

## 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

18<sup>th</sup>

### Department of Biotechnology Board of Studies Meeting Academic Year: 2024-25 (Even Semester)

The minutes of the 18<sup>th</sup> meeting of Board of Studies held on 08.11.2024 at 10.00 am at the B1 Block- Room No. 1213. (Department of Biotechnology - Instrumentation Room)

#### Members Present:

S. No.	Name	Category
1	Dr. P. Chidambara Rajan	Chairman
2	Dr. P.T. Prathima, Senior Scientist, ICAR Sugarcane Breeding Institute, Coimbatore.	Subject Expert
3	Dr.M.Prasad, R&D Executive, Industrial Enzymes, Marisym Biologicals Private Ltd, Coimbatore	Industrial Expert
4	Dr. R. Suganthi	Member
5	Dr. K. Kalimuthu	Member
6	Dr. K. Arungandhi	Member
7	Dr. Arun P	Member
8	Dr. M.N. Kathiravan	Member
9	Dr. M. Shanmugavadivu	Member
10	Dr. M. Poongothai	Member
11	Dr. S. Saranya	Member
12	Mrs. C.R. Aarthi	Member
13	Dr. N. Kuppuchami	Co-opted Member
14	Dr. A. Hazel Verbina	Co-opted Member
15	Dr. K.Girija	Co-opted Member
16	Ms. Dharsini T K	Student Representative- UG

The HoD and Chairman of the department of Biotechnology welcomed and introduced all the members and appreciated them for their continuous support and contribution for the development of academic standard and enrichment of the syllabus.

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

1. Dr. V. Vijaya Padma, Professor  
Department of Biotechnology  
Bharathiar University, Coimbatore. - University Nominee
2. Dr. S. Nakkeeran  
Dean i/c, Agricultural College and Research Institute,  
Kudumyanmalai, Pudukkottai. - Subject Expert



3. Dr. N. Karthikeyan  
Project Coordinator,  
Regional Sericulture & Research Center,  
Salem.

– Alumni

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

**Item 18.1:** *To review and approve the minutes of the previous meeting held on 06-04-2024.*

The chairman of the Board presented the minutes of the previous meeting held on 06-04-2024 and requested the members to approve. After brief discussion the following resolution was passed.

**Resolution:**

**Resolved to approve the minutes of the previous meeting held on 06-04-2024**

**Item 18.2:** *To consider and approve the syllabi for II semester for UG and PG students admitted during the academic year 2024-2025.*

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

**Changes Made:**

Course Code	Course	Reason
24BTU2CA	Core: Genetics	Dr. Prathima and Dr. Prasad suggested to include the following topics in <b>Unit II: "Ploidy"</b> <b>Unit III: "Y-linked inheritance"</b> for better understanding.
24BTU2CB	Core: Biochemistry	Dr. Prathima and Dr. Prasad suggested to include the following topic in <b>Unit III: "Ramachandran Plot"</b> for protein structure prediction.
24BTP2CA	Core: Immunotechnology	Dr. Prathima and Dr. Prasad suggested to remove the following topic <b>Unit II: "Surface Plasmon Resonance"</b> as it is not needed in this paper
24BTP2CB	Core: Genetic Engineering	Dr. Prathima and Dr. Prasad suggested to include the following topics <b>Unit IV: "qRT PCR"</b> for better understanding
24BTP2CC	Core: Environmental Biotechnology	Dr. Prathima and Dr. Prasad suggested to remove and include the following topics <b>Unit II: "Remove this unit and include pollution in Unit I"</b> as these topics are basic.



		<p><b>Unit IV: Biosorption and bioleaching to Unit III</b> for the addition of advanced topics in Unit IV.</p> <p>Dr. Prathima and Dr. Prasad suggested to shift <b>“Unit III to Unit II”</b> as the second unit is removed.</p> <p><b>Unit V: “Government organizations in environmental monitoring, Sustainable Development Goals in Environment, Carbon emission management”</b> for the understanding of environmental sustainability.</p>
24BTP2CD	<b>Core: Bioprocess Technology</b>	<p>Dr. Prathima and Dr. Prasad suggested to include the following topics</p> <p><b>Unit II: “Statistical optimization of media - RSM and CCD”</b> to understand the media optimization</p> <p><b>Unit V: “Regulatory affairs - Policies, regulations, environmental clearance and Certifications”</b> to understand the regulatory affairs.</p> <p>Dr. Prathima and Dr. Prasad suggested to remove the following topics</p> <p><b>Unit IV: “Separation of solid and liquid phases”</b> as it is included in centrifugation topic itself.</p>
24BTP2DA	<b>DSE: Forensic Biotechnology</b>	<p>Dr. Prathima and Dr. Prasad suggested to include the following topics</p> <p><b>Unit III : “RAPD”</b> for the understanding of random amplification of DNA</p>

After discussion the following resolution was passed.

**Resolution:**

**Resolved to approve the above modification and adopt the revised syllabus for UG students admitted for the academic year 2024-25 and to retain the existing syllabus for PG students admitted for the academic year 2024-25.**

**Item 18.3:** *To consider and approve the syllabi for IV semester for the students admitted in UG and PG during the academic year 2023-2024.*

The chairman presented the detailed scheme and Regulation for the students admitted in UG and PG from the academic year 2023-2024 and syllabi for the IV semester. The members deliberated in detail about the modification required.

After discussion it is unanimously decided to adopt the following changes.

**Resolution:**

**Resolved to approve and adopt to retain the existing syllabus for the courses for UG and PG students admitted for the academic year 2023-24.**



**Item 18.4:** To consider and approve the syllabi for VI semester for the students admitted in UG during the academic year 2022-2023.

The chairman presented the detailed scheme and Regulation for the students admitted in UG from the academic year 2022-2023 and syllabus for the VI semester. The members deliberated in detail about the modification required.

**Changes Made:**

Course Code	Course	Reason
223BT1A6CB	Bionanotechnology	Dr. Prathima and Dr. Prasad suggested to shift <b>Unit I: “Opportunities and Challenges of Nanotechnology to Unit V”</b> as it is a future aspect. Dr. Prathima and Dr. Prasad suggested to include <b>Unit I: “Size determination – XRD, particle size analyzer”</b> for the better understanding of nanoparticle size.
223BT1A6DA	DSE: Drug Design & Delivery	Dr. Prathima and Dr. Prasad suggested to remove <b>Unit III: “Concepts in CADD”</b> as it is repeating.

**New Courses Introduced:**

Course Code	Course	Reason
223BT1A6CA	Genomics and Proteomics	Dr. Prathima and Dr. Prasad suggested to include <b>Unit I: Whole genome databases, metagenomics</b> <b>Unit II: Transcriptomics</b> <b>Unit III: Protein databases</b> <b>Unit IV: Peptide mapping and peptide finger printing</b> for the understanding of advanced techniques. Dr. Prathima and Dr. Prasad suggested to remove <b>Unit I: Gene expression profiling</b> as it is repeating.
223BT1A6CP	Core Practical: Genomics, Proteomics and Bionanotechnology	Dr. Prathima and Dr. Prasad suggested to include <b>1. Database submission</b> to understand the tools used in genomic and proteomic data submission.
223BT1A6SA	Skill Enhancement: Stem Cell Technology	--
223BT1A6DC	DSE: Synthetic Biology	--
223BT1A6DE	DSE: Molecular Diagnostics	Dr. Prathima and Dr. Prasad suggested to remove <b>Unit III: PCR steps</b> as it is repeating Dr. Prathima and Dr. Prasad suggested to Shift <b>Unit III: MALDI to Unit IV</b>



		<b>Unit IV: Agarose gel electrophoresis to Unit III</b> as the are specific to the mentioned Units. Dr. Prathima and Dr. Prasad suggested to include <b>Unit IV: 2D gel electrophoresis, western blot, ELISA, Data interpretations</b> for the enhanced understanding of analytical techniques.
<b>223BT1A6DF</b>	<b>DSE: Food Technology</b>	Dr. Prathima and Dr. Prasad suggested to change <b>Unit IV: “Food sweeteners as Artificial sweeteners”</b> as they are synthetics compounds.

After discussion it is unanimously decided to adopt the following changes.

**Resolution:**

**Resolved to approve the above modification and adopt the revised syllabus for students admitted for the academic year 2022-23.**

**Item 18.5:** *To consider and approve the syllabi for PG Diploma, Certificate, Skill oriented courses to be offered during the academic year 2024-25.*

The chairman presented the detailed scheme for Diploma, Certificate, Skill oriented courses to be offered the students admitted from the academic year 2024-25 onwards. The members deliberated in detail about the modification required. After discussion it is unanimously decided to adopt the following changes.

**Resolution:**

**Resolved to retain the existing syllabus of 2022-23 batch without any modification for the students admitted from the academic year 2024-25.**

**Item 18.6:** *To consider and approve the panel of examiners for conducting of End Semester Practical's examination, Central Valuation and Question Paper Setting.*

The chairman presented the detailed the panel of examiners for conducting of End Semester Practical's examination, Central Valuation and Question Paper Setting. The members deliberated in detail about the modification required. After discussion it is unanimously decided to adopt the following changes.

**Resolution:**

**Resolved to retain the existing panel of 2022-23 batch without any modification for the students admitted from the academic year 2024-25.**



**Item 18.7:** *To consider and approve the syllabi of Self study theory paper offered in III semester for the students admitted during 2024-25.*

The chairman presented the detailed scheme and Self study theory syllabi for the students admitted in UG and PG from the academic year 2024-2025. The members deliberated in detail about the modification required.

After discussion the following resolution was passed.

**Resolution:**

**Resolved to retain the existing syllabus of 2023-24 batch without any modification for the students admitted from the academic year 2024-25.**

**Item 18.7:** *To consider and approve the syllabi of NPTEL course and get exemption for the courses offered in III semester for the PG students admitted during 2024-25 and V semester for the UG students admitted during 2023-24.*

The chairman presented the detailed syllabi for V semester of UG students admitted during 2023-24 and for III semester of PG students admitted during 2024-25. The members deliberated in detail about the modification required.

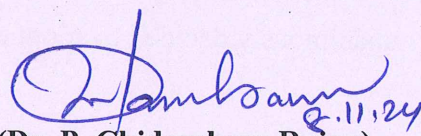
After discussion the following resolution was passed.

**Resolution:**

**Resolved to approve the syllabi of NPTEL course and get exemption for the courses offered in III semester for the PG students admitted during 2024-25 and V semester for the UG students admitted during 2023-24.**

Finally, the Chairman thanked all the members for their cooperation and contribution in enriching the syllabus with active participation in the meeting and sought the same spirit in the future also. The meeting was closed with formal vote of thanks proposed by Dr. P. Chidambara Rajan, Head and Chairman- Biotechnology.

**Date: 08.11.2024**

  
(Dr. P. Chidambara Rajan)  
BoS Chairman/HoD  
Department of Biotechnology  
Dr. N. G. P. Arts and Science College  
Coimbatore – 641 048



**Department of Biotechnology**  
**B.Sc. Biotechnology**  
**Syllabus Revision**

**Faculty: Biosciences**

**Board: Biotechnology**

**Semester: II**

**Course Code/Name: 24UBT2CA/Genetics**

Unit	Existing	Revised
I	Mendelian & Non Mendelian Inheritance: History of Genetics, Mendel's work: Choice of experimental plant, Monohybrid Experiment, Dihybrid Experiment, Back Cross and Test Cross. Chromosomal theory of Inheritance, Extranuclear inheritance, Maternal inheritance	--
II	Concept of Gene, Alleles and Chromosome: Gene vs Allele, Multiple Alleles, Pseudo alleles, Lethal genes. Gene Interactions: Allelic (Co-Dominance, Incomplete Dominance and pseudo-dominance), Non Allelic (Epistasis). Concept of loci on Chromosome, Structure of Prokaryotic and Eukaryotic chromosome, Karyotyping	Ploidy
III	Chromosomal Variations and Aberrations: Mutation - Spontaneous mutations and Induced mutations. Structural (deletion, duplication, inversion and translocation). Single Gene Disorders: Autosomal Dominant-Achondroplasia, Polycystic kidney, Autosomal Recessive - Cystic fibrosis, Sickle cell Anaemia. X-linked Dominant-Rett syndrome. X-linked Recessive-Haemophilia, Multifactorial- Cleft lip and palate	Y-linked inheritance
IV	Natural Horizontal Gene Transfer Methods: Genetic analysis of bacteria - Bacterial transformation, Conjugation (sex factor, Hfr strain, F'factor), Transduction in Bacteria (General and Specialized), Linkage and Crossing over, Recombination - Holliday model	--
V	Transposons and Population Genetics: Model organism for genetic analysis of development- Drosophila & Arabidopsis. Transposable elements of Prokaryotes (IS Elements, Composite and Tn3 Family) and Eukaryotes (Maize transposable elements). Gene frequency, Hardy-Weinberg law, calculating gene frequency, factors affecting gene frequency, Pedigree analysis	--

**PERCENTAGE OF SYLLABUS REVISION : 1.5%**

**COURSE FOCUS ON :**

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



**Department of Biotechnology**  
**B.Sc. Biotechnology**  
**Syllabus Revision**

**Faculty: Biosciences**

**Semester: II**

**Course Code/Name: 24BTU2CB/ Biochemistry**

**Board: Biotechnology**

Unit	Existing	Revised
I	Structure, classification and functions of carbohydrates, Glycoproteins, Glycolipids Glycolysis, gluconeogenesis and Krebs's cycle. Electron transport chain, Glyoxylate cycle, Glycogen synthesis and breakdown.	--
II	Lipids: Nomenclature, Classification and biological significance. Simple Lipids and Compound lipids. Synthesis and metabolism of fatty acids ( $\alpha$ , $\beta$ and $\omega$ Oxidation of fatty acids). Cholesterol Biosynthesis	--
III	Amino acid: Biosynthesis of amino acids, Essential and non essential amino acids, Properties and Metabolism of amino acid (Glycine). Protein: Classification and Properties – four levels of protein structure & conformations.	Ramachandran Plot
IV	Enzymes: Nomenclature and Classifications. Coenzymes, Abzymes and Ribozymes. Mechanism of enzyme actions - Active site, Lock and Key model & Induce fit Hypothesis, Enzyme substrate complex formation. Kinetics: Derivation of Michaelis-Menton equation.	--
V	Nucleic acids: Classification, structure and functions of nucleic acids, Biosynthesis of Purines and pyrimidines -De novo pathway, Salvage pathway.	--

**PERCENTAGE OF SYLLABUS REVISION : 1%**

**COURSE FOCUS ON :**

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



**Department of Biotechnology**  
**B.Sc. Biotechnology**  
**Syllabus Revision**  
**New course**

**Faculty: Biosciences**

**Board: Biotechnology**

**Semester: VI**

**Course Code/Name: 223BT1A6CA / Genomics and Proteomics**

Unit	Content
I	Access and retrieving genome project information from web - Comparative genomics. Identification and classification of genome using molecular markers, 16S rRNA typing/sequencing, Fragment Assembly and Expressed Sequence Tag (EST). Whole Genome sequencing - Sanger and Gilbert method - Next Generation Sequencing - Gene predictions. Gene Expression profiling. GENSCAN. Genomic and cDNA libraries. Metagenomics
II	Oligonucleotide design, Data collection, Image processing, Data transformation and normalization, Statistical analysis to identify differentially expressed genes and Microarray data classification. Comparison of SAGE and DNA Microarrays. Transcriptomics
III	Protein databases - UniProt, RCSB, InterPro, PDB. Database of Protein family trees - SMOS.2, LenVarDB, 3PFDB, SUPFAM, MegaMotifbase, DSDBASE, Peptide Sequencing - Mass spectrometry - Fundamentals, Ionization sources, Mass analyzers, MALDI sample preparation and analysis. Hybrid mass spectrometry configurations, in-gel & in-solution digestion.
IV	Introduction to quantitative proteomics - Relative and Absolute Quantification, Label Free Quantification - Spectral Counting. Gel based quantitative proteomics - Fluorescence 2-D Difference Gel Electrophoresis (FDIGE) and Labelled Quantification - In vivo labeling (SILAC & TAILS) and In vitro labeling (iTRAQ & TMT). Peptide Mapping and Peptide Fingerprinting
V	Functional Proteomics, Interaction proteomics - Biochemical approaches: Direct analysis, affinity purification and protein chips. Applications of proteomics in OMICS and its translational research (Metabolomics, Metabonomics and Neutriproteomics). Challenges in Proteomics.

**PERCENTAGE OF SYLLABUS REVISION - 100 %**

**COURSE FOCUS ON:**

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



**Department of Biotechnology**  
**B.Sc. Biotechnology**  
**Syllabus Revision**

**Faculty: Biosciences**

**Board: Biotechnology**

**Semester: VI**

**Course Code/Name: 223BT1A6CB / Bionanotechnology**

Unit	Existing	Revised
I	Key features of Nano-size,. Comparison of particle behavior at nanosize to macrosize. Strategies for Nanoarchitecture (top down & bottom up approaches). Introduction to Nanobiotechnology – Biogenic nanoparticle synthesis from plants, bacteria and yeast. Biomolecular design. Opportunities and challenges of Nanotechnology.	size determination – XRD and Particle size analyzer
II	Structural principles of Bionanotechnology: Natural Bionanomachinery – (Eg: Lotus leaf effect, Gecko lizard, fish hair structures, butterfly wings). Overview of Nanodevices - Strategies for construction of Nanodevices using Carbon as a raw material. Protein folding Aspects: Stable structure, Globular proteins, Role of chaperones in folding, lipid bilayer, DNA based nanostructures.	--
III	Principles of Functional Bionanotechnology. Information-driven nanoassembly: Energetics; Biomaterials- Filaments and fibrils, Minerals combined with biomaterials for specific applications. Biomolecular sensing taste and light sensors. Machine phase Bionanotechnology- Muscle sarcomeres and nerves).	--
IV	Differentiation of Nanoparticles and Nanosystems. Conventional drug delivery & targeted drug delivery – its role and advantages; Clinical Trials involved in Bionanotechnology.	--
V	Principles, types and applications of Bionano-imaging, Magnetic nano-particles, nano-biosensors, biochips, biorobotics, nanopore technology and nanoarrays in medicine, agriculture, food and environmental science. Opportunities and challenges of Nanotechnology.	Opportunities and challenges of Nanotechnology.

**PERCENTAGE OF SYLLABUS REVISION: 3.5%**

**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 type="checkbox"/>	Intellectual Property Rights	<input type="checkbox"/>	Gender Sensitization
<input type="checkbox"/>	Social Awareness/ Environment	<input checked="" type="checkbox"/>	Constitutional Rights/ Human Values/ Ethics



**B.Sc. Biotechnology**  
**Core Practical Syllabus Revision – New Course**

**Faculty: Bioscience**

**Board: Biotechnology**

**Semester: VI**

**Course Code / Name: Core Practical – Genomics, Proteomics and Bionanotechnology**

Exp. No.	Content
1.	Data Submission in genomic databank and protein databank
2.	Pairwise and multiple Sequence Alignment & Analysis by Clustal Omega
3.	Phylogenetic Analysis by MEGAx and interactive view for rooted phylogenetic trees and networks by Dendroscope3
4.	Protein Structure Prediction by AlphaFold, MODELLER and Rosetta
5.	Structure Databases & Visualization using PyMol, JMol, Cn3D and STING
6.	Protein Function Prediction sequence-based using InterPro, Pfam, PredictProtein, ProFunc and structure-based by COFACTOR
7.	Helix parameters identification by Heliquist
8.	Calculation of phi and psi angles in proteins using PyMOL, Chimera and VMD (Visual Molecular Dynamics)
9.	Structure validation and Protein Data Bank by PROCHECK, Ramachandran Plot tools in PyMOL/Chimera
10.	Proteomics data analysis by ProteoWizard tool
11.	Synthesis of Nanoparticles using herbal plants*
12.	Spectral analysis of Nanoparticles obtained from herbal sources*
13.	Antibacterial screening of metallic Nanoparticles.*

**PERCENTAGE OF SYLLABUS REVISION : 100 %**

**COURSE FOCUS ON**

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



**Department of Biotechnology**  
**B.Sc. Biotechnology**  
**Syllabus Revision**  
**New course**

**Faculty: Biosciences**  
**Semester: VI**

**Board: Biotechnology**

**Course Code/Name: 223BT1A6SA – Skill Based: Stem Cell Technology**

Unit	Content
I	Introduction to stem cells - in vivo and in vitro. Development of stem cells - Early development, gastrulation and lineage commitment, specification and development of primordial germ cells. Human stem cells and its plasticity with regard to research, cord blood stem cell.
II	In vitro stem cell regeneration - establishment of embryonic stem cells (ESC), Characterization of pluripotent stem cells (PCS), Molecular mechanism underlying pluripotency, Induction of pluripotency, Potential of induced pluripotent stem cells (iPSCs) in clinical applications, Reprogramming using defined factors and its mechanisms
III	In vitro differentiation, specification during development in adults, Trans differentiation and direct programming. Computational tools to dissect stem cells heterogeneity, in vitro cultures of adult stems cells to analyze differentiation capacity
IV	Histone modification, spatial organization of genome during ESC development and differentiation. Generation of chimeric animals and animal cloning; Pro-nuclear injection of blastocysts, transplantation of blastocysts into pseudo-pregnant mice and generation of chimeric and knockout animals
V	Clinical application of stem cell technologies with reference to adult stem cell disease modeling and therapy. Stem cell therapy guidelines and clinical trials. Embryo ethics - ethics of egg donation, premature translation of stem cell interventions. Access to future stem cell therapies awareness to the public.

**PERCENTAGE OF SYLLABUS REVISION - 100 %**

**COURSE FOCUS ON:**

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



**Department of Biotechnology**  
**B.Sc. Biotechnology**  
**Syllabus Revision**

**Faculty: Biosciences**

**Board: Biotechnology**

**Semester: VI**

**Course Code/Name: 223BT1A6DA – Drug Design & Delivery**

Unit	Existing	Revised
I	Introduction to Drug Design and Discovery, History and Evolution of the contemporary drug discovery process. Role of organic chemistry in Drug Discovery, Design and Development. Molecular properties and interactions of drug molecules. Structure Activity Relationships (SAR) and Quantitative SAR (QSAR) techniques in drug design.	--
II	Types of Drug design and Drug development, difference between drug design and drug development. Classical Targets in Drug Discovery - Enzymes, Inhibition of Enzymes, G-Protein-Coupled Receptors (GPCRs), Ion Channels and Membrane Transport Proteins (Transporters).	--
III	Cheminformatics - Introduction to pharmacophore, methods in docking simulations, Applications in ADME-tox and Limitations. <del>Concepts in CADD</del> . Role of Cheminformatics and Molecular Diversity in Lead Discovery. Sources of Lead Compounds, Screening, Identification, Modification and Lead Optimization.	--
IV	Introduction and classification of CADD. Drug design based on bioinformatics tools, Molecular docking, De novo design, Structure Based Drug Design (SBDD) and Ligand Based Drug Design (LBDD). Challenges and emerging problems in CADD, Legal & ethical considerations in drug development.	--
V	Introduction to drug delivery and targeting systems. Controlled drug release, parenteral and non parenteral routes of drug delivery and targeting - Oral, buccal, sublingual, GI tract, transdermal, nasal and pulmonary drug delivery. Gene delivery systems and Vaccine delivery. Challenges and obstacles to targeted drug delivery.	--

**PERCENTAGE OF SYLLABUS REVISION : 1.2%**

**COURSE FOCUS ON :**

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



**Department of Biotechnology**  
**B.Sc. Biotechnology**  
**Syllabus Revision**  
**New course**

**Faculty: Biosciences**

**Board: Biotechnology**

**Semester: VI**

**Course Code/Name: 223BT1A6DC – DSE: Synthetic Biology**

Unit	Content
I	Information Storage in Biology – DNA Structure, DNA Replication, and PCR. Information flow in Biology – Genetic code and Proteins. Controlling the flow of Information in Biology – Transcriptional Control, Translational control and, RNA regulation.
II	Systematic Design, Synthetic biology design cycle and its role in systematic design. The registry and part characterization. Information system – The SynBIS system and BioCAD concept. Modelling, Norbert Weiner, Signal Theory- analysis of periodic signals, Time and frequency domains, Systems and Control Theory. Block Diagram, Laplace transform method.
III	Enabling Technologies- Genome sequences, Open Online databases, DNA Sequencing, DNA Synthesis and System Biology. Foundations -Standard DNA Assembly, Standard Measurement, Modelling, Parts registries and Upcoming Technologies.
IV	Minimal Cells – Natural Minimal Cells, Genome Reduction, Synthetic Life, Genome Synthesis and Designer Cells. Origins of Life in nature and in the lab – The RNA world, Chemical replicating systems, Parts, Devices and Systems – Parts - Promoter, Operator, Ribosome Binding site, Protein coding sequence and Terminators. Simple systems – Feedback Loops, Switches, Oscillators, Edge detector and Counters. Turning Secondary Structure of mRNA in and around parts - RBS matching and Insulators.
V	Potential for development, Criteria for development, Challenges in developing applications, Constructing Microbial cell factories, Protein products, Fuels, Commodity chemicals, Materials, Specialty chemicals and drugs. Medical and Health applications, Biosensors, Smart therapeutics, Tissue engineering and patterning. Synthetic Biology for a Sustainable world – Bioremediation, Biomining, Engineering crops and commensal soil organisms. Societal Impact of synthetic Biology – Public Health and Environmental Risks, Biosecurity and Biohacking, Public value and new global inequality.

**PERCENTAGE OF SYLLABUS REVISION - 100 %**

**COURSE FOCUS ON:**

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



**Department of Biotechnology**  
**B.Sc. Biotechnology**  
**Syllabus Revision**  
**New course**

**Faculty: Biosciences**

**Board: Biotechnology**

**Semester: VI**

**Course Code/Name: 223BT1A6DE – DSE: Molecular Diagnostics**

Unit	Content
I	Introduction to Disease - Types -Characteristics - Classification of Diseases - Epidemiological aspects of diseases of national importance - Epidemiological aspects of Non - Communicable Diseases - Emerging and Re - Emerging Diseases.
II	History of diagnostics - Age of molecular diagnostics: Significances, Scope - Rise of Diagnostic industry in Indian and global scenario - Molecular Techniques in diagnosis of diseases - Biomarkers in disease diagnostics - Different terminology used in clinical laboratories.
III	Agarose gel electrophoresis, PCR, qPCR, Multiplex-PCR, RFLP, DNA fingerprinting, Southern Blotting, Electrophoresis techniques, DNA Sequencing. Introduction to primer designing.
IV	SDS-PAGE electrophoresis, 2D gel electrophoresis, western blotting and ELISA. Chromatography method of separation and detection: high performance liquid chromatography. Identification of a molecules by mass spectrometry: introduction to the technique, its applications in diagnostics and basic interpretation of the mass spectrometer graphs. MALDI- TOF and data interpretations.
V	Traditional disease diagnosis methods and tools – infection caused by Salmonella and Mycobacterium. Diagnosis of Candidiasis. Diagnosis of Pox and Hepatitis viruses. Diagnosis of Protozoan disease (Amoebiasis and Leishmaniasis). Cancer- different types of cancers, genetics of cancer- oncogenes, tumour suppressor genes. Methods available for the diagnosis of genetic diseases and metabolic disorders.

**PERCENTAGE OF SYLLABUS REVISION - 100 %**

**COURSE FOCUS ON:**

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



**Department of Biotechnology**  
**B.Sc. Biotechnology**  
**Syllabus Revision**  
**New course**

**Faculty: Biosciences**

**Board: Biotechnology**

**Semester: VI**

**Course Code/Name: 223BT1A6DF / FOOD TECHNOLOGY**

Unit	Content
I	Introduction to food biotechnology and related industries; general aspects of food industry, world food demand and Indian scenario, constituents of food, quality and nutritive aspects. GM Foods; Single cell Protein (SCP) production, mushroom production technology.
II	Food additives- definitions, need for food additives, classification and functions of different additives: thickeners, antioxidants, colouring agents, flavouring agents, sweeteners, emulsifiers; Probiotics, Prebiotics and Synbiotics - Production & importance; Preservation techniques: refrigeration & freezing, dehydration, heating, irradiation, antimicrobial agents used in food preservation.
III	Fermented Foods: Dairy products - Milk, Curd, Yoghurt, Cheese, Kafir production technologies; Pickle, Kimchi, Sauerkraut, Miso, Kombucha; Soft and Alcoholic Beverages. Introduction to Food Packaging: definition, factors involved in the evolution and selection of a food package. Types of packaging; Aseptic packaging of foods: sterilization techniques of packaging materials; Active Food Packaging.
IV	Food borne diseases. Food Allergens. Food Adulteration. Food colors (natural & artificial food colourants). Food flavoring agents. Properties & function of Emulsifiers & Stabilizers in food. Artificial Sweeteners – Saccharine, Acesulfane, Aspartame & Sucrolose). Food Contaminants.
V	Introduction to concepts of food safety and food quality assurance. Hazard analysis and critical control point (HACCP), Role of international regulatory agencies: USFDA and ISO. Indian food laws and standards: Prevention of Food Adulteration (PFA) Act, Fruit Products Order (FPO), Meat Products Order (MPO), Cold Storage Order (CSO), Role of AGMARK Standard, Bureau of Indian Standards (BIS) and Food Safety and Standards Authority of India (FSSAI).

**PERCENTAGE OF SYLLABUS REVISION - 100 %**

**COURSE FOCUS ON:**

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



**Department of Biotechnology**  
**M.Sc. Biotechnology**  
**Syllabus Revision**

**Faculty: Biosciences**

**Board: Biotechnology**

**Semester: II**

**Course Code/Name: 24BTP2CA - Immunotechnology**

Unit	Existing	Revised
I	Cells and Organs of Immune System: History and scope of immunology. Types of Immunity - Passive, Active and Acquired immunity. MHC and its types. Humoral and Cell Mediated immunity. Cells and organs of immune systems – Bone marrow, Spleen, Lymph nodes and their functions. Antigens -Types, haptens, epitopes and factors influencing antigenicity. Antibody – Structure, types, properties and functions. Immunoglobulin gene rearrangements.	--
II	Antigen – Antibody interaction: Affinity, avidity, cross reactivity, specificity, epitope mapping; Agglutination and Precipitation reactions. Immunoassays– Immuno Diffusion and Immunoelectrophoresis, RIA, ELISA, Western blotting, ELISPOT assay, immunofluorescence – FISH and GISH, Surface Plasmon resonance, Biosensor assays for assessing ligand – receptor interaction.	--
III	New Generation Antibodies: Antibody engineering; Hybridoma and monoclonal antibody (MCAB) techniques, Purification of MCABs. Characterization of MCABs / and Labelling of antibodies. Antibodies as <i>in-vitro</i> and <i>in-vivo</i> probes. Applications of monoclonal antibodies in diagnostics and therapeutics.	--
IV	Vaccine Technology: Vaccine design based on clinical requirements: Active immunization; live, killed, attenuated, Sub unit vaccines; Recombinant DNA and protein-based vaccines, plant-based vaccines and reverse vaccinology; Peptide vaccines, conjugate vaccines; Passive Immunization; Antibody and immunocompetent cells transfusion; Cell based vaccines, edible vaccines, marker vaccines, viral like particles (VLPs), Dendritic cell-based vaccines, Vaccine against cancer, T Cell based vaccines and Therapeutic vaccines.	--
V	Hypersensitivity and Transplantation: Hypersensitivity– Mechanism and Types. Auto immune disorders –Type I diabetes and Rheumatoid arthritis. Role and mechanism of CD4+ T cells, MHC and TCR in autoimmunity. Tumor immunology: tumor antigens, oncogenes, immune responses and tumor evasion of the immune system, detection of cancers and therapy-chemotherapy and radiation therapy. Machine Learning in Cancer Diagnostics. Transplantation Immunology – immunological basis of graft rejection, clinical transplantation and immunosuppressive therapy.	--

**PERCENTAGE OF SYLLABUS REVISION: 1.2%**

**COURSE FOCUS ON :**

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



**Department of Biotechnology**  
**M.Sc. Biotechnology**  
**Syllabus Revision**

**Faculty: Biosciences**

**Board: Biotechnology**

**Semester: II**

**Course Code/Name: 24BTP2CB – Genetic Engineering**

Unit	Existing	Revised
I	DNA manipulative Enzymes – Nucleases, Ligases, Polymerases, DNA modifying Enzymes - Alkaline Phosphatase, Polynucleotide Kinase, Terminal deoxy nucleotidyl transferase. Enzymes for cutting DNA – Restriction and Ligation – Linkers, Adaptors, Homopolymer tailing.	--
II	Vectors for Cloning – Plasmids - classification. Plasmids – pBR322 and pUC vectors, Bacteriophage vectors - M13 vectors, Lambda vectors (Insertion and Replacement vectors), Phagemids, Cosmids, Viral Vectors, Animal Viral vectors - SV-40, Baculovirus Vector, retroviral vectors, Plant vectors -Ti and Ri Plasmids. Yeast Vectors- BAC, YAC, YEP and Shuttle Vectors for Cloning.	--
III	Gene transfer methods – Physical and Chemical, Construction of cDNA and genomic DNA libraries. Blotting techniques – Northern, Southern and Western Blotting. Microarray - DNA and Protein (Protein chips). Genome editing - CRISPR/Cas 9.	--
IV	PCR & its types: Principle, steps and applications – Nested PCR, Reverse Transcriptase PCR, Colony PCR, Touchdown PCR and Hot Start PCR. Genetic markers: Types and Applications - RAPD, RFLP, SSLP, AFLP, VNTRs and microsatellites.	qRT-PCR
V	Production of recombinant pharmaceuticals: insulin, factor VIII and Recombinant Vaccines. Gene therapy for inherited diseases, Gene therapy for cancer, Gene silencing - antisense and RNA interference, Gene knock out.	--

**PERCENTAGE OF SYLLABUS REVISION : 1%**

**COURSE FOCUS ON :**

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



**Department of Biotechnology**  
**M.Sc. Biotechnology**  
**Syllabus Revision**

**Faculty: Biosciences**

**Board: Biotechnology**

**Semester: II**

**Course Code/Name: 24BTP2CC – Environmental Biotechnology**

Unit	Existing	Revised
I	Ecosystem structure and functions: Abiotic and biotic components, energy flow, food chain, foodweb and trophic levels, ecological pyramids, N, P, C and S cycles in nature. Threats to environment -pollutions, waste materials and xenobiotics. Bioaccumulation and Biomagnification	Pollution and its types
II	<del>Hazards of Pollution: Types of pollution – Water, Land, Air, Noise and Nuclear. Methods for the measurement of pollution. Global environmental problems: ozone depletion, green house effect and acid rain.</del>	Environmental toxicology: Toxic chemicals in the environment (air and water) – their effects and biochemical interactions; Pesticides in water, biochemical aspects of arsenic, cadmium, lead, mercury, carbon monoxide, ozone and PAN pesticide. Mode of entry of toxic substances in environment, its breakdown and detoxification. Biotransformation of xenobiotics.
III	<del>Environmental toxicology: Toxic chemicals in the environment (air and water) – their effects and biochemical interactions; Pesticides in water, biochemical aspects of arsenic, cadmium, lead, mercury, carbon monoxide, ozone and PAN pesticide. Mode of entry of toxic substances in environment, its breakdown and detoxification. Biotransformation of xenobiotics.</del>	Biosorption and Bioleaching of heavy metals (Mercury, Chromium and Lead), Microbially enhanced Phosphorus and Nitrogen removal. Advantages and disadvantages of biosorption and bioleaching. Microbial Role in Carbon capture. Biosorption of Organic Compounds - polychlorinated biphenyls (PCBs), textile dyes and pharmaceuticals wastes.
IV	Xenobiotics and Bioremediation: Xenobiotics in environment - biodegradation of hydrocarbons, pesticides, lignin and synthetic dyes - azo dyes. Bioremediation & Phytoremediation: Applications of bioremediation. <del>Bioabsorption and Bioleaching of heavy metals (Mercury, Chromium and Lead), advantages and disadvantages of bioleaching. Application of biotechnology in xenobiotic bioremediation.</del>	--
V	Environmental Monitoring: Environmental Monitoring Programme - Bioindicators of environment, Environment Management, Environment Laws (National and international) and National Environmental Policies.	Government organizations in environmental monitoring, Sustainable Development Goals in Environment, Carbon emission management

**PERCENTAGE OF SYLLABUS REVISION : 60.5%**

**COURSE FOCUS ON :**

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



**Department of Biotechnology**  
**M.Sc. Biotechnology**  
**Syllabus Revision**

**Faculty: Biosciences**

**Board: Biotechnology**

**Semester: II**

**Course Code/Name: 24BTP2CD – Bioprocess Technology**

Unit	Existing	Revised
I	Bioprocess - Microbial biomass; Screening and selection of organisms for bioprocess; Strain improvement of industrially important microorganisms; Preservation of cultures after strain improvement programme. Fermentation inoculum preparation for bacterial and fungal processes.	--
II	Fermentation media - Natural and synthetic. Sources of Carbon, Nitrogen, vitamins and other elements. Types of Fermentation: Solid state and Submerged - Batch, continuous and Fed-Batch fermentation. Optimization of fermentation process parameters: measurement of temperature, pressure, pH, dissolved oxygen and foam.	Statistical optimization of media – RSM and CCD.
III	Types of reactors: Bubble column, airlift reactor, packed bed, fluidized bed, trickle bed, membrane reactor, photobioreactor, solid state fermenter, animal and plant cell bioreactors. Scale up and scale down studies of bioreactors. Phases of cell growth, Kinetic model for cell growth: Monod's model, Haldane's model and factors affecting cell growth.	--
IV	Biomass separation by centrifugation, filtration, micro and ultrafiltration, flocculation. Cell disintegration: physical, chemical and enzymatic methods. Separation of solid and liquid phases. Isolation and purification techniques for proteins and other products. Principles of bioprocess control, bioprocess automation and application of IoT in bioprocessing.	--
V	Pharmaceutical Products – Enzymes (Protease and amylase), Antibiotics (Penicillins and Tetracycline), Vitamins (B2, B12), Aminoacids (lysine, glutamic acid), Organic acids (acetic acid, lactic acid); Food Products - probiotics, cheese, cultured meat, Single Cell Protein (SCP). Agricultural Products - Biofertilizer (Rhizobium and Pseudomonas) and Biopesticides (Bacillus thuringiensis).	Regulatory affairs – Policies, regulations, clearance and certifications.

**PERCENTAGE OF SYLLABUS REVISION : 7.5%**

**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 type="checkbox"/>	Intellectual Property Rights	<input type="checkbox"/>	Gender Sensitization
<input type="checkbox"/>	Social Awareness/ Environment	<input type="checkbox"/>	Constitutional Rights/ Human Values/ Ethics



**Department of Biotechnology**  
**M.Sc. Biotechnology**  
**Syllabus Revision**

**Faculty: Biosciences**

**Board: Biotechnology**

**Semester: II**

**Course Code/Name: 24BTP2DA /Forensic Biotechnology**

Unit	Existing	Revised
I	Forensic science - History, scope, branches and functions. Forensic science in international perspectives, including set up of INTERPOL and FBI. Duties of forensic scientists. Forensic laboratories in India-Central Forensic Science Laboratory. Collection and Preservation of Blood, Semen, Saliva, Urine, Faeces and Milk samples for forensic examinations.	Forensic laboratories in India and worldwide.  Vomit, Hair, Fibers, and Fecal matter from crime scene.
II	<del>Forensic characterization: Hair morphology and types, their importance, nature, location, collection, evaluation and tests for their identification. Blood Properties and blood grouping, presumptive and confirmatory tests. Sperm-composition, morphology of spermatozoa, presumptive and confirmatory tests (including Azoospermic semen stains), seminal fluid isozymes typing, forensic significance of sperm, collection and analysis of evidences in rape cases.</del>	Importance of Hair, Sperm and Blood in forensic characterization. Hair- morphology, tests for their identification. Blood- composition and properties, presumptive and confirmatory tests.
III	<del>DNA Profiling: Introduction, history of DNA typing, molecular biology of DNA, variations, polymorphism, DNA extraction-organic and inorganic extraction. Comparison of extraction methods and commercial kits. DNA typing systems- RFLP, PCR amplifications and Sequence polymorphism. Analysis of SNP, YSTR and mitochondrial DNA. Ancient DNA typing and evaluation of DNA typing results.</del>	Structure of DNA, DNA extraction-organic and inorganic extraction. Variations in DNA related to forensic Biotechnology, DNA profiling-history and applications. Methods used in DNA profiling- Restriction Fragment Length Polymorphism (RFLP), Polymerase Chain Reaction (PCR), RAPD, Short Tandem Repeat (STR) Analysis, Single Nucleotide Polymorphism (SNP) Analysis, Mitochondrial DNA (mtDNA) Profiling, Y-Chromosome STR (Y-STR) Analysis and Variable Number Tandem Repeats (VNTR) Analysis.
IV	<del>DNA Statistics: frequency estimate calculations, interpretations, allele frequency determination, Paternity/Maternity index, Sibling index, Probability of match. Human Genome Project: introduction, history, goals, benefits, social, ethical and legal issues. DNA forensic databases, ethical, legal, and social issues associated with DNA Data banking, potential benefits of DNA Data banking, quality control, certification and accreditation.</del>	Allele frequency, Random Match Probability (RMP). Impact of Human genome project on Forensic Biotechnology.
V	<del>Forensic significance of DNA profiling: Applications in disputed paternity cases, child swapping, missing person's identity- civil immigration, veterinary, wildlife and agriculture cases. Legal perspectives- legal standards for admissibility of DNA profiling, procedural and ethical concerns, status of development of DNA profiling in India and abroad. New and future technologies: SNPs, DNA chips, DNA Barcoding and limitations of DNA profiling.</del>	Disaster Victim Identification (DVI), Environment, Public Health and Epidemiology, Agriculture and Food safety. New and Future technologies for Forensic Biotechnology.

**PERCENTAGE OF SYLLABUS REVISION : 83%**



**COURSE FOCUS ON :**

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



**Department of Biotechnology**  
**M.Sc. Biotechnology**  
**Syllabus Revision**

**Faculty: Biosciences**

**Board: Biotechnology**

**Semester: IV**

**Course Code/Name: Pharmaceutical Biotechnology**

Unit	Existing	Revised
I	Properties – dynamics of enzymatic activity, sources, extraction and purification, pharmaceutical applications of enzymes, therapeutic and clinical. Production of amyloglucosidase, glucose isomerase, amylase and trypsin. Limitations in the enzyme production. Immobilization – applications – perspectives of enzyme engineering.	
II	Introduction to active constituents - isolation, classification, properties. Systematic pharmacognostic study of a) Carbohydrates and derived products: agar, guar gum, acacia, honey, Isabgol, pectin, starch and sterculia b) Lipids: Bees wax, Castor oil, Cocoa butter, Cod-liver oil, Kokum butter, Lard, Rice Bran oil, Shark liver oil and Wool fat.	
III	Herbal Medicines - Characteristics, Efficacy, importance, allergic reactions of phytoconstituents. Principles - Ayurveda, Unani, Siddha, Homeopathy. Drugs derived from Animal - Gelatin, Glycerin, Heparin, Lanolin, Premarin, Animal vaccines. Pharmaceutics from Marine source – Cytarabine, Zicomotide, Omega-3-acid ethyl ester, Trabectodin, Brentuximab vadotin. Bioavailability of pharmaceuticals. Biosimilar drugs and AI in drug development.	
IV	DNA Vaccine - construction and immunology, DNA vaccine expression, plasmid delivery of DNA vaccines. Bacterial vaccines – preparation and applications. mRNA vaccines, Peptide vaccines and Antitoxins. Serum-immune blood derivatives and immunity related products. Gene Pharming.	
V	Estimation of toxicity LD 50 and ED 50. Immunogenicity of biopharmaceuticals: Factors contributing to immunogenicity (product-related factors, host-related factors), Measurement of immunogenicity. Consequence of immunogenicity to biopharmaceuticals. Neutraceuticals. Economics of drug development.	

**PERCENTAGE OF SYLLABUS REVISION : 3.465%**

**COURSE FOCUS ON :**

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



## ATTENDANCE OF THE EIGHTEENTH BOARD OF STUDIES MEETING

**Faculty: Biosciences**

**Board: Biotechnology**

Date : 08/11/2024

Time : 10.00 a.m.

Venue : Department of Biotechnology (Room. No: 1213)

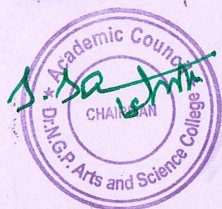
**The following members were present for the Board of Studies meeting**

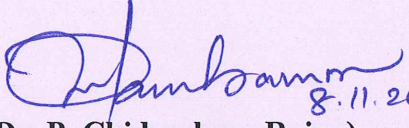
S. No	Name	Designation	Signature
1.	Dr. P. Chidambara Rajan Professor and Head	Chairman	PRESENT
2.	Dr. V. Vijaya Padma Professor, Department of Biotechnology Bharathiar University, Coimbatore	University Nominee	ABSENT
3.	Dr. S. Nakkeeran Dean i/c, Agricultural College and Research Institute, Kudumiyamalai, Pudukkottai	Subject Expert	ABSENT
4.	Dr. P.T. Prathima, Senior Scientist, Crop Improvement Division, ICAR-Sugarcane Breeding Institute, Coimbatore	Subject Expert	PRESENT
5.	Dr. M. Prasad R&D Executive – Industrial Enzymes Marisym Biologicals Private Limited, Coimbatore	Industrial expert	PRESENT
6.	Dr. N. Karthikeyan Project Coordinator, Regional Sericulture & Research Center, Salem	Alumni	ABSENT
7.	Ms. Dharsini T K III B.Sc. Biotechnology	Student Representatives	PRESENT
	Mr. Jeevanantham S II M.Sc. Biotechnology		ABSENT
8.	Part I (Language I) Dr. N. Kuppuchamy Associate Professor and Head Department of Tamil	Co-opted member	PRESENT
9.	Part II (Language II) Dr. A. Hazel Verbina Professor and Head Department of English	Co-opted member	PRESENT
10.	Allied - IDC- Biophysics Dr. K. Girija Associate Professor and Head (i/c) Department of Physics	Co-opted member	PRESENT
11.	Dr. K. Kalimuthu Professor	Internal Member	PRESENT
12.	Dr. R. Suganthi	Internal Member	PRESENT



	Professor		
13.	Dr. K. Arungandhi Professor	Internal Member	PRESENT
14.	Dr. Arun. P Professor	Internal Member	PRESENT
15.	Dr. M.N. Kathiravan Professor	Internal Member	PRESENT
16.	Dr. M. Shanmugavadivu Associate Professor	Internal Member	PRESENT
17.	Dr. M. Poongothai Associate Professor	Internal Member	PRESENT
18.	Dr. Radha Palaniswamy Assistant Professor	Internal Member	ABSENT
19.	Dr. S. Saranya Assistant Professor	Internal Member	PRESENT
20.	Mrs. C.R. Aarthi Assistant Professor	Internal Member	PRESENT

Date: 08.11.2024



  
 (Dr. P. Chidambara Rajan)  
 BoS Chairman/HoD  
 Department of Biotechnology  
 Dr. N. G. P. Arts and Science College  
 Coimbatore – 641 048







## ATTENDANCE OF THE EIGHTEENTH BOARD OF STUDIES MEETING

**Faculty: Biosciences**

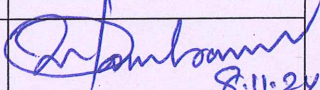
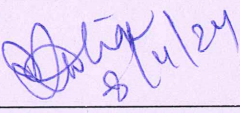
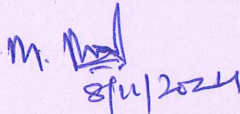
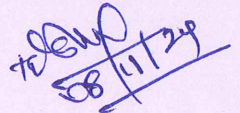
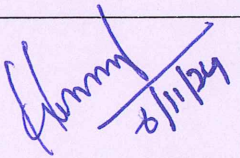
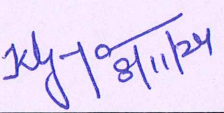
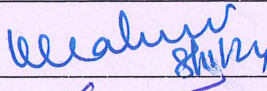
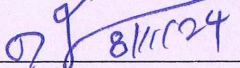
**Board: Biotechnology**

Date : 08/11/2024

Time : 10.00 a.m.

Venue : Department of Biotechnology (Room. No: 1213)

**The following members were present for the Board of Studies meeting**

S. No	Name	Designation	Signature
1.	Dr. P. Chidambara Rajan Professor and Head	Chairman	 8.11.24
2.	Dr. V. Vijaya Padma Professor, Department of Biotechnology Bharathiar University, Coimbatore	University Nominee	ABSENT
3.	Dr. S. Nakkeeran Dean i/c, Agricultural College and Research Institute, Kudumiyanmalai, Pudukkottai	Subject Expert	ABSENT
4.	Dr. P.T. Prathima, Senior Scientist, Crop Improvement Division, ICAR-Sugarcane Breeding Institute, Coimbatore	Subject Expert	 8/11/24
5.	Dr. M. Prasad R&D Executive – Industrial Enzymes Marisym Biologicals Private Limited, Coimbatore	Industrial expert	 8/11/2024
6.	Dr. N. Karthikeyan Project Coordinator, Regional Sericulture & Research Center, Salem	Alumni	ABSENT
7.	Ms. Dharsini T K III B.Sc. Biotechnology	Student Representatives	T.K. Dharsini 08.11.24
	Mr. Jeevanantham S II M.Sc. Biotechnology		ABSENT
8.	Part I (Language I) Dr. N. Kuppuchamy Associate Professor and Head Department of Tamil	Co-opted member	 08/11/24
9.	Part II (Language II) Dr. A. Hazel Verbina Professor and Head Department of English	Co-opted member	 8/11/24
10.	Allied - IDC- Biophysics Dr. K. Girija Associate Professor and Head (i/c) Department of Physics	Co-opted member	 8/11/24
11.	Dr. K. Kalimuthu Professor	Internal Member	 8/11/24
12.	Dr. R. Suganthi Professor	Internal Member	 8/11/24



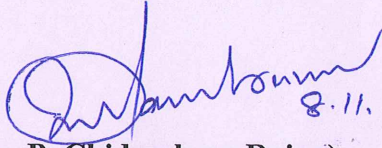




13.	Dr. K. Arungandhi Professor	Internal Member	K. Arun 8/11/24
14.	Dr. Arun. P Professor	Internal Member	Dr. Arun P 8/11/24
15.	Dr. M.N. Kathiravan Professor	Internal Member	M. N. Kathiravan 8/11/24
16.	Dr. M. Shanmugavadivu Associate Professor	Internal Member	M. Shanmugavadivu 8/11/24
17.	Dr. M. Poongothai Associate Professor	Internal Member	M. Poongothai 8/11/24
18.	Dr. Radha Palaniswamy Assistant Professor	Internal Member	ABSENT
19.	Dr. S. Saranya Assistant Professor	Internal Member	Dr. S. Saranya 8/11/24
20.	Mrs. C.R. Aarthi Assistant Professor	Internal Member	Mrs. C.R. Aarthi 8/11/24

Date: 08.11.2024



  
8.11.24  
(Dr. P. Chidambara Rajan)

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



