkbox"/>	Skill Development	<input checked="" type="checkbox"/>	Entrepreneurial Development
<input checked="" type="checkbox"/>	Employability	<input checked="" type="checkbox"/>	Innovations
<input checked="" type="checkbox"/>	Intellectual Property Rights		Gender Sensitization
<input checked="" type="checkbox"/>	Social Awareness/ Environment		Constitutional Rights/ Human Values/ Ethics

Syllabus Revision (New Course)
B.Sc. Biochemistry

Faculty: Biosciences

Board: Biochemistry

Semester: V

Course Code/ Name: 223BC1A5SA / Recombinant DNA Technology

Unit	Syllabus
I	INTRODUCTION AND TOOLS OF RECOMBINANT DNA (rDNA) TECHNOLOGY Aim and scope of rDNA technology. Isolation of Nucleic acids. Tools of rDNA technology – Restriction endonucleases – types and features. DNA Polymerases, Klenow DNA Polymerase I, Transferases, Polynucleotide kinases, Alkaline phosphatases and Ligases. Linkers and Adaptors. Safety guidelines of recombinant DNA research.
II	VECTORS AND GENE CLONING Vectors - Basic feature, Plasmids, Bacteriophages, Cosmids, Artificial chromosomes, Shuttle vectors, Expression vectors - one example for each vector type. Cloning hosts for each vector. Introduction of cloned genes into cell – transformation, particle bombardment, liposome mediation, microinjection, ultrasonication and electroporation.
III	CONSTRUCTION OF LIBRARIES AND SCREENING OF rDNA PRODUCTS Construction of Genomic and cDNA library. Screening and selection of recombinant clones: Colony hybridization, Marker genes, reporter genes, Insertional inactivation – Blue-white screening.
IV	TECHNIQUES IN rDNA TECHNOLOGY Probes - probe construction and labeling. Principle of polymerase chain reaction (PCR) and applications, RT PCR - principle, technique and application. Genetic Finger Printing – RFLP, RAPD, site directed mutagenesis. Principle and procedure of Southern, Northern and Western blotting. DNA sequencing: Outline of Sanger's method – applications, Next Generation Sequencing (NGS), Gene mapping - Chromosome walking.
V	APPLICATIONS OF rDNA TECHNOLOGY Applications of rDNA technology in animals: Production and applications of transgenic mice, role of ES cells in gene targeting in mice. Production of insulin, human growth factor, gene therapy, human genome project and its application, DNA microarray, Protein engineering. Ethical issues in GM products.

PERCENTAGE OF SYLLABUS REVISED: 100%

COURSE FOCUS ON:

<input checked="" type="checkbox"/>	Skill Development	<input checked="" type="checkbox"/>	Entrepreneurial Development
<input checked="" type="checkbox"/>	Employability	<input checked="" type="checkbox"/>	Innovations
	Intellectual Property Rights		Gender Sensitization
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Syllabus Revision (New Course)
B.Sc. Biochemistry

Faculty: Biosciences

Semester: V

Course Code/ Name: 223BC1A5DA - Blood Biochemistry and Hematology

Board: Biochemistry

Unit	Syllabus
I	<p>Introduction to Blood Composition and Function</p> <p>Overview of blood -Definition, classification, basic functions, composition of blood -</p> <p>Plasma: Components and functions, Formed elements: Red blood cells, white blood cells, platelets.</p> <p>Blood Cell Morphology: Morphological characteristics of different blood cells, Interpretation of blood smears. Hematopoiesis: Organs and process involved in hematopoiesis. Blood Groups - ABO blood group system, Rh factor and its significance.</p>
II	<p>Introduction to Hematological parameters</p> <p>Haemoglobin: Structure and functions. Haemoglobin estimation-Spectrophotometric and gasometric method.</p> <p>RBC Count and WBC Count by Bulk and micropipette method, Erythrocyte Sedimentation Rate, Complete blood count (CBC), Red blood cell indices and their clinical significance.</p> <p>Comprehensive Metabolic Panel (CMP). Acid base balance - Normal range, disturbances in acid base balance - acidosis, alkalosis and its analysis by blood gas test.</p>
III	<p>Hematological Disorders</p> <p>Classification, causes, pathophysiology, symptoms, diagnosis and treatment options of hematological disorders- Hemoglobinopathies: Thalassemia, Red cell G6PD deficiency; WBC: Leukocytosis, leukopenia, Neutropenia, leukaemia, Myelodysplastic syndrome; Platelets: Thrombocytosis and thrombocytopenia, Immune thrombocytopenic purpura (ITP), Thrombotic thrombocytopenic purpura (TTP)). Pancytopenia</p>
IV	<p>Hemostasis in blood Coagulation & Hematological Techniques</p> <p>Physiology of hemostasis: Coagulation - cascade, role of clotting factors and coagulation inhibitors. Fibrinolysis and Test for blood fibrinolytic activity. Coagulation Studies - Prothrombin time (PT), Clot Retraction test, activated partial thromboplastin time (aPTT), International normalized ratio (INR), D-dimer assay. Anticoagulant therapy - Heparin, warfarin, direct oral anticoagulants (DOACs).</p>
V	<p>Blood Transfusion and Immunohematology</p> <p>Blood transfusion - Procedure, types & complications. Blood donation and storage, Blood banks. Hematopoietic stem cell transplantation- High resolution HLA typing using next-generation sequencing. Immunohematology: Direct and indirect Coombs tests. Molecular methods in blood group genotyping - DNA Sequencing and Pirosequencing</p>

PERCENTAGE OF SYLLABUS REVISED: 100 %

COURSE FOCUS ON:

<input checked="" type="checkbox"/>	Skill Development	<input checked="" type="checkbox"/>	Entrepreneurial Development
<input checked="" type="checkbox"/>	Employability	<input checked="" type="checkbox"/>	Innovations
	Intellectual Property Rights	<input checked="" type="checkbox"/>	Gender Sensitization
<input checked="" type="checkbox"/>	Social Awareness/ Environment	<input checked="" type="checkbox"/>	Constitutional Rights/ Human Values/ Ethics

Syllabus Revision (New Course)
B.Sc. Biochemistry

Faculty: Biosciences

Semester: V

Course Code/ Name: 223BC1A5DC / DIARY BIOCHEMISTRY

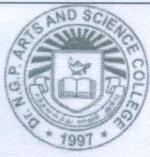
Board: Biochemistry

Unit	Syllabus
I	Standard composition of milk Receipt and filtration, separation of milk components, pasteurisation, homogenisation, deodorisation, product specific processing, packaging and storage. Value added products from milk: manufacturing methods and limitations.
II	Adulteration in dairy products Adulterants in milk: Definition, different types, health implications. Adulteration in milk products: Cheese-Cellulose powder, Butter - vegetable oils and maize dough, ice creams, infant milk powder, curd and other value added products.
III	Food Processing Receipt and filtration, separation of milk components, pasteurisation, homogenisation, deodorisation, product specific processing, packaging and storage. Value added products from milk: manufacturing methods and limitations.
IV	Instruments and techniques involved in dairy industries Quality check: Lactometer and butyrometer. Analytical techniques: GCMS, HPLC and LCMS in testing milk metabolites. Microbial analysis: methylene blue and phosphate test, standard plate count, total bacterial count and total coli form count. Instruments used in processing: homogeniser, pasteurizer, aging vats, aseptic, UHT & ESL filling & process machinery.
V	Dairy organizations Government concerns for dairy: Department of animal husbandry and dairy, Ministry for food processing India, FSSAI. Global agencies: International Dairy Federation, global dairy platform. Funding agencies for dairy products.

PERCENTAGE OF SYLLABUS REVISED: 100%

Course Focus on:

<input checked="" type="checkbox"/>	Skill Development	<input checked="" type="checkbox"/>	Entrepreneurial Development
<input checked="" type="checkbox"/>	Employability	<input checked="" type="checkbox"/>	Innovations
	Intellectual Property Rights		Gender Sensitization
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Dr. N.G.P. ARTS AND SCIENCE COLLEGE

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Approved by Government of Tamil Nadu & Accredited by NAAC with 'A++' Grade (3rd Cycle-3.64 CGPA)

Dr. N.G.P.-Kalappatti Road, Coimbatore-641 048, Tamil Nadu, India.

Website: www.drngpasc.ac.in | Email: info@drngpasc.ac.in | Phone: +91-422-2369100

BoS

17th

ATTENDANCE OF THE FIFTEENTH BOARD OF STUDIES MEETING

Faculty: Bioscience

Venue: IOT ROOM

Name of Board: Biochemistry

Date: 4/04/2024, Time: 09.30 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. ASC	Chairman	<i>harn 4/4/24</i>
2	Dr. A. Vijaya Anand Professor, Dept. of Human Genetics and Molecular Biology, Bharathiar University, Coimbatore- 641046	VC nominee	<i>ABSENT</i>
3	Dr. Kalaiselvi Senthil Associate Professor Department of Biochemistry, Biotechnology and Bioinformatics Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore -641043	Subject Expert	<i>[initials] 4/4/24.</i>
4	Dr. D. Amirtham Associate Professor, Centre for Plant Molecular Biology, Tamil Nadu Agricultural University, Lawley Road, Coimbatore, Tamil Nadu, - 641003.	Subject Expert	<i>[initials] 4/4/24</i>
5	Dr. M. G. Sridhar Professor and Head, Dept of Biochemistry and Vice Principal, KMCH Institute of Health Sciences and Research, Coimbatore-641014.	Subject Expert& Special Invitee	<i>ABSENT</i>
6	Dr. E. Santhini Senior Scientific Officer- B/ Technical Manager Centre of Excellence for Medical Textiles The South India Textile Research Association Coimbatore-641014	Industrial Expert	<i>E. Santhini 4/4/24</i>
7	Dr. S. Vadivel HOD of Clinical Biochemistry and Quality Control System K.G.Hospital ,Coimbatore- 641018	Alumni	<i>(initials)</i>
8	Dr. N. Kuppuchamy Department of Tamil, Dr. N.G.P. ASC	Co-opted Member	<i>Not in Co-opted</i>
9	Dr. A. Hazel Verbina Department of English, Dr. N.G.P. ASC	Co-opted Member	<i>Verbina</i>





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BoS

17th

10	Dr. M.Suganthi Department of Chemistry, Dr. N.G.P. ASC	Co-opted Member	<i>M.Suganthi</i>
11	Dr.R.Sowrirajan Department of Mathematics, Dr.N.G.P. ASC	Co-opted Member	<i>R.Sowrirajan</i>
12	Dr. N. Kannikaparameswari Department of Biochemistry, Dr. N.G.P. ASC	Member	<i>N.Kannikaparameswari</i>
13	Dr. T. Indhumathi Department of Biochemistry, Dr. N.G.P. ASC	Member	<i>T.Indhumathi</i>
14	Dr. K. Rajathi Department of Biochemistry, Dr. N.G.P. ASC	Member	<i>K.Rajathi</i>
15	Ms. Vidhya shree I M.Sc Biochemistry	Student Representative	<i>Vidhya</i>
16	Ms. Yashmitha.R II B.Sc Biochemistry	Student Representative	<i>Yashmitha</i>

Date: 04/04/2024



S.Gowri
(Dr.S.Gowri)
Chairman, BoS Biochemistry

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