



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

(An Autonomous Institution, Affiliated to Bharathiar University, Coimbatore)  
Approved by Government of Tamil Nadu & Accredited by NAAC with 'A++' Grade (3<sup>rd</sup> Cycle-3.64 CGPA)  
Dr. N.G.P.-Kalapatti Road, Coimbatore-641 048, Tamil Nadu, India.  
Website: www.drngpasc.ac.in | Email: info@drngpasc.ac.in. | Phone: +91-422-2369100

BoS

15<sup>th</sup>

## MINUTES OF THE FIFTEENTH BOARD OF STUDIES MEETING

Faculty: Biosciences

Board: Biochemistry


The Meeting of Board of Studies (BoS) was held as given below:

Name of the Body	Board of Studies
Department	Biochemistry
Meeting No.	15
Date and Time	14.06.2023 @ 9.30 a.m.
Venue	IQAC Board Room
Members Attended	The details are given in the ANNEXURE -I

### AGENDA

1.	Discussion on UG syllabi for Part III - Core Courses for third semester 2022-23 Batch and onwards
2.	Discussion on syllabus for Part III - Inter Disciplinary Course (IDC) offered by Department of Mathematics for 2022-23 batch and onwards
3.	Discussion on syllabus for Part III - Inter Disciplinary Course (IDC) offered to Department of Food science and nutrition in Third semester for 2022-23 Batch and onwards
4.	Discussion on Part I (Tamil/Hindi/French/Malayalam) offered by Language department for 2022-23 Batch and onwards
5.	Discussion on Part II (English) offered by English department for 2022-23 Batch and onwards
6.	Discussion on UG syllabi for Part III - Core Course in First semester, IDC offered by Department of chemistry for 2023-24 Batch and onwards
7.	Discussion on Part I (Tamil/Hindi /French/Malayalam) offered by Language departments for 2023-24 Batch and onwards and onwards
8.	Discussion on Part II offered by English department for 2023-24 Batch and onwards
9.	Discussion on PG core syllabi in Third semester courses for 2022-23 Batch and onwards
10.	Discussion on PG DSE syllabi in Third semester courses offered to Department of Biotechnology and Microbiology for 2022-23 Batch and onwards
11.	Discussion on PG DSE syllabi in Third semester courses offered by Department of Biotechnology and Microbiology for 2022-23 Batch and onwards
12.	Discussion on PG core and DSE syllabi in First semester courses for 2023-24 Batch and onwards



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### MINUTES OF THE FIFTEENTH BOARD OF STUDIES MEETING

**Faculty: Biosciences**

**Board: Biochemistry**

The Chairman of BoS welcomed all the panel members for the meeting. The items listed in the agenda were taken for discussion.

The following are the minutes of the meeting:

<b>Item - 01</b>	Discussion on UG syllabi for Part III - Core Courses for third semester 2022-23 Batch
<b>Discussion</b>	<p><b>223BC1A3CA: Human Physiology</b>          Prof.M.G. Sridhar suggested to include the topics lung volume and chloride shift under Respiratory system.          He also suggested to include basics of Assisted reproductive technology (ART) instead of <i>In vitro</i> Fertilization in Reproduction system.</p> <p><b>223BC1A3CB: Developmental Biology</b>          Prof Sridhar suggested to include the topics Antagonistic Pleiotropy in Unit-V</p> <p><b>223BC1A3CP: Human Physiology and Developmental Biology (New Course)</b>          Prof M.G.Sridhar and Dr.K.Kalaiselvi suggested to include case studies of respiratory and cardiac systems.          Dr.E.Santhini suggested to include developmental stages of Zebra Fish.          DBT Star status scheme proposed practical- Estimation of Haemoglobin was included in the COURSE</p> <p><b>223BC1A3SA: Analytical Biochemistry</b>          Dr.K.Kalaiselvi suggested to include Imaging techniques in Unit V and also suggested to provide demonstration for all the analytical techniques to gain analytical skills.          Prof.M.G.Sridhar suggested to have a visit to Nuclear Medicine Department in Tertiary Care Hospital to explore the have an exposure to medical applications of radioisotopes.</p>
<b>Resolution</b>	The Board unanimously approved the above syllabus
<b>Item - 02</b>	Discussion on syllabus for Part III - Inter Disciplinary Course (IDC) offered by Department of Mathematics
<b>Discussion</b>	<p><b>222MTIA3ID – Principles of Biostatistics (New Course)</b>          The syllabus approved by the Board of Studies in Mathematics was placed for endorsement.</p>
<b>Resolution</b>	The Board unanimously approved the above syllabus.
<b>Item - 03</b>	Discussion on syllabus for Part III - Inter Disciplinary Course (IDC) offered to Department of Food science and nutrition in Third semester for 2022-23 Batch and onwards
<b>Discussion</b>	<p><b>223BC1A3IA: Interdisciplinary course :Biochemistry I</b>          Dr.Vadivel suggested to include arabinose under monosaccharides and blood group antigens under proteoglycans and glycoproteins.</p>
<b>Resolution</b>	The Board unanimously approved the above syllabus.
<b>Item - 04</b>	Discussion on Part I (Tamil/Hindi/French/Malayalam) offered by Language department for 2022-23 Batch and onwards
<b>Discussion</b>	<p><b>221TL1A3TA/ 221TL1A3HA /221TL1A3FA /221TL1A3MA: Part I: Tamil-III/ Hindi-III/French-III/ Malayalam - III respectively (New Course)</b>          The unified syllabi approved by the Board of Studies in Languages were placed for endorsement.</p>
<b>Resolution</b>	The Board unanimously approved the syllabi.

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<b>Item - 05</b>	<b>Discussion on Part II (English) offered by department of English for 2022-23 Batch</b>
<b>Discussion</b>	<b>221EL1A3EA : Part II: Professional English III</b> The unified syllabus approved by the Board of Studies in English was placed for endorsement.
<b>Resolution</b>	The Board unanimously approved the syllabus
<b>Item - 06</b>	Discussion on UG syllabi for Part III - Core Course in First semester, IDC offered by Department of chemistry for 2023-24 Batch and onwards
<b>Discussion</b>	The unified syllabus was placed for discussion and no changes were recommended
<b>Resolution</b>	The Board unanimously approved the syllabus
<b>Item-07</b>	Discussion on Part I (Tamil/Hindi /French/Malayalam) offered by Language departments for 2023-24 Batch and onwards and onwards
<b>Discussion</b>	<b>231TL1A1TA/ 231TL1A1HA /231TL1A1FA /231TL1A1MA: Part I: Tamil-I/ Hindi-I/French-I/ Malayalam - I respectively (New Course)</b> The unified syllabi approved by the Board of Studies in Languages were placed for endorsement.
<b>Resolution</b>	The Board unanimously approved the Curriculum.
<b>Item - 08</b>	<b>Discussion on Part II (English) offered by department of English for 2022-23 Batch</b>
<b>Discussion</b>	<b>231EL1A1EA : Part II: Professional English III</b> The unified syllabus approved by the Board of Studies in English was placed for endorsement.
<b>Resolution</b>	The Board unanimously approved the syllabus
<b>Item – 09</b>	Discussion on PG-syllabi for Core Courses for third semester 2022-23 Batch and onwards
	<b>223BC2A3CA: Biostatistics and Research Methodology</b> Prof.Vijay Anand Suggested including online software tools to gain knowledge for free SPSS online softwares. He also suggested including types of hypothesis in Unit-IV. Dr.K.Kalaiselvi suggested changing the course title as Research Methodology and Biostatistics and revamping the syllabus accordingly.
	<b>223BC2A3CB: Plant Biochemistry and Biotechnology</b> Prof. Kalaiselvi Senthil suggested changing the title as Soilless Cultivation instead of Plant Tissue Culture in Unit-IV. She also suggested adding alternative cultivation techniques like hydroponics, aquaponics, etc. Prof. Kalaiselvi Senthil suggested including biosafety aspects of transgenic plants in Unit-V.
	<b>223BC2A3CC: Genetic Engineering</b> Prof.Kalaiselvi senthil suggested to remove Restriction mapping from Unit-1 and to include in Unit-2.
	<b>223BC2A3CP: Clinical Biochemistry</b> Dr.Santhini suggested to include estimation of glycosylated Haemoglobin and iron
	<b>223BC2A3CQ: Plant Biochemistry and Genetic Engineering</b> Dr.Kalaiselvi suggested to remove estimation of chlorophyll, RFLP and to include gene amplification by PCR and restriction digestion analysis of plasmid DNA.
<b>Resolution</b>	The Board approved the syllabi for the above courses

cont..



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<b>Item -10</b>	Discussion on PG DSE syllabi in Third semester courses offered to department of Biotechnology and Microbiology for 2022-23 Batch and onwards	
<b>Discussion</b>	<b>223BC2A3DA: Free Radicals and Antioxidant Biology</b> All the members suggested to remove the course as per the suggestions since its an advanced level course received from the Students and to add new course on Free Radicals and Antioxidant Biology .	
<b>Resolution</b>	The Board unanimously approved the syllabus	
<b>Item -11</b>	Discussion on PG DSE syllabi in Third semester courses offered by department of Biotechnology and Microbiology for 2022-23 Batch and onwards	
<b>Discussion</b>	<b>223MB2A3DA: Medical Laboratory therapeutics 223BT2A3DA: Molecular therapeutics</b> offered by the department of Microbiology and Biotechnology were placed for endorsement	
<b>Resolution</b>	The Board unanimously approved the syllabus	
<b>Item-12</b>	Discussion on PG core and DSE syllabi in First semester courses for 2023-24 Batch and onwards	
<b>Discussion</b>	The unified syllabus was placed for discussion and no changes were recommended	
<b>Resolution</b>	The Board unanimously approved the syllabus	

The chairman of Board of Studies (BoS) thanked all the members for their active participation and cordially invited them for the next meeting.


**Date: 14.06.2023**

*Gowri S*  
14/6/23  
(Dr.Gowri.S)

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





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**Syllabus Revision  
B.Sc Biochemistry**

**Faculty: Biosciences**

**Board: Biochemistry**

**Semester: III**

**Course Code/ Name: 223BC1A3CB: Developmental Biology**


Unit	Existing	Changes
I	Basic concepts of development Potency- Totipotent pluripotent, multipotent, unipotent cells. Commitment : Autonomous specification, conditional specification, Syncytial specification, morphogenetic gradients, cell specification. Primary germ layers: Ectoderm, Mesoderm, Endoderm, triploblastic and diploblastic animals. Fate maps and cell lineages, Genomic equivalence: Creation of sheep dolly as evidence for genomic equivalence. Imprinting: DNA methylation Mutants, chimeras and transgenes for analysis of development ( Fate mapping studies) Chick- quail experiment -GFP	----
II	Early Embryonic Development The Stages of Animal Development, Developmental Patterns in Unicellular Protists and Metazoa, The Developmental Mechanics of Cell Specification, Determining the Function of Genes during Development. Structure of Gametes, Recognition of Egg and Sperm, Acrosomal Reaction. The Early Development of Snails. The genetics of axis specification in Drosophila. Early Mammalian Development: Mammalian Anterior-Posterior Axis Formation, Dorsal- Ventral and left-Right Axes in Mammals.	
III	Later Embryonic Development Cell aggregation and differentiation in Dictyostelium discoideum; axes and pattern formation in Drosophila, amphibia and chick; organogenesis – vulva formation in Caenorhabditis elegans; eye lens induction, limb development and regeneration in vertebrates; differentiation of neurons, post embryonic development-larval formation, metamorphosis; environmental regulation of normal development; Sex determination - environment dependance in reptiles, location dependent	
IV	An overview of plant development Plant Life Cycles , Gamete Production in Angiosperms , Pollination ,Fertilization , Embryonic Development, Dormancy, Germination, Vegetative Growth, The Vegetative-to-Reproductive Transition ,Senescence	
V	Programmed Cell Death, Aging and Senescence Programmed cell death-mechanism and significance Genes and ageing, Insulin signalling cascade in c. elegans ,Environmental and epigenetic causes of ageing, Teratogenesis: Introduction, Principles and Teratogenic agents.	IGF-1 signaling in aging Antagonistic pleiotropy

**PERCENTAGE OF SYLLABUS REVISED: 6 %**

**COURSE FOCUS ON:**

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



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**Syllabus Revision  
B.Sc Biochemistry**

**Faculty: Biosciences**

**Board: Biochemistry**

**Semester: III**

**Course Code/ Name: 223BC1A3CA: Human Physiology**

Unit	Existing	Changes
I	<b>Body fluids and Respiratory system</b> Blood and Body fluids: Intracellular, extracellular and interstitial fluid. Plasma as an extracellular fluid. Structure and functions of RBCs, WBCs and Platelets. Hemoglobin- Structure and function. Mechanism of blood coagulation, Anticoagulants, Blood types and blood transfusion. Formation and functions of lymph, CSF. <b>Respiratory system:</b> Diffusion of gases in lungs, transport of oxygen from lungs to tissues through blood, factors influencing the transport of oxygen. Transport of CO <sub>2</sub> from tissues to lungs through blood, factors influencing the transport of CO <sub>2</sub>	Lung volumes Chloride shift.
II	<b>Muscle and Nervous system</b> Muscle system: Skeletal muscles - Properties of skeletal muscles, Muscular contraction and relaxation, Smooth muscle - mechanism of contraction. <b>Nervous system:</b> Central Nervous system. Peripheral Nervous system. Blood brain barrier and CSF, Structure of neuron, Membrane potentials. Synaptic transmission, Structure of Neuromuscular junction and mechanism of neuromuscular transmission, neurotransmitters, Sensory receptors and neural pathways. Somatic sensation, EEG, sleep, coma, learning and memory.	
III	<b>Cardiovascular system</b> Anatomy of heart, Properties of cardiac muscles, Conducting system of the heart, Cardiac cycle – Diastole and Systole, ECG. Chemical energy required for cardiac contraction, Pressure changes during cardiac cycles, Regulation of heart pumping–Effect of temperature, potassium and calcium ions on heart function. Overview of circulation– Capillary circulation, Blood volume, Blood flow, Arterial and venous blood pressure	
IV	<b>Gastrointestinal physiology</b> Anatomy and histology of alimentary canal. Digestive glands – histological Structures of salivary glands, pancreas, liver. Movements of alimentary canal. Composition and functions of saliva, gastric, pancreatic, intestinal juices and bile. Synthesis of Bile acids. Digestion and absorption of carbohydrates, proteins and fats	
V	<b>Excretory, Endocrine and Reproductive system</b> Excretory System: Mechanism of urine formation, Composition of urine, Micturition, Renal regulation of acid balance. Endocrine system: Definition and role of hormones, mechanism of action of hormones – intracellular receptor mechanism and second messenger mechanism (cAMP, cGMP, Ca <sup>2+</sup> ). Structure, function and manifestations of deficiency and excess of hormones of pituitary, thyroid, parathyroid, pancreatic and adrenal glands. Reproduction system- overview- principles of contraception and IVF.	Basic Principles of IVF - an overview, Assisted reproductive technology- Basics of ART

**PERCENTAGE OF SYLLABUS REVISED: 10 %**


**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



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**Syllabus Revision  
B.Sc Biochemistry**

**Faculty: Biosciences**

**Board: Biochemistry**

**Semester: III**

**Course Code/ Name: 223BC1A3CP: Human Physiology and Developmental Biology (New Course)**

S.No	Particulars
1.	Estimation of Hemoglobin by Sahli's Method and Cyanomethehemoglobin method ( DBT Star Practical )
2.	Determination of Hematocrit
3.	Determination of Total RBC and WBC Count
4.	Staining of Peripheral Blood Smear & Differential Leukocyte Count (DLC)
5.	Determination of bleeding time and clotting time
6.	Determination of blood grouping (ABO , Rh typing)
7.	Pulmonary function tests and spirometry (Demonstration)
8.	Histology of connective tissue, liver, brain permanent slides ( Demonstration)
9.	Measurement of pulse rate, heart rate and blood pressure
10.	Case studies -Renal (clearance, GFR, eGFR ) Respiratory system & cardiac systems.
11.	12.Study of whole mounts and sections of developmental stages of frog Cleavage stages, blastula, gastrula, neurula, tail-bud stage, tadpole (external and internal gill stages)
12.	13.Study of whole mounts of developmental stages of chick through permanent slides: Primitive streak (13 and 18 hours), 21, 24, 28, 33, 36, 48, 72, and 96 hours of incubation (Hamilton and Hamburger stages)
13.	Study of the developmental stages and life cycle of Drosophila, Zebra fish from stock culture
14.	Study of different sections of placenta (photomicrograph/ slides)

**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





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## Syllabus Revision B.Sc Biochemistry

Faculty: Biosciences

Board: Biochemistry

Semester: III

Course Code/ Name: 223BC1A3SA: Analytical Biochemistry

Unit	Existing	Changes
I	Chromatography techniques Basic Principles and applications of paper chromatography, Thin layer chromatography, Gas liquid chromatography, Ion-exchange chromatography, Affinity chromatography, Molecular sieve chromatography, High Performance Liquid Chromatography, Fast Protein Liquid Chromatography.	Types, Techniques, Column chromatography. HPTLC  Demonstration on Paper chromatography Packing of column using burette, cotton, sand and silica gel
II	Electrophoresis techniques Basic Principles, technique and applications of Paper electrophoresis, Gel electrophoresis - SDS-PAGE, Agarose gel electrophoresis, Capillary electrophoresis, <del>detection and identification (staining procedures) of proteins and nucleic acids</del> , Isoelectric focusing of proteins, 2D Electrophoresis.	Immuno electrophoresis.  Demonstration on electrophoresis
III	Centrifugation techniques Basic principles of centrifugation and sedimentation, sedimentation coefficient, different types of rotors, differential centrifugation, density gradient centrifugation, Ultracentrifugation	Demonstration on centrifugation.
IV	Spectroscopic techniques Concept of electromagnetic spectrum. Basic principles and applications of UV Visible spectrometry and Colorimetry, Fluorimetry, Flame photometry, Atomic absorption spectroscopy, Nephelometry and turbidimetry.	Demonstration on UV Visible spectrometry and Fluorimetry
V	Radio isotopic techniques Introduction to radioisotopes. Radioactive decay, Units of Radioactivity, Detection, and measurement of Radioactivity – Geiger-Muller counter, Scintillation counter, Auto-radiography. Applications of Radio-isotopes in biological and medical sciences. Safety and disposal of radioisotopes.	Imaging Techniques,  Visit to Nuclear medicine department

PERCENTAGE OF SYLLABUS REVISED: 28%

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







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## Syllabus revision B.Sc Food Science and Nutrition

Faculty: Biosciences

Board: Biochemistry

Semester: III

Course Code/ Name: 223BC1A3IA IDC III: Biochemistry I

Unit	Existing	Changes
I	<b>Carbohydrates</b> Carbohydrate - Classification, structure, properties and chemical reaction of monosaccharide - Glucose, Fructose, Galactose, Mannose, Disaccharide- Maltose, Lactose and sucrose. Polysaccharides - Homo polysaccharides - Starch, Glycogen and Cellulose Hetero polysaccharides - Hyaluronic acid, Heparin, Chondroitin sulphate. Biological importance of sugar derivates - glycosaminoglycan, proteoglycan and glycoprotein - Bacterial cell wall polysaccharides	Arabinose  Blood group antigens
II	<b>Lipids</b> Lipids: Definition classification of lipids, physiochemical properties. Storage lipids- fatty acids- types. Structural lipids - phospholipids, glycolipids & sphingolipids. Structure and Biological role of cholesterol	
III	<b>Aminoacids</b> Classification of amino acids, general properties, Non protein amino acids. Peptide bond - Structure and conformation, Protein classification, Physiochemical properties of proteins. Organization of protein Structure - primary, secondary (keratin, collagen) Tertiary (Myoglobin), Quaternary structure (Hemoglobin).	Aminoacids and Proteins
IV	<b>Nucleic acids</b> Structure of Purines, pyrimidines, Nucleosides and Nucleotides. Properties of nucleic acids. DNA Double helical structure - isoform. RNA - Types - m RNA, tRNA, rRNA - structure & function.	
V	<b>Minerals</b> Minerals in biological system and their importance - Iron, Calcium, Phosphorus, Iodine, Copper, Zinc. Vitamins - Definition, Classification: Fat soluble Vitamins (Vitamin A, D, E, K) and Water soluble :Vitamins (Vitamin B and C) - Sources, Functions and deficiencies. Role of Vitamins as antioxidants and cofactors. Hormones involved in regulatory metabolism: Insulin, Glucagon and thyroid.	Vitamins and Minerals

PERCENTAGE OF SYLLABUS REVISED: 10%

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





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## Syllabus revision M.Sc Biochemistry

Board: Biochemistry

Faculty: Biosciences

Semester: III

Course Code/ Name: 223BC2A3CA: Research Methodology and Biostatistics

Unit	Existing	Changes
I	<b>Methods for Collection of Data</b> Organising a statistical survey, Planning and executing the survey. Source of data – Primary and secondary data, Collection – observation, interview, enquiry forms, questionnaire schedule and check list. Classification and tabulation of data. Diagrammatic & graphic presentation of data. Parametric and non parametric tests.	Concepts of sampling Sampling of variables (large samples and small samples)  Unit V shifted to Unit I
II	<b>Statistical Measures</b> Measures of central tendency: arithmetic mean, median, mode, quartiles, deciles and percentiles. Measures of variation: range, quartile deviation, mean deviation and standard deviation. Correlation analysis: Scatter diagram, Karl Pearson's coefficient of correlation and Spearman's rank method. Regression—analysis. Introduction to R programming. MS Excel, Introduction to SPSS package.	Coefficient of variation. Regression analysis - Regression line, Regression equation. Statistical analysis using Excel GraphPad Prism Software  Unit I shifted to Unit-II
III	<b>Probability</b> Definition, concepts, theorems—(proof of the theorems not necessary) and calculations of probability. Theoretical distributions: Binomial, Poisson, and Normal distribution. Normal distribution: importance, properties, conditions and constants of the distribution (proof not necessary)	Addition and Multiplication theorems  Unit II shifted to Unit-III
IV	<b>Sampling distribution and test of significance</b> Errors in hypothesis testing, standard error and sampling distribution. Sampling of variables (large samples and small samples). Student's 't' distribution and its applications. Chi - square test & goodness of fit. Analysis of variance- one way and two-way classification. Duncan's Multiple Range Test. Design of experiment - completely randomized block design and randomized block design.	Types and Testing of hypothesis  Unit III shifted to Unit-IV
V	<b>Research Methodology</b> Research: General-Introduction, types and classification of research-diagnostic, descriptive, and exploratory research. Topology for literature research-scientific methods-components of scientific methods. Formulation of research paper. Research design-types of research design—histological design, descriptive design. Formation of hypothesis. Synopsis writing. An approach for National and International Research funding agencies	Research Design - Classification of research designs, need for research design, features of good research design, experimental research design Thesis writing, Publication in a scientific journal; Preparation of Abstract and manuscript. Plagiarism Importance of Ethical clearance in Research  Unit-IV shifted to Unit-V

PERCENTAGE OF SYLLABUS REVISED: 38.42 %

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
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**Syllabus Revision  
M.Sc Biochemistry**

**Faculty: Biosciences**

**Board: Biochemistry**

**Semester: III**

**Course Code/ Name: 223BC2A3CB: Plant Biochemistry and Biotechnology**

Unit	Existing	Changes
I	Photosynthesis and Water Absorption Introduction to Plant cell. Photosynthesis: Apparatus, role of photosynthetic pigments, Biochemistry of Dark and light reaction - photo systems I and II, Photosynthetic electron transport - cyclic and non-cyclic photophosphorylation. Carbon reactions in Calvin cycle (C3 plants), Hatch slack pathway (C4 plants), Crassulacean acid metabolism, factors affecting photosynthesis. Biochemical basis of photorespiration (PR pathway) – C2 cycle. Water absorption – Mechanism of water absorption, symplast and apoplast – concept, Transpiration – types, mechanism and factors affecting transpiration.	
II	Nitrogen Metabolism and Plant growth and development Nitrogen metabolism: Development and structure of root nodules, Role of nod factors in nodule development. Structure of plant nitrogenase system, Symbiotic nitrogen fixation and its regulation. Formation and assimilation of ammonia. Biochemistry of seed development, dormancy, germination, fruit development, ripening and Senescence. Structure and function of phytochrome, flowering, photoperiodism and vernalization.	Nitrogen fixation in nonsymbiotic plants.  Sulphate metabolism in leaf; sulfite reduction and Sulphur cycle.
III	Plant Hormones and Secondary Metabolites Plant hormones: Structure, biosynthesis and biochemical mode of action of auxins, gibberellins, cytokinins, abscisic acid and ethylene. Secondary metabolites: classification, biosynthesis and functions of terpenoids, alkaloids, phenolics, tannins, lignin, waxes and anthocyanins. Secondary metabolites in clinical, cosmetic and food industries (each with any two examples). Responses of plants to biotic (pathogen and insects) and abiotic (water, temperature and salt) stresses. Overview on Toxins of plant origin and Antioxidative defense system in plants.	
IV	<del>Plant Tissue Culture</del> Introduction to tissue culture - Media composition and preparation. Micropropagation, callus induction, cell suspension and protoplast culture, organogenesis and somatic embryogenesis. Haploid production – Anther, pollen, embryo and ovule culture. Selection of hybrid cells, cybrids, somaclonal variation. Germplasm storage and cryopreservation. Applications of tissue culture for crop improvement and for the overproduction of plant secondary metabolites (Bioreactors).	Soilless cultivation  Alternative techniques – hydroponics. Aquaponics
V	Transgenics in Plants Importance of RFLP, RAPD and SCAR in plant breeding management. Agrobacterium and crown gall tumors – Ti plasmid and Ri plasmid vectors. Mechanism of T-DNA transfer to plants. Plant viral vectors, Direct transformation of plants by physical methods. Promoters, Selectable markers and reporter genes used in plant vectors. Application of transgenesis in crop improvement – Insect resistance, disease resistance, virus resistance, herbicide resistance, and abiotic stress resistance. <del>Transgenesis for male sterility and improved nutrition</del> ; Transgenic plants - Ethies, Bt cotton, Bt brinjal, Plant genome-Rice. Pros and Cons of GM crops	Ethical issues in Plant genetic engineering.  Biosafety of transgenic plants.

PERCENTAGE OF SYLLABUS REVISED: 24.63 %

**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





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15<sup>th</sup>

## Syllabus Revision M.Sc Biochemistry

Board: Biochemistry

Faculty: Biosciences

Semester: III

Course Code/ Name: 223BC2A3CC: Genetic Engineering

Unit	Existing	Changes
I	<del>Introduction of genetics and genetic engineering</del> Introduction to genetics and genetic engineering and DNA technology, gene cloning, specialized tools and techniques, benefits of gene cloning. Isolation and purification of Nucleic acids: Preparation of total Cellular DNA, plasmid DNA, bacteriophage DNA, plant cell DNA, isolation of mRNA from mammalian cells.	<b>Introduction to genetic engineering and gene modifying enzymes</b> Restriction Modification enzymes in recombinant DNA technology and cloning: Restriction endonuclease (nomenclature, types, recognition sites, mode of action, applications), DNA ligase, <i>E. coli</i> DNA polymerase I and Klenow enzyme, T4 DNA polymerase, reverse transcriptase, polynucleotide kinase, alkaline phosphatase, nuclease and terminal transferase. Linkers and adapters.
II	<del>Probes and Techniques</del> Restriction endonucleases — types and functions; restriction mapping. Nucleic acid probes and their applications — cloned probes, oligonucleotide probes; labeling of nucleic acid probes. Nucleic acid hybridization techniques — liquid and dot blot technique; Southern and Northern hybridization; <i>in situ</i> hybridization; whole mount <i>in situ</i> hybridization. FISH. Polymerase chain reaction — types and applications. DNA fingerprinting, Chemical synthesis of genes: Principles of DNA sequencing: Sanger's sequencing, Next generation sequencing and Introduction to Illumina or Pyro-sequencing.	Zoo blot technique. Restriction mapping. Automated sequencing, RNA sequencing, DNA foot printing. Chromosome walking and jumping.
III	<del>Cloning and Cloning Strategies</del> Cloning vectors and Cloning strategies — salient features. Plasmids vectors. Bacteriophage vectors, Cosmid vectors, DNA (single stranded) vectors, viral vectors. Transposons vectors. High capacity cloning vectors — bacterial artificial chromosomes, phage P1, yeast artificial chromosomes and PACs. Genomic and cDNA cloning, cDNA library	<b>Cloning vectors and Expression vectors</b> Vectors for molecular cloning: Plasmid vector - pBR322, pUC18; Phage (lambda and M13) vector; Cosmids; Phagemids; High-capacity cloning vectors - BAC, YAC, PAC, MAC and HAC; Viral vectors - SV 40. Gene expression in prokaryotes - Tissue specific promoter, wound inducible promoters, strong and regulatable promoters, vectors with tags (Histidine tags, signaling peptides for exportation). Fusion proteins: Mammalian cell expression: Two - vector expression, two - gene expression vectors; Yeast Expression vectors; Shuttle vectors.
IV	<del>Expression vector systems</del> Expression vectors — vectors for maximizing protein synthesis, fusion proteins. Expression vectors — expression of cloned genes in <i>E. coli</i> . Cloning and expression of cloned genes in <i>Bacillus subtilis</i> . Cloning in yeasts; yeast expression vectors, over expression in yeast. Expression in baculovirus system. Cultured insect cell expression systems: mammalian cell expression systems. Recombination, selection and screening methods and processes.	<b>Gene transfer methods and Screening strategies</b> Gene transfer methods: calcium phosphate coprecipitation, electroporation, lipofection, biolistics, viruses, microinjection. Choice of host organisms for cloning. Immunological screening for expressed genes. Construction of genomic and cDNA library.
V	<del>Gene transfer methods and Transgenic animals</del> Gene transfer methods in animal cells — calcium phosphate coprecipitation, electroporation, microinjection, using viral vectors. Transfer, cotransfer, selectable markers like TK, PSV, PRSV and reporter genes. Gene targeting in animal cells; transfer and expression of cloned genes in <i>Drosophila</i> . Gene knockout: Methods for production of transgenic animals (mice, sheep, goat, fish, pig, cow etc.) — retroviral, DNA microinjection and engineered stem cell methods. Applications of transgenic animals; transgenic animals as models in the prevention of human diseases like cystic fibrosis; muscular dystrophy and anticancer therapy, Gene Editing- CRISPR Cas 9 and TALEN.	<b>Applications of genetic engineering</b> Gene targeting and tagging. Gene knock-out and knock-in. Generation of transgenic animals and its application (any two). Therapeutic applications - Insulin, Growth hormones, Hepatitis B vaccines. Diagnostic probe of genetic diseases. Gene therapy: Stem cell gene therapy, Somatic cell gene therapy, Gene therapy for ADA and cystic fibrosis. Gene Editing- Cre-loxP recombination technology, ZNF, RNA interference. Ethical, social and biosafety aspects of GMO's (Overview).


PERCENTAGE OF SYLLABUS REVISED: 90%  
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



Dr.NGPASC  
COIMBATORE [INDIA]



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**Syllabus Revision  
M.Sc Biochemistry**

**Faculty: Biosciences**

**Board: Biochemistry**

**Semester: III**

**Course Code/ Name: 223BC2A3CD: Clinical Biochemistry**

Unit	Existing	Changes
I	<b>Specimen collection and processing, use of Biochemical data, Automation</b> Specimen collection and processing: Collection of blood by various methods, anticoagulants of blood. Collection of urine-timed urine specimens, urine preservatives. Collection of feces and Amniotic fluid- Handling of specimen for testing-Use of Biochemical data in clinical medicine-Diagnosis, Management, Screening-. Acquisition and interpretation of biochemical data- Test Request-Factors Affecting Test Results- Interpretation of Results- Predictive Value of Tests- - Automation in the clinical biochemistry: Processes -Laboratory information systems-robotics-Types of automation.	Overview of clinical laboratory setup
II	<b>Blood and coagulation</b> Blood and coagulation: The coagulation cascade -Laboratory tests of coagulation - Interpretation of coagulation-tests-Blood Transfusion- Blood group antigens- Laboratory transfusion tests-Investigation of suspected transfusion-reaction-Haemolytic disease of the newborn-Porphyrrias- erythropoietic and hepatic , Haemolysis -Anemia- Iron deficiency anaemia-Inherited and acquired haemolytic anaemias -Diagnosis of Haemolysis-Haemoglobinopathies- sickle cell anemia, Thalassemia- Alpha and Beta); - Laboratory Diagnosis of Haemoglobinopathies.	
III	<b>Metabolic disorders</b> Disorders of carbohydrate metabolism: glycogen storage diseases, galactosemia, fructosuria. Hypoglycemia, hyperglycemia, Diabetes mellitus-classification, metabolic abnormalities, diagnosis and management. Disorders of lipid metabolism: lipoproteinaemias. Lipid storage diseases-Gaucher's and Tay sach's disease. Fatty liver and Atherosclerosis. Disorders of amino acid metabolism; Phenylketonuria, alcaptonuria, albinism, and maple syrup urine disease.	lactose intolerance, gout
IV	<b>Liver and Renal functions tests, Clinical Enzymology</b> Liver function tests: Jaundice- Definition, types, Causes, consequences, Laboratory diagnosis and treatment in jaundice, Tests related to excretory (bile pigments) synthetic (plasma proteins, prothrombin time) detoxifying (hippuric acid, NH <sub>3</sub> , aminopyrine) and metabolic (galactose) functions. Renal function tests: clearance of tests - urinary calculi, renal hypertension - principles of peritoneal and hemodialysis - urinalysis for normal and abnormal constituents. Clinical Enzymology- plasma functional and nonfunctional enzymes. Enzymes in health and disease- Creatinine kinase, Amonotransferases, amylase and alkaline phosphatase.	
V	<b>Molecular clinical and Forensic Biochemistry</b> Molecular clinical Biochemistry-Techniques of Genetic Analysis-Detection of specific sequences in DNA -Detection of mutations-Applications of DNA Analysis - Prenatal diagnosis-Screening-Inherited diseases - Cystic fibrosis- Multifactorial and polygenic disease-Familial hypercholesterolaemia-Gene Therapy -Stem cells in gene therapy -Gene therapy in cancer. Forensic biochemistry- Samples and Sampling-Poisoning with Endogenous Agents- $\gamma$ -Hydroxybutyrate -Insulin. Post-Mortem Biochemistry: Vitreous humour. Specific Diagnostic Problems-Anaphylaxis reactions-Diabetes Overview- Point of Care Technology Instruments. Use of AI in diagnostics, Quality assurance in clinical laboratories - Six Sigma concept	

**PERCENTAGE OF SYLLABUS REVISED: 6 %**

**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





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## Syllabus Revision M.Sc Biochemistry

Faculty: Biosciences

Board: Biochemistry

Semester: III

Course Code/ Name: 223BC2A3CP: Clinical Biochemistry

1	Estimation of blood glucose	Estimation of blood glucose by DNS method
2	Estimation of haemoglobin in blood	Estimation of haemoglobin in blood by Drabkin's method Estimation of glycated haemoglobin
3	Estimation of Serum cholesterol	Estimation of Serum cholesterol by modified Zak's method
4	<del>Estimation of serum calcium</del>	Estimation of Iron by wong's thiocyanate method
5	Estimation of creatinine in serum/ urine/ Creatinine clearance	Estimation of creatinine in serum/ urine/ Creatinine clearance
6		Assay of serum acid phosphatase and alkaline phosphatase activity by Fiske Subbarow method
7	Assay of serum AST/ALT	Assay of serum AST/ALT activity
8	Estimation of serum total proteins and albumin	Estimation of serum total proteins and albumin by biuret method
9	Glucometer (demonstration)	Glucometer (demonstration)
10	Paper chromatography of aminoacids in urine	Paper chromatography of aminoacids in urine
11	<del>Estimation of amylase activity in saliva</del>	Estimation of amylase activity in serum
12	Estimation of Bilirubin in Serum	Estimation of Bilirubin in Serum

PERCENTAGE OF SYLLABUS REVISED: 26%

<input checked="" type="checkbox"/> Skill Development	<input checked="" type="checkbox"/> Entrepreneurial Development
<input checked="" type="checkbox"/> Employability	<input checked="" type="checkbox"/> Innovations
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## Syllabus Revision M.Sc Biochemistry

Faculty: Biosciences  
Semester: III

Board: Biochemistry


### Course Code/ Name: 223BC2A3CQ: Practical – Plant Biochemistry and Genetic Engineering

Experi-ments	Existing	Changes
1	Estimation of total chlorophyll, chlorophyll a and chlorophyll b pigments from leaves and its separation using TLC	Qualitative analysis of secondary phytochemicals in medicinal plants
2	Qualitative analysis of secondary phytochemicals in medicinal plants	Estimation of total alkaloids
3	Estimation of total alkaloids	Estimation of total phenols
4	Estimation of total phenols	Estimation of total flavonoids
5	Estimation of total flavonoids	Estimation of phytosterols
6	Estimation of phytosterols	Sterilization and media preparation
7	Sterilization and media preparation	Callus Induction - Carrot and Micropropagation - Rose
8	Callus Induction - Carrot and Micropropagation - Rose	Restriction digestion analysis of plasmid DNA
9	Demonstration of Agrobacterium mediated genetic transformation	Gene amplification by PCR
10	Ligation of DNA into linearized plasmid	Random amplified polymorphic DNA (RAPD)
11	Restriction fragment length polymorphism	Ligation of DNA into plasmid and visualization through agarose gel electrophoresis.
12	Random amplified polymorphic DNA	Agrobacterium mediated genetic transformation (Demonstration)

Percentage of syllabus Revised: 30%

<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
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**Syllabus Revision (New Course)**  
**M.Sc Biochemistry**

Faculty: Biosciences

Board: Biochemistry

Semester: III

Course Code/ Name: 223BC2A3DA: Free Radicals and Antioxidant Biology

Unit	Existing
I	Definition of free radicals, Reactive Oxygen Species (ROS) and Reactive Nitrogen Species (RNS). Formation and physiological roles of free radicals. Mechanism of oxidative damage to biomolecules (DNA, proteins, lipids). Role of oxidative stress in aging and disease development. Role of ROS/RNS in cellular homeostasis and adaptation. Techniques for measuring ROS/RNS levels. Methods for assessing oxidative damage to biomolecules
II	Role of ROS in cardiovascular pathophysiology; Oxidative stress in atherosclerosis, hypertension, Alzheimer Parkinson&#39;s, obesity and metabolic syndrome; Mitochondrial dysfunction and metabolic diseases; Air pollution and respiratory diseases; Antioxidant therapies for cardiovascular diseases, cancer prevention and therapy; Antioxidant protection against environmental toxins
III	Enzymic antioxidants- Chemistry, mechanism, antioxidant effect of superoxide dismutase (SOD), Catalase and its role in H <sub>2</sub> O <sub>2</sub> detoxification, Glutathione Peroxidase, and the glutathione system. Non Enzymic antioxidants- source, chemistry, toxicity, biochemical functions, bioavailability, bioassays, Antioxidant effects of Vit A, Vit C (ascorbic acid), Vit E (tocopherols and tocotrienols), glutathione and selenium.
IV	Antioxidant capacity of fruits, vegetables, and plant-based foods. Food processing and preservation effects on antioxidant content. ROS and skin aging processes; Exercise- induced ROS production and oxidative stress, Redox balance and muscle recovery. Effects of exercise on antioxidant defense systems Antioxidant-rich diets and health outcomes. Antioxidant supplementation and disease prevention. - Personalized nutrition and antioxidant requirements
V	Mitochondrial-targeted therapeutics . Antioxidants as immunomodulators. Antioxidant strategies for stem cell therapy. Antioxidant-based therapies for disease treatment; Redox modulators in cancer therapy- Redox-active compounds in drug discovery. Clinical trials and future perspectives

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







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## ATTENDANCE OF THE FIFTEENTH BOARD OF STUDIES MEETING

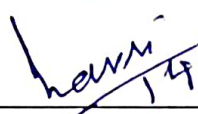
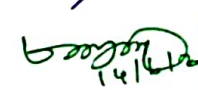

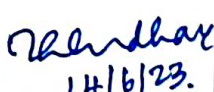


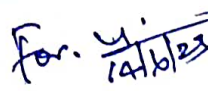
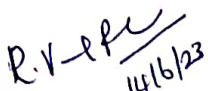
Faculty: Bioscience

Venue: IQAC BOARD ROOM

Name of Board: Biochemistry

Date: 14/06/2023, 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	 14/6/23
2	Dr.A. Vijaya Anand Professor, Dept. of Human Genetics and Molecular Biology, Bharathiar University, Coimbatore- 641046	VC nominee	 14/6/23
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	
4	Dr.D.Amirtham Assistant Professor (SG) Department of Agriculture & Allied Sciences Agricultural Engineering College and Research Institute, Kudumianmalai, Pudukottai-600124	Subject Expert	Absent
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	 14/6/23.
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	
7	Dr.S.Vadivel HOD of Clinical Biochemistry and Quality Control System K.G.Hospital, Coimbatore- 641018	Alumni	
8	Dr.N.Kuppuchamy Department of Tamil, Dr. N.G.P. ASC	Co-opted Member	 For. 14/6/23
9	Dr.R. Vithya Prabha Department of English, Dr. N.G.P. ASC	Co-opted Member	 14/6/23





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10	Dr. M.Suganthi Department of Chemistry, Dr. N.G.P. ASC	Co-opted Member	<i>[Signature]</i>
11	Dr.R.Sowrirajan Department of Mathematics, Dr.N.G.P. ASC	Co-opted Member	<i>[Signature]</i> 14/6/23
12	Dr.N.Kannikaparameswari Department of Biochemistry, Dr. N.G.P. ASC	Member	<i>[Signature]</i>
13	Dr.T.Indhumathi Department of Biochemistry, Dr. N.G.P. ASC	Member	<i>[Signature]</i>
14	Dr.K.Rajathi Department of Biochemistry, Dr. N.G.P. ASC	Member	<i>[Signature]</i>
15	Mr.Arun Kumar.G II M.Sc Biochemistry	Student Representative	<i>[Signature]</i>
16	Ms.Sivasakthi.G III B.Sc Biochemistry	Student Representative	<i>[Signature]</i>

Date : 14/06/2023

*[Signature]*  
14/6/23

(Dr.S.Gowri)

Chairman, BoS Biochemistry

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

