MINUTES OF THE FOURTEENTH 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.	**14**
Date and Time	**02.12.2022 @ 9.30 a.m.**
Venue	**Innovation Lab**
Members Attended	**The details are given in the ANNEXURE -I**

AGENDA	
1.	Discussion on UG syllabi for Part III - Core Courses in second semester for 2022-23 Batch and onwards
2.	Discussion on syllabus for Part III - Inter Disciplinary Course (IDC) offered by Department of Physics in second semester for 2022-23 batch and onwards
3.	Discussion on Part I (Tamil/Hindi/French/Malayalam) offered by Language department in second semester for 2022-23 Batch and onwards
4.	Discussion on Part II (English) offered by English department in second semester for 2022-23 Batch and onwards
5.	Discussion on Part IV (AECC) Basic Tamil / Advanced Tamil /Human rights and women's rights offered by Tamil Department and department of Commerce with Corporate Secretaryship with CA respectively in second semester for 2022-23 batch and onwards
6.	Discussion on credits for Part V Extension Activity for 2022-23 Batch and onwards
7.	Discussion on PG syllabi in Second semester courses for 2022-23 Batch and onwards
8.	Discussion on PG DSE offered by Department of Biochemistry to other departments in second semester for 2022-23 Batch and onwards
9.	Discussion on syllabus for IDC course offered to Department of Chemistry in second semester for 2022-23 batch and onwards
10.	Discussion on Value Added Certificate Courses (VACC)
11.	Any other matter

MINUTES OF THE FOURTEENTH 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:

Item - 01	Discussion on UG syllabi for Part III - Core Courses in second semester for 2022-23 Batch and onwards
Discussion	**223BC1A2CA: Enzymes (New Course)** Dr. Santhini suggested to include the topics Enzyme specificity – Group specificity, optical specificity, Metal cofactors, Turnover of enzymes in order to obtain knowledge about recent trends in enzymology Prof.Kalaiselvi Senthil suggested including Enzymes as Biosensors- Calorimetric Biosensor and potentiometric Biosensor to understand recent applications of enzymes. **223BC1A2CB: Microbiology (New Course)** Dr.Santhini suggested to include the topics Molecular methods to study complex microbial communities, Functional Metagenomics to learn advances in Microbiology. **223BC1A2CP: Enzymes and Microbiology (New practical Course)** Determination of Molecular weight of enzymes using gel filtration, Enzyme immobilization by sodium alginate method, Culture transfer techniques: Solid to solid (Streaking), Liquid to solid (spreading), Liquid to liquid, solid to liquid and determination of CFU/ml were included as **DBT star practical.**
Resolution	The Board approved the syllabi for the above three courses
Item - 02	Discussion on syllabus for Part III - Inter Disciplinary Course (IDC) offered by Department of Physics in second semester for 2022-23 batch and onwards
Discussion	**222PY1A2IB – IDC II: Physics (New Course)** The syllabus approved by the Board of Studies in Physics was placed for endorsement.
Resolution	The Board unanimously approved the above syllabus
Item - 03	Discussion on Part I (Tamil/Hindi/French/Malayalam) offered by Language department in second semester for 2022-23 Batch and onwards
Discussion	**221TL1A2TA: Part I: Tamil-II: Ara Ilakkiyam (New course)** **221TL1A2HA: Part I: Hindi-II: Modern Literature (New course)** **221TL1A2FA: Part I: French-II: Grammar, Translation and Civilization (New course)** **221TL1A2MA: Part I: Malayalam – II: Modern Literature (New course)** The unified syllabi approved by the Board of Studies in Languages were placed for endorsement.
Resolution	The Board unanimously approved the syllabi.

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Item - 04	Discussion on Part II (English) offered by English department in second semester for 2022-23 Batch and onwards
Discussion	**221EL1A2EA: Part II: Professional English II (New Course)** The unified syllabus approved by the Board of Studies in English was placed for endorsement.
Resolution	The Board unanimously approved the syllabus
Item – 05	Discussion on Part IV (AECC) Basic Tamil / Advanced Tamil /Human rights and women's rights offered by Tamil Department and department of Commerce with Corporate Secretaryship with CA respectively in second semester for 2022-23 batch and onwards
Discussion	**221TL1A2AA: Basic Tamil** **221TL1A2AB:Advanced Tamil** The unified syllabus approved by the Board of Studies Tamil was placed for endorsement. **225CR1A2AA: Human rights and women's rights** The unified syllabus approved by the Board of Studies in commerce with Corporate Secretaryship with CA was placed for endorsement.
Resolution	The Board unanimously approved the syllabus
Item – 06	Discussion on credits for Part V Extension Activity for 2022-23 Batch and onwards
Discussion	One credit to be awarded for each extension activity like YRC/NCC/NSS/ RRC/Yoga/Sports/Clubs
Resolution	The Board members approved one credit for Extension activity
Item – 07	Discussion on PG syllabi in Second semester courses for 2022-23 Batch and onwards
	223BC2A2CA: Immunology (New Course) Dr.Vadivel and Prof.Kalaiselvi Senthil Suggested to include the topics Immunotechniques: Avidin – biotin mediated immunoassay. Immunohistochemistry – immunofluorescence, immunoferritin technique, Fluorescent immunoassay, fluorescence activated cell sorting (FACS). Cytokines assay: ELISPOT. Lymphocytes transformation test (LTT); Lymphoblastoid cell lines. Chemiluminescence assay to gain knowledge in biological research. **223BC2A2CB: Metabolism (New Course)** Prof.Sridhar suggested to include the topics Ketolysis, Composition and synthesis of lipoproteins and their transport in the body to convey the recent trends in metabolic abnormalities **223BC2A2CC: Microbial Biochemistry (New Course)** Prof.Kalaiselvi Senthil suggested to include the topics Types of fermentors- Waldhof, tower, cylindro-conical, air-lift, deep-Jet, cyclone column, packed tower and rotating disc fermenter to gain better knowledge about fermenters. **223BC2A2CD: Genetics and Molecular Biology (New Course)** Dr.Vadivel and Dr.Santhini suggested to include the topics Lux Operon and quorum sensing, Two component systems in nutrient sensing, Riboswitches, Heat shock response in *E.coli*, Flagellar variation in salmonella to update the students with recent topics in gene regulation

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Discussion	**223BC2A2CP: Immunology and Molecular Biology (New practical Course)** Dr.Kalaiselvi Senthil suggested to include the topics Latex agglutination test, CMIA, ECLIA (Industrial Visit), Effect of UV dose on survival rate of bacteria, Blue or white colony test for lac+/lac-, Karyotyping (demonstration) to gain practical knowledge in Immunology **223BC2A2CQ: Microbial Biochemistry and Metabolism (New practical Course)** Dr.Vadivel suggested to include Production and estimation of red wine from grapes, Estimation of Lipoproteins which provide the skills of innovative approach in microbial Biochemistry
Resolution	The Board approved the syllabi for the above courses
Item -8	Discussion on PG DSE offered by Department of Biochemistry to other departments in second semester for 2022-23 Batch and onwards
Discussion	**223BC2A2DA: Biochemistry of Toxicology** Dr.Santhini suggested to include the topics Ames test, Eukaryotic mutation test, Toxicological evaluation of Recombinant DNA - derived proteins, Fungicides, Herbicides. Environmental consequences of pesticide toxicity, Biopesticides, Toxicology of food additives to learn recent advances in toxicological research.
Resolution	The Board unanimously approved the syllabus
Item -9	Discussion on syllabus for IDC course offered to Department of Chemistry in second semester for 2022-23 batch and onwards
Discussion	**223BC2A2EA : Drug Biochemistry** Prof.Vijaya anand suggested to include the topics Patenting of Drug, Marketing, Computer aided drug design to gain knowledge in drug Biochemistry.
Resolution	The Board members approved the syllabus for the above course.
Item – 10	Discussion on Value Added Certificate Courses (VACC)
Discussion	The VAC courses entitled Molecular Diagnostics to be offered by internal faculty and Cheminformatics offered by the industry were discussed
Resolution	The Board members approved the syllabi for the above two courses.
Item – 11	Any other matter
Discussion	The board members discussed and recommended the Panel of Examiners
Resolution	The Board unanimously approved the Panel of Examiners

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

Date: 02.12.2022

02/12/22

(DR.S.GOWRI)

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

Syllabus Revision

Faculty: Biosciences **Board: Biochemistry**

Semester: II

Course Code/ Name: 223BC1A2CA: Enzymes

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

PERCENTAGE OF SYLLABUS REVISED: 38%

COURSE FOCUSES ON:

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

Syllabus Revision

Faculty: Biosciences **Board: Biochemistry**

Semester: II

Course Code/ Name: 223BC1A2CB: Microbiology

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

PERCENTAGE OF SYLLABUS REVISED: 26 %

COURSE FOCUSES ON :

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

Syllabus – Practical (New)

Faculty: Biosciences **Board: Biochemistry**

Semester: II

Course Code/ Name: 223BC1A2CP: ENZYMES AND MICROBIOLOGY

	Enzymes
1	Effect of pH on the activity of any one of the following enzymes: a). Acid phosphatase b). Amylase c). Urease
2	Effect of temperature on the activity of any one of the following enzymes: a). Acid phosphatase b). Amylase c). Urease
3	Effect of substrate concentration on the activity of any one of the following enzymes: a). Acid phosphatase b). Amylase c). Urease
4	Separation of isoenzymes by Native PAGE andSDS PAGE (Demonstration)
5	Enzyme immobilization by sodium alginate method **(DBT Star Practical)**
6	Determination of Molecular weight of enzymes using gel filtration **(DBT Star Practical)**
	Microbiology
7	Preparation and Inoculation of Culture Media-Solid and Liquid
8	Culture transfer techniques: Slid to solid (Streaking), Liquid to solid (spreading), Liquid to liquid, solid to liquid and determination of CFU/ml. **(DBT Star Practical)**
9	Staining techniques- Simple staining, Gram Staining, Negative, spore and Acid-Fast Staining.
10	Antibiotic sensitivity of bacterial pure culture
11	Tests for identification of Bacteria- IMViC, Bacterial Sugar Fermentation, Oxidase, catalase, urease and H2SProduction
12	Study and plot the growth curve of E. coli by turbidimetric and standard plate count methods **(DBT Star Practical)**

Note: End Semester Practical Examination requires completion of 10 experiments out of 12.

PERCENTAGE OF SYLLABUS REVISED: 100%

COURSE FOCUSES ON :

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

Syllabus Revision

Faculty: Biosciences **Board: Biochemistry**
Semester: II
Course Code/ Name: 223BC2A2CA: Immunology

Unit	Existing	Changes
I	**Cells of Immune System and Immune Responses** Cells of Immune System: Hematopoiesis, hematopoietic growth factors, Regulation of hematopoiesis, clinical uses of stem cells. ~~Lymphoid cells-T cells, B-cells-lymphoblast and null cells, granulocytes, monocytes and macrophages~~, CD antigens and membrane molecules of immune cells. Development, maturation, activation and differentiation of T-cells and B-cells, adhesion molecules. Immune Responses: Humoral and cell-mediated immune responses, primary and secondary immune responses, Theory of clonal selection.	. Lymphoid cells and myeloid cells
II	**Antigens, Antigen Recognition, Immunoglobulins** Antigens: B-cell epitopes, T-cell epitopes, antigenicity and immunogenicity, factors influencing immunogenicity, Haptens, adjuvants; Immunoglobulins: Structure and functions, Isotype, allotypes, Idiotypes; Classes, Immunoglobulins super family, ~~Gene rearrangement and antibody diversity~~, class switching. T-cell receptor and its diversity. Antigen Recognition: MHC-Genetic organization and inheritance, Antigen processing and presentation (Cytosolic and Endocytic pathway).	Organization and expression of immunoglobulin genes, generation of antibody diversity.
III	**Complement, Cytokines, Cytotoxicity, AIDS** ~~Complement Activation: Complement activation pathways (classical, alternative and Lectin), Biological consequence of complement activation.~~ Cytokines: IL, IFN, TNF, CSF- role in immune regulation, Cytokine receptors, Cytokine antagonists. Cell mediated immunity: CTL mediated cytotoxicity, NK cell mediated toxicity. Primary and secondary immunodeficiency diseases. AIDS: Structure of HIV, destruction of T cells, $CD4^+/CD8^+$ ratio, immunity to HIV virus, AIDS vaccine.	Complement system: components of complement activation and its biological consequences - classical, alternative and lectin pathways.
IV	**Hypersensitivity, Autoimmunity, Animal Models, Transplantation and Cancer immunology** Hypersensitivity reactions: Type I, II, III & IV. ~~Immunological tolerance. Autoimmunity: Concept, general mechanism, (organ specific, non-organ specific), Autoimmune disease in human-Rheumatoid arthritis, Myasthenia gravis, Systemic lupus erythematosus.~~ Experimental Animal Models: inbred strains, SCID mice, nude, knockout mice. Transplantation immunology: Immunologic basics of Graft rejection, MHC antigens in transplantation and HLA tissue typing, Immunosuppressive therapy. Cancer immunology: ~~Tumor antigens, Immune response to tumor antigens, Tumor evasion of the immune system,~~ Cancer immunotherapy.	Autoimmunity - organ specific (Hashimoto's thyroiditis) and systemic (Rheumatoid arthritis, Systemic lupus erythematosus) diseases. Immune response to tumors, Immunological surveillance of cancer
V	**Vaccines and Immuno-techniques** Vaccines: Active and passive immunization, recombinant vector vaccines, DNA vaccines, synthetic peptide vaccines, multivalent sub-units vaccines, COVID 19 vaccine, ~~general side effects of vaccines (review).~~ Immunotechniques: Hybridoma technology - Introduction, Antibody engineering (production of monoclonal antibodies), ~~Immunotherapy with genetically engineered antibodies. Detection of molecules using~~ agglutination, precipitation, immune-diffusion, immuno electrophoresis, ELISA, RIA, western blot, ~~flowcytometry/cell sorting~~ and ~~immune-fluorescence microscopy, immunohistochemistry.~~	Immunotechniques: Avidin - biotin mediated immunoassay. Immunohistochemistry - immunofluorescence, immunoferritin technique. Fluorescent immunoassay, fluorescence activated cell sorting (FACS). Cytokines assay: ELISPOT. Lymphocytes transformation test (LTT); Lymphoblastoid cell lines. Chemiluminesence

PERCENTAGE OF SYLLABUS REVISED: 39 %

COURSE FOCUSES ON :

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

Syllabus Revision

Faculty: Biosciences **Board: Biochemistry**

Semester: II

Course Code/ Name: 223BC2A2CB: Metabolism

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

PERCENTAGE OF SYLLABUS REVISED: 27 %

COURSE FOCUSES ON :

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

Syllabus Revision

Faculty: Biosciences **Board: Biochemistry**

Semester: II

Course Code/ Name: 223BC2A2CC: Microbial Biochemistry

Unit	Existing	Changes
I	**Microbial Nutrition, Medium, Growth and Measurement** Microbial Nutrition- nutritional requirements and uptake of nutrients by microbial cells; Transport of sugars into bacterial cell- the bacterial phosphotransferase system. Nutritional groups of microorganisms (autotrophs, heterotrophs and mixotrophs). Growth media- synthetic, complex, selective, enrichment and differential media. Microbial Growth- different phases of growth in batch cultures, synchronous, continuous and biphasic growth. Factors influencing microbial growth. Methods for measuring microbial growth- ~~Direct microscopy, viable count estimates, turbidometry and biomass.~~ Bacterial Cell cycle.	Transport of non-PTS sugars. Membrane bound transport systems- E.Coli lactose permease, Beta-methyl galactoside system
II	**Microbial Energy and Synthesis Biology** Energy yielding metabolism- carbohydrates- EMP, HMP, TCA- importance in bacteria. Phosphoketolase pathway, ED pathway, characteristics of electron transport in bacteria. Bacterial Chemotaxis and quorum sensing. Biosynthesis of cell wall- peptidoglycan, teichoic acid, lipids; biosynthesis of straight and branched chain fatty acids, unsaturated fatty acids and cyclopropane fatty acids. Synthesis of triacylglycerols, phospholipids, glycolipids and polyisoprenoids. Metabolism of purines and pyrimidines.	Aminoacid synthesis in microbes
III	**Fermentation Technology** Fermentation technology- Principles of fermentation, surface, submerged and solid-state fermentations. Batch, fed batch, semi-continuous and continuous culture techniques. ~~Strategies for strain improvement and maintenance of the industrial strains.~~ Downstream processing. ~~Design and operation of fermentors, Agitation and aeration.~~ Bioreactors. ~~Types of fermentors- continuous stirred-tank fermentor (CSTF), air-lift fermentor,~~ Types of reactions in fermentations. ~~Microbial production of Primary metabolites: organic acids (Acetic acid, lactic acid, and citric acid), Amino acids (glutamic acid, lysine, threonine, phenylalanine) and Vitamins (B12, B2, and vitamin C).~~	Strain improvement for better yield Design of fermenter- parts of the fermenter and their functions Specialized bioreactors Types of fermentors- Waldhof, tower, cylindro-conical, air-lift, deep-Jet, cyclone column, packed tower and rotating disc fermenter
IV	~~**Industrial and Agricultural Fermentation Technology**~~ Genetically modified organisms. ~~Enzymes- amylase, proteases, streptokinase,~~ Production of biogas from agricultural wastes. Production of bio-insecticides from bacteria and fungi. ~~Environmental Microbiology:~~ Microbiology of food-food spoilage, controlling food spoilage, types of food borne diseases, microbiology of fermented food. Applied environmental microbiology- water purification and sanitary analysis. Waste water treatment. Bio-degradation, bioremediation and bio- augmentation.	Environmental and Agricultural Technology Bio fertilizers - bacteria and blue-green algae
V	~~**Bio-Pharmaceuticals**~~ Production of antibiotics – source, production, recovery and uses of penicillin, tetracycline, amoxicillin. Production of bacterial and fungal polysaccharides; Commercial production of xanthan gum. Single cell protein-production and application.	Industrial and Pharamceutical Biotechnology Enzymes- amylase, proteases, streptokinase Microbial production of Primary metabolites: organic acids (Acetic acid, lactic acid, and citric acid), Amino acids (glutamic acid, lysine, threonine, phenylalanine) and Vitamins (B12, B2, and vitamin-C).

PERCENTAGE OF SYLLABUS REVISED: 23% %

COURSE FOCUSES ON :

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

Syllabus Revision

Faculty: Biosciences **Board: Biochemistry**

Semester: II

Course Code/ Name: 223BC2A2CD: GENETICS AND MOLECULAR BIOLOGY

Unit	Existing	Changes
I	**Genetics** Mendelian Principles: Segregation, Independent Assortment, Dominance relations, Multiple alleles, Incomplete dominance, Over dominance. Gene interaction, Epistasis, lethality and lethal genes, Sex determination and sex linkage, linkage and crossing over, gene mapping. Chromosomal theory of inheritance, Chromosomal aberrations, maternal effects. Introduction to Population genetics, gene frequency, factors affecting gene frequency. Genetic drift, Pedigree analysis and genetic counseling. Fine structure of Gene, cistron, recon, Structures of Eukaryotic and Prokaryotic genes. Cytoplasmic genetic systems- mitochondria and chloroplast DNA. Experimental evidence for DNA as the genetic material	Hardy-Weinberg Law, Eugenics
II	**Replication and Recombination** ~~Structure of DNA and RNA- Composition, Types and Functions.~~ Replication in prokaryotes: replication in circular chromosomes- Cairns model, rolling circle model. Eukaryotic replication, replication fidelity. Replication in RNA virus (retroviruses) ~~and plasmid replication.~~ Inhibitors of replication. DNA recombination: ~~Homologous, site specific and transposition~~, Homologous recombination: Holliday Model and Rec BCD pathway. Site-specific recombination: Lambda phage integration, and excision rearrangement. Transposition: Prokaryotic transposition, conservative and replicative transposition. Eukaryotic transposable elements~~, yeast and Drosophila transposons.~~	Retro-Transposons. DNA -Transposons
III	**Transcription and Translation** Transcription- ~~definition,~~ coding strand, template strand, sense strand and antisense strand, promotor, DNA-dependent RNA polymerase, role of Pribnow box, template binding, prokaryotic transcription, Rho-dependent and independent transcription, posttranscriptional processing in prokaryotes, alternative splicing, RNA editing. Eukaryotic transcription, post-transcriptional modifications of eukaryotic RNAs, RNA splicing, introns and splicing reactions, exons and enhancers	Nuclear export of mRNA- mRNA stability. Inhibitors of transcription Regulation of translation. Inhibitors of translation. Post translational modification of proteins.
IV	**Gene Regulation** Genetic code- definition, deciphering of the genetic code, ~~codon dictionary,~~ salient features of genetic code. ~~Structure of t-RNA, activating enzymes, binding of amino acids to t-RNA, wobble mechanism and its significance, composition of prokaryotic and eukaryotic ribosomes, leader sequence, Shine-Dalgarno sequence, reading frame shift,~~ prokaryotic and eukaryotic protein biosynthesis- initiation, elongation, translocation and termination, polysomes. ~~Protein folding – Chaperon mediated and independent. Inhibitors of protein synthesis.~~ Regulation of gene expression in prokaryotes-operon model, lac, trp, ~~arabinose~~ operons, ~~repression and attenuation.~~ Regulation of gene expression in eukaryotes: Britten-Davidson model, transcriptional regulation. C-value paradox, repetitive DNA.	araBAD operon, Riboswitches, Heat shock response in E.coli, Flagellar variation in salmonella: Lux Operon and quorum sensing, Two component systems in nutrient sensing. Genes controlling yeast mating types, Xenopus 5S rRNA in oocytes, Silk fibroin gene, Drosophila sex determination, Chicken globin genes and Environmental gene regulation.
V	**DNA Damage and Repair** Mutagenesis - Spontaneous and Induced mutations – Physical and Chemical mutagenesis, Molecular mechanisms of mutagenesis – Transition, Transversion, Frame Shift, mis-sense and non-sense mutations. DNA repair – Direct reversal repair, double strand break repair in mammals, Excision repair - base and nucleotide excision repair, mismatch repair, recombination repair, SOS response and mutagenic repair.	Detection of mutations: CLB Method and attached method.

PERCENTAGE OF SYLLABUS REVISED: 40%

COURSE FOCUSES ON :

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

Syllabus Revision

Faculty : Biosciences **Board : Biochemistry**

Semester : II

Course Code/ Name: 223BC2A2DA / Biochemistry of Toxicology

Unit	Existing	Changes
I	**Introduction to Toxicology:** Definition and scope of toxicology, Classification of toxic agents. Dose-response relationship: Synergism and Antagonism, Determination of ED50 and LD50. Acute and chronic exposures, Factors influencing toxicity - Abiotic and Biotic factors, Chemical interactions - Bioaccumulation and Bio-magnification.	
II	**Biochemical basis of Toxicology:** Mechanisms of Toxicity, Interaction of toxicant with target molecules -Disturbance of excitable membrane function. Altered calcium homeostasis. Covalent binding to cellular macromolecules. ~~Tissue specificity of toxicity --Metabolism of haloalkanes, haloalkenes and their toxic effects on tissues.~~	Toxicokinetics - ADME (Absorption, Distribution, Metabolism and Excretion) and Toxicodynamics Organ toxicology, Genetic and reproductive toxicology, Toxicogenomics
III	**Principles and procedures of testing for acute toxic effects:** Toxicity testing - Genetic toxicity testing and mutagenesis assays - *In-vitro* test systems - Bacterial mutation tests: Reversion test and Fluctuation tests. *In-vivo* mammalian mutation tests - Host mediated assay and Dominant lethal test. Use of drosophila in toxicity testing. DNA Repair assays, Chromosome damage test. Toxicity testing in animals.	Ames test, Eukaryotic mutation test Toxicological evaluation of Recombinant DNA – derived proteins.
IV	**Effects and Metabolism of toxins:** Fungal toxins, Mycotoxins - Aflatoxins, Bacterial toxins - Exotoxins ~~(types-I, II and -III)~~ and Endotoxins, Viral toxins, Algal toxins, Teratogens, Carcinogens, Mutagens, Snake venom toxin, Spider, Scorpion and Jellyfish toxins, Antivenom. Xenobiotic metabolism: Phase 1– III reactions, Cytochrome-P450.	Free radical theory of oxygen toxicity
V	**Pesticide toxicology, Metal toxicology, Chemical toxicology, Air and water pollutants:** Mechanism and site of action of Chlorinated organics (DDT, BHC), organophosphates and carbamates. Mode of action of toxic heavy metals - arsenic, mercury, cadmium and lead. Biochemical effects of ozone, peroxyacetyl nitrate (PAN), carbon monoxide, nitrogen oxides, sulphur dioxide and cyanide. Common air pollutants, water pollutants and their sources, air pollution due to methyl- isocyanate (MIC) and asbestos. Case studies.	Fungicides, Herbicides. Environmental consequences of pesticide toxicity. Biopesticides Toxicology of food additives

PERCENTAGE OF SYLLABUS REVISED: 30 %

COURSE FOCUSES ON:

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

Syllabus – Practical (New)

Faculty: Biosciences **Board: Biochemistry**

Semester: II

Course Code/ Name: 223BC2A2CP: Practical- Immunology and Molecular Biology

Experi -ments	Changes
1	Raising of antibodies in animal model and isolation
2	Partial purification of antibodies- Ammonium sulphate precipitation, Dialysis
3	Precipitin Ring Test
4	Detection of antigens / antibodies by ELISA technique, CMIA, ECLIA (Industrial Visit)
5	Immuno electrophoresis of antigens
6	Precipitation reaction - Single and Double Immunodiffusion
7	Latex agglutination test- widal Test.
8	Blood smear identification of leucocytes by Giemsa staining
9	Isolation of chromosomal DNA from bacterial cells and separation on agarose gel electrophoresis.
10	Isolation of plasmid DNA from bacterial culture and separation on agarose gel electrophoresis.
11	Isolation of total RNA from yeast/ *E. coli* and separation of RNA by agarose gel electrophoresis.
12	Transformation of *E. coli* cells with plasmid DNA and Blue or white colony test for lac^+/lac^-
13	Effect of UV dose on survival rate of bacteria.
14	Determination of DNA damage by comet assay
15	Karyotyping (demonstration)

Note: End Semester Practical Examination requires completion of 10 experiments out of 15.

Percentage of syllabus Revised: -100%

COURSE FOCUSES ON :

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

Syllabus – Practical (New)

Faculty: Biosciences **Board: Biochemistry**

Semester: II

Course Code/ Name: 223BC2A2CP: Practical- Immunology and Molecular Biology

Experi -ments	Changes
1	Raising of antibodies in animal model and isolation
2	Partial purification of antibodies- Ammonium sulphate precipitation, Dialysis
3	Precipitin Ring Test
4	Detection of antigens / antibodies by ELISA technique, CMIA, ECLIA (Industrial Visit)
5	Immuno electrophoresis of antigens
6	Precipitation reaction - Single and Double Immunodiffusion
7	Latex agglutination test- widal Test.
8	Blood smear identification of leucocytes by Giemsa staining
9	Isolation of chromosomal DNA from bacterial cells and separation on agarose gel electrophoresis.
10	Isolation of plasmid DNA from bacterial culture and separation on agarose gel electrophoresis.
11	Isolation of total RNA from yeast/ *E. coli* and separation of RNA by agarose gel electrophoresis.
12	Transformation of *E. coli* cells with plasmid DNA and Blue or white colony test for lac^+/lac^-
13	Effect of UV dose on survival rate of bacteria.
14	Determination of DNA damage by comet assay
15	Karyotyping (demonstration)

Note: End Semester Practical Examination requires completion of 10 experiments out of 15.

Percentage of syllabus Revised: -100%

COURSE FOCUSES ON :

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

Syllabus Revision

Faculty: Biosciences **Board: Biochemistry**

Semester: II

Course Code/ Name: 223BC2A2EA : Drug Biochemistry

Unit	Existing	Changes
I	**Pharmacology and Pharmacokinetics** Pharmacology: Classification of drugs, sources and preparation, ~~natural source, synthetic drugs, drug preparation: crude drug, pure drug compounds, pharmaceutical preparations.~~ Routes of drug administration: sublingual, buccal, oral, rectal, intravenous, intramuscular, subcutaneous, transdermal, inhalational and topical administration. Pharmacokinetics: drug absorption, drug distribution, drug biotransformation (role, formation and phases), drug excretion: quantitative pharmacokinetics, ~~drug plasma concentration curve,~~ bioavailability, ~~volume of distribution~~, drug clearance.	
II	**Pharmacodynamics** Definition. Drug receptors: Types, classification, drug-receptor interaction ~~(binding and affinity, signal transduction, efficacy, receptor regulation and drug tolerance).~~ Dose-response relationships (gradal and quantal). Adverse effects of drugs. Factors affecting drug safety and efficacy.	Drug receptor interaction - Agonist, antagonist, Inverse agonist, partial agonist.
III	**Antidepressant drugs and neurodegenerative diseases** Antidepressant drugs: Mechanism of action, therapeutic uses, kinetics and adverse effects. of tricyclic antidepressants and monoamine oxidase inhibitors. Treatment of neurodegenerative diseases: ~~neurotransmission in CNS, synaptic potentials, drugs used for Alzheimer disease and Parkinson disease. Mechanism of action, therapeutic uses, kinetics and adverse effects of Hypnotic drug (barbiturates).~~	**Parkinson's Diseases** - Introduction, Monoamine oxidase inhibitors. **Alzheimer diseases**- Mode of action Galantamine, rivastigmine. **Hypnotic drug** - zolpidem or zaleplon.
IV	**Drugs for peptic ulcer, inflammation , thyroid disorders and Diabetes** Anti-peptic ulcer drugs: H2 receptor antagonists and inhibitors of H+K+ ATP-ase pump. Anti-inflammatory drugs: Mechanism of action, therapeutic uses, pharmacokinetics and adverse effects of Anti-inflammatory drugs -aspirin and colchicine. ~~Anesthetics: patient factors in selection of anesthesia, induction, maintenance and recovery from anesthesia, features, potency, uptake, distribution, action and adverse effects of inhalation anesthetics. Intravenous and local anaesthetics.~~	Antimicrobial drugs - Sulfonamides, trimethoprim, penicillin, aminoglycosides and bacterial resistance. Thyroid and anti- thyroid drugs, Insulin and oral anti- diabetic drugs.
V	**Anticancer drugs** ~~Introduction to chemotherapy, treatment strategies, treatment regimens and scheduling, limitations of chemotherapy. Mechanism of action, therapeutic uses, pharmacokinetics and adverse effects of antimetabolites~~ (Methotrexate ~~and 5- fluorouracil~~), antibiotics (Dactinomycin and Bleomycin), microtubule inhibitor (Vincristine and Vinblastine), ~~steroid hormones and their antagonist (Tamoxifen) and interferons~~	Anticancer drugs - Mode of action and its mechanism - Cyclophosphamide and methotrexate. Patenting of Drug, Marketing, Computer aided drug design.

PERCENTAGE OF SYLLABUS REVISED: 67 %

COURSE FOCUSES ON :

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

ATTENDANCEOF THE FOURTEENTH BOARD OF STUDIES MEETING

Faculty: Bioscience **Name of Board: Biochemistry**
Venue: Innovation Lab Date: 02/12/2022 **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	
2	Dr.A. Vijaya Anand Professor Dept. of Human Genetics and Molecular Biology Bharathiar University, Coimbatore- 641046	VC nominee	2/12/2022
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	2/12/22
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	Absent
7	Dr.S.Vadivel HOD of Clinical Biochemistry and Quality Control System K.G.Hospital ,Coimbatore- 641018	Alumni	
8	Dr.S.Balasubramanian Dean Research and Development, Dr. N.G.P. ASC	Member	02/12/22
9	Dr.N.Kuppuchamy	Co-opted	2/12/22

	Department of Tamil, Dr. N.G.P. ASC	Member	
10	Dr.R.Vithya Prabha Department of English, Dr. N.G.P. ASC	Co-opted Member	R.V-epe 2/12/22
11	Dr.K.Girija Department of Physics, Dr. N.G.P. ASC	Co-opted Member	2/12/22
12	Dr.N.Kannikaparameswari Department of Biochemistry, Dr. N.G.P. ASC	Member	
13	Dr.T.Indhumathi Department of Biochemistry, Dr. N.G.P. ASC	Member	T. 2/12/22
14	Dr.K.Rajathi Department of Biochemistry, Dr. N.G.P. ASC	Member	2/12/22
15	Ms.Miruthula.S II M.Sc Biochemistry	Student Representative	S. Miruthula
16	Ms.Manorida. G III B.Sc Biochemistry	Student Representative	G. Manorida

Date :02/12/2022

2/12/22

(Dr.S.Gowri)
Chairman,BoS Biochemistry

Academic Council
Dr. V. Rajendran
CHAIRMAN
Dr. N.G.P. Arts College

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