



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 (3rd 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

14th

MINUTES OF THE FOURTEENTH BOARD OF STUDIES MEETING

Faculty: Biosciences

Board: Biotechnology

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

Name of the Body	BoS
Department	Biotechnology
Meeting No.	14 th
Date and Time	05.12.2022
Venue	A1 Block Room No.102, Board Room
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 Computer Science for 2022-23 Batch and onwards
3.	Discussion on Part – I (Tamil/Hindi/French/Malayalam) offered by Language Departments for 2022-23 Batch and onwards
4.	Discussion on Part -II (English) offered by English Department for 2022-23 Batch and onwards
5.	Discussion on Part IV (AECC - II) Basic Tamil & Advanced Tamil offered by Tamil department and Human Rights & Women's Rights offered by 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 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 Biotechnology to other departments for 2022-23 Batch and onwards
9.	Discussion on syllabus for Part III - Inter disciplinary Course (IDC) offered by Department of Artificial intelligence and Machine Learning for 2022-23 Batch and onwards
10.	Discussion on PG Diploma syllabi in First Semester courses for 2022-23 Batch and onwards
11.	Any other matter





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MINUTES OF THE FOURTEENTH BOARD OF STUDIES MEETING

Faculty: Bioscience

Board: Biotechnology

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	<p>Part III :223BT1A2CA : Genetics Dr. Prathima and Dr. Prasad suggested to include the following topics for a better understanding in basic concepts of genetics.</p> <ul style="list-style-type: none">• Unit I: Experimental Plants in genetic studies.• Unit II: Penetrance• Unit III: Spontaneous Mutations and Induce Mutation.• Unit V: Retrotransposons, gene frequency Calculation, Factor affecting gene frequency and pedigree analysis. <p>Part III :223BT1A2CB :Microbiology Dr. Prathima and Dr. Prasad suggested to include the following topics on causative pathogens.</p> <ul style="list-style-type: none">• Unit III: <i>Corynebacterium diphtheriae</i>.• Unit IV: Viral gastroenteritis (Stomach flu), Ebola and Corona Virus 2019 (Covid -19).• Unit V : Fungal Eye Infections - Keratitis, Endophthalmitis, Yeast infection (Vaginal infection), Jock itch (<i>Tinea cruris</i>). <p>223BT1A2CP – Core Practical: Genetics and Microbiology Dr. Prathima and Dr. Prasad suggested to include the following experiments in genetics, to enrich the basic skills in genetics</p> <ul style="list-style-type: none">• Determination of Phage Titre• Sex chromatin observation from Buccal smear *• Blood typing in humans for multiple alleles and Rh factor• Problem solving in Pedigree Analysis <p>* DBT Star College Experiment</p>
Resolution	The Board members approved the above syllabi.
Item - 02	Discussion on syllabus for Part III - Inter disciplinary Course (IDC) offered by Department of Computer Science.
Discussion	<p>224CS1A2IB: Python for Biologists: (New Course) The syllabus approved by the Board of Studies in Computer Science was placed for endorsement.</p>
Resolution	The Board unanimously approved the syllabus.





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14th

Item - 03	Discussion on Part - I (Tamil/Hindi/French/Malayalam) offered by Languages Departments for 2022-23 Batch and onwards.
Discussion	Part I: 221TL1A2TA: Tamil-II: - Ara Ilakkiyam 221TL1A2HA: Hindi-II – Modern Literature 221TL1A2FA: French-II – Grammar, Translation and Civilization 221TL1A2MA: Malayalam – II - Modern Literature (New Course) The unified syllabus approved by the Board of Studies in Languages was placed for endorsement.
Resolution	The Board unanimously approved the syllabi.
Item - 04	Discussion on Part -II (English) offered by English Department for 2022-23 Batch and onwards.
Discussion	Part II: 221EL1A2EA: 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 - II) Basic Tamil & Advanced Tamil offered by Tamil department and Human Rights & Women's Rights offered by Department of Commerce with Corporate Secretaryship with CA respectively in Second semester for 2022-23 Batch and onwards
Discussion	221TL1A2AA:(AECC - II) Basic Tamil and 221TL1A2AB: Advanced Tamil The unified syllabi approved by the Board of Studies in Languages was placed for endorsement 225CR1A2AA: (AECC - II) Human Rights & Women's Rights (New Course) The unified syllabi approved by the Board of Studies in Commerce with Corporate Secretaryship with CA was placed for endorsement
Resolution	The Board members approved the syllabi.
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 unanimously approved one credit for Extension activity
Item - 07	Discussion on PG syllabi in Second Semester courses for 2022-23 Batch and onwards
Discussion	The courses of II semester of M.Sc. Biotechnology Batch: 2022 – 23 were discussed in the board. As Dr. Prathima and Dr. Prasad suggested to include topics in 223BT2A2CA – Immunotechnology • Unit I: Organs of Immune system: Bone Marrow, Spleen, Lymph Nodes and





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role in immunity and Immunoglobulin Gene Rearrangements.

- Unit II: Avidity, GISH, CMI techniques: Lympho proliferation assay, and Mixed lymphocyte reactions suggested for the better understanding On modern techniques in analysis of immune response.
- Unit III: Applications of Monoclonal antibodies in diagnostics and therapeutics to enrich the knowledge and new diagnostic techniques.
- Unit IV: Edible vaccines, marker vaccine, Viral Like Particles (VLPs), Dendritic cell based vaccines, Vaccine against cancer, T cell based vaccines and Therapeutic vaccines to develop the knowledge on advancements in vaccine and their production.
- Unit V: Role and mechanism of CD4+ T cells, MHC and TCR in autoimmunity. Tumor evasion of the immune system. Immunological basis of graft rejection, clinical transplantation and immunosuppressive therapy. Machine Learning in Cancer Diagnostics to gain the more knowledge on tumor and transplant immunology.

223BT2A2CB – Genetic Engineering

- Unit I: Purification of DNA from living cells to provide knowledge on extraction.
- Unit II: Plasmid – Size and Classification, Bacteriophages life cycle, Viruses as cloning vectors. Artificial chromosomes -BAC, HAC, YAC and Hosts for cloning to impart knowledge on basic molecular biology.
- Unit III: Microarray -DNA and Protein (Protein chips). Site Directed mutagenesis. Genome editing - CRISPR/Cas 9 to introduce the research tools.
- Unit IV: Genetic markers – Types -RAPD, RFLP SSLP, AFLP SNPS, STR, STS, VNTRs Microsatellites and its application – to enrich on knowledge genotypic characterization.
- Unit V: Recombinant pharmaceuticals – Insulin, factor VIII and Vaccines, and their Production. Identifications of genes responsible for human diseases to develop knowledge based on pharmaceutical industry needs.

223BT2A2CC – Environmental Biotechnology

- Unit III: Pesticides in water, biochemical aspects of arsenic, cadmium, lead, mercury, carbon monoxide, ozone and PAN pesticide, Mode of entry of toxic substance in environment, its breakdown and detoxification; biotransformation of xenobiotics to be include for understanding the concept on role of biotechnology in designing the remediation for environmental issues.
- Unit IV: Bioremediation of heavy metals (Mercury, Chromium and Lead).





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14th

	<p>Applications of Biotechnology in xenobiotics bioremediation.</p> <ul style="list-style-type: none">• Unit V: National and international environmental laws. <p>223BT2A2CD – Bioprocess Technology</p> <ul style="list-style-type: none">• Unit III: Phase of cell growth, Factors affecting cell growth, Kinetic model for cell growth, Monod's model, Haldane's model, Mass balances for bioreactors and Design equations to enrich the knowledge on fermentation techniques.• Unit V: Single cell Protein (SCP) for better understanding of microbial biomass. <p>223BT2A2CP - Core Practical: Immunotechnology and Bioprocess Technology Dr. Prathima and Dr. Prasad recommended the introduction of following experiments, to improve hands-on skill to collect clinical samples and enhance the knowledge of industrial applicability of immobilization.</p> <ul style="list-style-type: none">• Collection of Blood, separation of serum and plasma• Immobilization of bacterial cells and enzyme assay <p>223BT2A2CQ – Core Practical: Genetic Engineering and Environmental Biotechnology Dr. Prathima and Dr. Prasad recommended the introduction of following experiments to enhance the practical knowledge of plant based genome isolation and to apply their biodegradation knowledge of textile dyes by bacterial isolates.</p> <ul style="list-style-type: none">• Extraction of DNA from Plant sample• Isolation and screening of dye degrading bacteria from industrial waste water
Resolution	The Board unanimously approved the syllabi.
Item - 08	Discussion on PG DSE offered to other departments for 2022-23 Batch and onwards
Discussion	New course was introduced after detailed discussion.
Resolution	The Board unanimously approved the syllabus.
Item -09	Discussion on syllabus for Part III - Inter disciplinary Course (IDC) offered to Department of Artificial intelligence and Machine Learning for 2022-23 Batch and onwards
Discussion	The Board unanimously approved the syllabus for Part III - Inter disciplinary Course (IDC)
Resolution	The Board unanimously approved the syllabus
Item -10	Discussion on PG Diploma syllabi in First Semester courses for 2022-23 Batch and onwards
Discussion	Dr. Prathima and Dr. Prasad suggested to follow the existing syllabi
Resolution	The Board unanimously approved the syllabi





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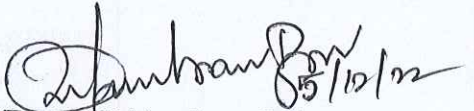
BoS

14th

Item -11	Any other matter
Discussion	The board members discussed the Panel of Examiners
Resolution	The Board unanimously approved the Panel

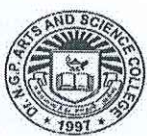
The chairman of Board of Studies (BoS) thanked all the members for their active participation and providing their valuable suggestions.

Date: 05.12.2022


(Dr. P. Chidambara Rajan)

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





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Syllabus Revision

Faculty: Bioscience

Board: Biotechnology

Semester: II

Course Code/ Name: 223BT1A2CA - Genetics

Unit	Existing	Changes
I	Mendelian and Non Mendelian inheritance History of Genetics, Mendel's work: Monohybrid Experiment, Dihybrid Experiment, Back Cross and Test Cross. Chromosomal theory of Inheritance, Extra nuclear inheritance (mitochondrial, chloroplast), Maternal inheritance.	Choice of experimental plant
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.	Penetrance. Karyotyping and its applications.
III	Chromosomal variations and aberrations Mutation: Physical and Chemical mutagens, Numerical-Euploidy and Aneuploidy; Structural (deletion, duplication, inversion and translocation). Single Gene Disorders: Autosomal Dominant-Achondroplasia, poly cystic kidney, Autosomal Recessive - Cysticfibrosis, Sickle cell Anaemia, X-linked Dominant-Rett syndrome, X linked recessive-Haemophilia, Multifactorial- Cleft lip and palate	Spontaneous mutations (Point and Frame shift) and Induced mutations
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	Chromosomal Crossover
V	Transposons and Population genetics Model organism for genetic analysis of development- Drosophila & Arabidopsis. Transposable elements of Prokaryotes (IS Elements, Composite and Tn3Family) and Eukaryotes (Maize transposable elements), Gene frequency, Hardy-Weinberg law,	Retrotransposons, Calculating gene frequency, Factors affecting gene frequency, Pedigree analysis

PERCENTAGE OF SYLLABUS REVISED: 21%

COURSE FOCUSES 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 type="checkbox"/>	Constitutional Rights/ Human Values/ Ethics



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14th

Syllabus Revision

Faculty: Biosciences

Board: Biotechnology

Semester: II

Course Code/ Name: 223BT1A2CB - Microbiology

Unit	Existing	Changes
I	Concepts of Microbiology History of Microbiology - Biogenesis Vs Abiogenesis, Contributions of Louis Pasteur, Robert Koch, Edward Jenner, Alexander Fleming. Microscopy – Bright field or Light, Dark Field, Phase contrast, Fluorescence; Electron Microscopy – Scanning Electron Microscope (SEM), Transmission Electron Microscope (TEM).	-
II	Media, Sterilization techniques and Growth of Microbes Sterilization- Methods - Physical – Dry Heat, Moist Heat, Cold sterilization and Chemical. Preparation of Culture Media – types. Growth curve - Determination of Generation Time, Measurement of Growth – Viable count, Turbidometry and Direct Cell count. Nutritional classification of microbes.	-
III	Bacteria- Structure and its causative diseases Classification (Bergy's manual) - Bacterial Structure, Reproduction of Bacteria. Diseases caused by <i>Mycobacterium tuberculosis</i> (Tuberculosis), <i>Salmonella typhi</i> (Typhoid), <i>Vibrio cholera</i> (Cholera), <i>Clostridium tetani</i> (Tetanus) and <i>Staphylococcus aureus</i> (Skin Infections),	<i>Corynebacterium diptheriae</i> (Diphtheria).
IV	Virus- Structure and its causative diseases Virus structure, Classification (Baltimore), Reproduction – Generalized and Specialized, Diseases caused by HIV (AIDS), Hepatitis B Virus (Jaundice), <i>Varicella zoster</i> (Chicken Pox), <i>Polio myelitis</i> (Polio),	Viral gastroenteritis (stomach flu), Ebola and Corona virus 2019 (COVID-19).
V	Fungus- Structure and its causative diseases Fungal structure - classification - reproduction. Diseases caused by <i>Tinea rubrum</i> (body ring worm), <i>Tinea pedis</i> (athlete's foot), <i>Candida</i> species (bronchitis), <i>Actinomyces israelii</i> (oral infection), <i>Aspergillus fumigatus</i> (sinus, bronchi, lungs).	Fungal Eye Infections - Keratitis, Endophthalmitis, Yeast infection (Vaginal), Jock itch (<i>Tinea cruris</i>).

PERCENTAGE OF SYLLABUS REVISED: 18%

COURSE FOCUSES 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 type="checkbox"/>	Constitutional Rights/ Human Values/ Ethics



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Core Practical Syllabus Revision

Faculty: Bioscience

Board: Biotechnology

Semester: II

Course Code/ Name: 223BT1A2CP – Core Practical: Genetics and Microbiology

Exp. No.	Content
1.	Enumeration of microorganism from soil by serial dilution method
2.	Staining of Bacteria–Negative and Gram staining, Fungal Staining
3.	Observation of fungi under stereomicroscope*
4.	Bacterial growth curve by turbidimetry method
5.	Isolation of Auxotrophic mutants by Gradient plate technique
6.	Determination of Thermal death time of bacteria
7.	Antibiotic sensitivity test
8.	Methylene Blue Reduction test
9.	Determination of Phage Titre
10.	Sex chromatin observation from Buccal smear *
11.	Blood typing in humans for multiple alleles and Rh factor
12.	Problem solving in Pedigree Analysis

Note: 10 is Mandatory out of 12

* DBT STAR College Experiments

PERCENTAGE OF SYLLABUS REVISED: 100

COURSE FOCUSES 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



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Syllabus Revision

Faculty: Bioscience

Board: Biotechnology

Semester: II

Course Code/ Name: 223BT2A2CA - Immunotechnology

Unit	Existing	Changes
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, Cell Mediated immunity. Cells and organs –and their functions. Antigens - Types, haptens, epitopes and Factors influencing antigenicity. Antibody – Structure, types, properties and functions. Immunoglobulin gene rearrangements.	Bone marrow, Spleen, Lymph nodes and their immune response, Cytokines.
II	Antigen Antibody Reactions Antigen – Antibody interaction, affinity, cross reactivity, specificity, epitope mapping; Agglutination reactions and Precipitation reactions. Immuno assays – Immuno Diffusion and Immunoelectrophoresis, RIA, ELISA, Western blotting, ELISPOT assay, immunofluorescence – Surface plasmon resonance, Biosensor assays for assessing ligand – receptor interaction.	Avidity, GISH, CMI techniques – lympho proliferation assay, mixed lymphocyte reaction.
III	New Generation Antibodies Antibody engineering; Hybridoma and monoclonal antibody (MCAb) techniques, Production of murine hybridoma, Production of MCABs in cultures and animal (Ascites), Purification of MCABs. Characterization of MCABs/ and Labelling of antibodies. Phage display libraries; Antibodies as <i>In - Vitro</i> and <i>In - Vivo</i> probes.	Applications of monoclonal antibodies in diagnostics and therapeutics.
IV	Vaccine Technology Rationale vaccine design based on clinical requirements: Active immunization, live, killed, attenuated, Sub unit vaccines; Recombinant DNA and proteinbased vaccines, plant-based vaccines and reverse vaccinology; Peptide vaccines, conjugate vaccines; Passive Immunization; Antibody, Transfusion of immuno- competent cells, Stem Cell Therapy. Cell based vaccines. Edible vaccines, marker vaccines, viral like particles (VLPs)	Dendritic cellbased 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. Tumor immunology: tumor antigens, oncogenes, immune responses and detection of cancers and therapy- chemotherapy and radiation therapy. Transplantation Immunology.	Role and mechanism of CD4+ T cells, MHC and TCR in autoimmunity, tumor evasion of the immune system, immunological basis of graft rejection, clinical transplantation and immunosuppressive therapy. Machine Learning in Cancer Diagnostics.

PERCENTAGE OF SYLLABUS REVISED: 35%
 COURSE FOCUSES ON:

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



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Syllabus Revision

Faculty: Biosciences

Board: Biotechnology

Semester: II

Course Code/ Name: 193BT2A2CB - Genetic Engineering

Unit	Existing	Changes
I	Manipulation of DNA DNA manipulative Enzymes – Nucleases, Ligases, Polymerases, DNA modifying Enzymes - Alkaline Phosphatase, Polynucleotide Kinase, Terminal deoxy nucleotidyl transferase. Enzymes for cutting DNA - Restriction Endonucleases. Ligation – Linkers, Adaptors, Homopolymer tailing.	Purification of DNA from living cells.
II	Cloning Vectors Vectors for Cloning –Plasmids – pBR322 and pUC vectors, Bacteriophages –Bacteriophage vectors - M13 vectors, Lambda vectors (Insertion and Replacement vectors), Phagemids, Cosmids, Yeast vectors, Shuttle vectors, Animal Viral vectors - SV-40, Baculovirus Vector, retroviral vectors, Expression vectors – pMal, GST and pET-based vectors, Plant vectors -Ti and Ri Plasmids.	Plasmids - size, classification, Infection cycle, Viruses as cloning vectors for other organisms, Artificial chromosomes – BAC, HAC, YAC. Hosts for cloning.
III	Gene Cloning Methodologies Direct and indirect methods of gene transfer, selectable markers and reporter genes Construction of cDNA and genomic libraries. cDNA cloning – directional and non-directional method, Screening of genomic and cDNA libraries – colony and plaque hybridization, Blotting techniques – Northern, Southern, Immunological screening.	DNA Microarray and Protein Microarray (Protein chips). Site directed mutagenesis. Genome editing - CRISPR/Cas 9.
IV	PCR and Genetic markers Primer design, PCR & Types: Principle, Steps and Applications – Nested PCR, Multiplex PCR, Real Time qPCR, Reverse Transcriptase PCR, Colony PCR, Touchdown PCR and Hot Start PCR.	Genetic markers: Types and Applications - RAPD, RFLP, SSLP, AFLP, SNPs, STR, STS, VNTRs, microsatellites.
V	Gene cloning Applications Gene therapy for inherited diseases, Gene therapy and cancer, Gene silencing - antisense and RNA interference, Gene knock out.	Production of recombinant Pharmaceuticals. Recombinant insulin, Recombinant factor VIII, Recombinant Vaccines. Identification of genes responsible for human diseases

PERCENTAGE OF SYLLABUS REVISED: 30%

COURSE FOCUSES 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



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Syllabus Revision

Faculty: Biosciences

Board: Biotechnology

Semester: II

Course Code/ Name: 203BT2A2CC - Environmental Biotechnology

Unit	Existing	Changes
I	Ecosystem structure and functions Abiotic and biotic components, Energy flow, food chain, food web and trophic levels, Ecological pyramids, N,P,C and S cycles in nature. Threats to environment (Pollutions, waste materials and Xenobiotics). Bioaccumulation and Biomagnification	
II	Hazards of Pollution Types of pollution (Water, Land, Air, Noise and Nuclear), Methods for the measurement of pollution, Global environmental problems: ozone depletion, greenhouse effect and acid rain	
III	Physical, Chemical, Biological Treatment system and solid waste pollution and its management: composting systems, vermicomposting, Biomedical waste management. Current status of biomedical waste management.	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 substance, its breakdown and detoxification; biotransformation of xenobiotics
IV	Xenobiotics and Bioremediation Xenobiotics in Environment - Biodegradation of Hydrocarbons, Pesticides, Lignin, Synthetic dyes. Bioremediation & Phytoremediation: Applications of bioremediation. Bioabsorption. Advantages and disadvantages of bioleaching	Bioleaching of heavy metals (Mercury, Chromium and Lead). Application of Biotechnology in Xenobiotics bioremediation
V	Environmental Monitoring Environmental Monitoring Program Bioindicators environment, Environment Management, Environment Laws , National Environmental Policies.	National and international environmental laws

PERCENTAGE OF SYLLABUS REVISED: 23%

COURSE FOCUSES ON:

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



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Syllabus Revision

Faculty: Biosciences

Board: Biotechnology

Semester: II

Course Code/ Name: 223BT2A2CD - Bioprocess Technology

Unit	Existing	Changes
I	Introduction to Bioprocess Technology 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.	Bioprocess, biomass
II	Media formulation and upstream process Fermentation media - Natural and synthetic. Sources of Carbon; Nitrogen and vitamins and other elements. Types of Fermentation: Solid Substrate, Submerged, Batch, Continuous and Fed-Batch fermentation. Optimization of fermentation process and Fermentation process parameters: measurement of temperature, pressure, pH, dissolved Oxygen and foam.	-
III	Bioreactor configurations and Microbial growth kinetics 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, Factors affecting cell growth, Kinetic model for cell growth: Monod's model, Haldane's model, Mass balances for bioreactors, Design equations
IV	Downstream Processing Biomass separation by centrifugation, filtration, flocculation and other methods; 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 computer in bioprocessing.	application of IoT, micro, ultra filtration
V	Microbial products in pharmaceutical, food and agriculture industry Pharmaceutical Products - Enzymes (Protease and amylase), Antibiotics (penicillins, tetracycline), Vitamins (B2, B12), Aminoacids (lysine, glutamic acid), Organic acids (acetic acid, lactic acid); Food Products - Probiotics, cheese, Cultured meat, Agricultural Products - Biofertilizer (<i>Rhizobium</i> , <i>Pseudomonas</i>) and Biopesticides (<i>Bacillus thuringiensis</i>).	Single Cell Protein (SCP)

PERCENTAGE OF SYLLABUS REVISED: 19%
COURSE FOCUSES ON:

<input checked="" type="checkbox"/>	Skill Development	<input checked="" type="checkbox"/>	Entrepreneurial Development
<input checked="" type="checkbox"/>	Employability	<input checked="" type="checkbox"/>	Innovations
<input checked="" type="checkbox"/>	Intellectual Property Rights	<input type="checkbox"/>	Gender Sensitization
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Syllabus Revision - New Course

Faculty: Biosciences

Board: Biotechnology

Semester: II

Course Code/ Name: 223BT2A2DA - ELECTIVE II : Forensic Biotechnology

Unit	Content
I	Introduction and Forensic Sample Collection Historical aspects of forensic science. Scope of forensic science. Functions of forensic science. Branches of forensic science. Forensic science in international perspectives, including set up of INTERPOL and FBI. Duties of forensic scientists. Collection and Preservation of Blood, Semen, Saliva, Urine, Faeces and Milk Samples for forensic examinations.
II	Forensic Sample Examination Forensic Hair characterization: Morphology and types, their importance, nature, location, collection, evaluation and tests for their identification. Chemistry and properties, Presumptive and Confirmatory tests, Individualization. Formation, Composition, Morphology of spermatozoa, forensic significance, Presumptive and Confirmatory tests (including Azoospermic semen stains) Individualization (Blood Grouping, seminal fluid isozymes typing, forensic significance, Collection and analysis of evidences in Rape cases.
III	Forensic Sample DNA Profiling DNA Profiling: Introduction, History of DNA Typing, molecular biology of DNA, variations, polymorphism, DNA Extraction-Organic and Inorganic extraction, Comparison of Extraction methods, Commercial kits DNA typing systems- RFLP analysis, PCR amplifications, sequence polymorphism. Analysis of SNP, YSTR, Mitochondrial DNA, Ancient DNA typing, Evaluation of results
IV	Statistics and DNA databank 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 Databanking, Potential Benefits of DNA Databanking Quality control, certification and accreditation.
V	Applications of Forensic Biotechnology 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: DNA chips, SNPs and limitations of DNA profiling.

PERCENTAGE OF SYLLABUS REVISED: 100%

COURSE FOCUSES 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
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Core Practical Syllabus Revision

Faculty: Bioscience

Board: Biotechnology

Semester: II

Course Code/ Name: 223BT2A2CP - Core Practical: Immunotechnology and Bioprocess Technology

Exp. No.	Existing	Changes
1.	Separation of serum.	Collection of Blood, separation of serum and plasma.
2.	Blood grouping.	Blood grouping.
3.	Purification of IgG antibodies using affinity chromatography.	Single Radial Immuno diffusion.
4.	Ouchterlony Double diffusion	Ouchterlony Double diffusion.
5.	Rocket Immunoelectrophoresis	Rocket Immunoelectrophoresis.
6.	Single Radial Immunodiffusion	Purification of IgG antibodies using affinity chromatography.
7.	Latex agglutination test.	Latex agglutination test.
8.	Immobilization of yeast cells	Immobilization of bacterial cells and enzyme assay.
9.	Production & estimation of biomass (SCP)	Production & estimation of biomass (SCP).
10.	Wine production and estimation of alcohol content.	Wine production and estimation of alcohol content.
11.	Demonstration of acetic acid oxidation (vinegar production).	Demonstration of acetic acid oxidation (vinegar production).

Note: 9 is Mandatory out of 11

PERCENTAGE OF SYLLABUS REVISED: 10

COURSE FOCUSES 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
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Core Practical Syllabus Revision

Faculty: Bioscience

Semester: II

Board: Biotechnology

Course Code/ Name: 223BT2A2CQ - Core Practical: Genetic Engineering and Environmental Biotechnology

Exp. No.	Existing	Changes
1.	Extraction of genomic DNA from bacteria	Extraction of genomic DNA from bacteria
2.	Extraction of DNA from Fungi	Extraction of DNA from Fungi
3.	Extraction of DNA from goat liver	Extraction of DNA from goat liver
4.	-	Extraction of DNA from Plant sample
5.	Agarose gel electrophoresis & Estimation of DNA purity and Quantification	Agarose gel electrophoresis & Estimation of DNA purity and Quantification
6.	Isolation of plasmid DNA from bacteria	Isolation of plasmid DNA from bacteria
7.	Restriction digestion and ligation of Lambda phage DNA	Restriction digestion and ligation of Lambda phage DNA
8.	Isolation of RNA and separation in denaturing gel	Isolation of RNA and separation in denaturing gel
9.	Water quality Analysis-color, pH, MPN and acidity	Water quality Analysis-color, pH, MPN and acidity
10.	Total Hardness by EDTA titrimetric method and chloride estimation	Total Hardness by EDTA titrimetric method and chloride estimation
11.	Estimation of total alkalinity, carbonate and bicarbonate	Estimation of total alkalinity, carbonate and bicarbonate
12.	Determination of chemical oxygen demand	Determination of chemical oxygen demand
13.	Metal analysis from environment samples by flame photometry	Metal analysis from environment samples by flame photometry
14.	-	Isolation and screening of dye degrading bacteria from industrial waste water

Note: 10 is Mandatory out of 14

PERCENTAGE OF SYLLABUS REVISED: 10

COURSE FOCUSES ON:

<input checked="" type="checkbox"/>	Skill Development	<input checked="" type="checkbox"/>	Entrepreneurial Development
<input checked="" type="checkbox"/>	Employability	<input type="checkbox"/>	Innovations
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Syllabus Revision - New Course IDC- Artificial Intelligence & Machine Learning

Faculty: Biosciences

Board: Biotechnology

Semester: IV

Course Code/ Name: 213BT1A41B - Bioinformatics and Technologies

Unit	Content
I	Introduction to Bioinformatics Basics of Cell-Chromosome-Genome-Genes and DNA-Central Dogma. Introduction to DNA sequencing - Illumina, Pyro 454 and Ion torrent. Biological Databases: DNA sequence Database-Protein Database and Sequence analysis tools.
II	Genomics Genome Mapping-Assembly and Comparison. Structural and Functional Genomics. RNA sequencing and Transcriptomics. Gene Prediction: Computational Methods of Gene Prediction, difficulties and application of gene prediction.
III	Proteomics Introduction to protein structure, visualization, comparison and classification. Secondary and tertiary protein structure prediction using bioinformatics tools and methods of protein modeling.
IV	Bioinformatics in Computer-Aided Drug Design Introduction to CADD and drug discovery process. Structural Bioinformatics in drug discovery-SAR and QSAR techniques in drug design. Molecular docking and AutoDock tools.
V	Applied Bioinformatics Tools Introduction to Bioinformatics search tools-Entrez and ExPASy. Sequence alignment: DNA Sequence analysis-Protein sequence analysis-Pairwise and Multiple sequences Alignment. Database search-Motif Search (Protein Motifs and Domain Prediction)-Molecular Modeling and Phylogenetic tree construction and analysis.

PERCENTAGE OF SYLLABUS REVISED: 100%

COURSE FOCUSES ON:

<input checked="" type="checkbox"/>	Skill Development	<input type="checkbox"/>	Entrepreneurial Development
<input checked="" type="checkbox"/>	Employability	<input checked="" type="checkbox"/>	Innovations
<input checked="" type="checkbox"/>	Intellectual Property Rights	<input type="checkbox"/>	Gender Sensitization
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Syllabus Revision - New Course IDC- Biotechnology

Faculty: Computer Science

Board: Computer Science

Semester: II

Course Code/ Name: 224CS1A2IB - Python for Biologists


Unit	Course Content
I	Introduction to Digital Computer: Von Neumann concept - Storage - Programming Languages - Translators - Problem Solving Strategies: Problem Analysis - Algorithms - Flow Charts - Introduction to Python: Introduction- Python overview- Comments - Python Identifiers - Reserved keywords - Variables - Standard data types - Operators - Statements and Expressions - String Operations - Boolean Expressions
II	Control Statements: Iteration - The for loop - While statement - if elif else statement - Input from keyboard Functions: Introduction - Built-in functions - Composition of Functions - Type conversion - Type coercion - Date and time - dir() function - help() function - User defined functions - Parameters & arguments - Function calls - The return statement - Python recursive function - Writing Python Scripts
III	Strings: Compound data type - len function - String slices - String traversal - Escape characters - String formatting operator - String formatting functions. Lists - Values and accessing elements - Traversing a list - Deleting elements from list - Built-in list operators - Built-in list methods.
IV	Tuples: Creating tuples - Accessing values in tuples - Tuple assignment - Tuples as return values - Basic tuple operations - Built-in tuple functions - Dictionaries: Creating a dictionary - Accessing values in a dictionary - Updating dictionary - Deleting elements from dictionary - Operations in dictionary - Built-in dictionary methods.
V	Biopython Installation - Biopython Components: Alphabet - Seq - MutableSeq - SeqRecord - Align - AlignIO - ClustalW - SeqIO - AlignIO - BLAST - Biological Related Data - Entrez - PDB - PROSITE - SeqUtils - Sequencing.

PERCENTAGE OF SYLLABUS REVISED: 100%
COURSE FOCUSES 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
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ATTENDANCE OF THE THIRTEENTH BOARD OF STUDIES MEETING

Faculty: Biosciences


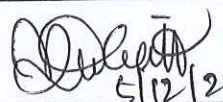
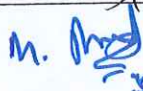
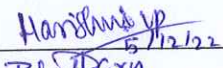
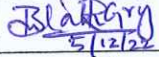

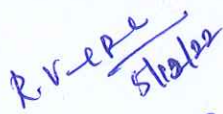
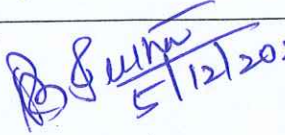
Board: Biotechnology

Date : 05/12/2022

Time : 10.00 a.m.

Venue : Department of Biotechnology (A1 Block-Board Room, Room. No: 102)

The following members were present for the Board of Studies meeting

S. No	Name	Designation	Signature
1.	Dr. P. Chidambara Rajan Professor and Head Department of Biotechnology	Chairman	
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-641007	Subject Expert	 5/12/22
5.	Dr. M. Prasad R&D Executive – Industrial Enzymes Marisym Biologicals Private Limited Coimbatore	Industrial expert	 5/12/2022
6.	Dr. N. Karthikeyan Project Coordinator Regional Sericulture & Research Center Salem	Alumni	ABSENT
7.	Ms. Harshini V P – III B.Sc Biotechnology	Student Representatives	 5/12/22
	Ms. Beula Gracy R – II M.Sc Biotechnology		 5/12/22
8.	Part I (Language I) Dr. N. Kuppaswamy Professor and Head Department of Tamil	Co-opted member	 5/12/22
9.	Part II (Language II) Dr. R. Vithya Prabha Professor and Head Department of English	Co-opted member	 5/12/22
10.	Allied - IDC- Computer Sciences Dr. B. Rosiline Jeetha Professor and Head Department of Computer Science	Co-opted member	 5/12/2022

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11.	Dr. R. Suganthi Professor Department of Biotechnology	Internal Member	<i>Dr. R. Suganthi</i> 5/12/22
12.	Dr. K. Arungandhi Professor Department of Biotechnology	Internal Member	<i>K. Arungandhi</i> 5/12/22
13.	Dr. Arun. P Professor Department of Biotechnology	Internal Member	<i>Dr. Arun. P</i> 5/12/22
14.	Dr. M.N. Kathiravan Professor Department of Biotechnology	Internal Member	<i>Dr. M.N. Kathiravan</i> 5/12/22
15.	Dr. M. Shanmugavadivu Associate Professor Department of Biotechnology	Internal Member	<i>Dr. M. Shanmugavadivu</i> 5/12/22
16.	Dr. M. Poongothai Associate Professor Department of Biotechnology	Internal Member	<i>Dr. M. Poongothai</i> 5/12/22
17.	Dr. Radha Palaniswamy Assistant Professor Department of Biotechnology	Internal Member	<i>Dr. Radha Palaniswamy</i> 05/12/22
18.	Dr. S. Saranya Assistant Professor Department of Biotechnology	Internal Member	<i>Dr. S. Saranya</i> 05/12/22
19.	Dr. P. Deepak Assistant Professor Department of Biotechnology	Internal Member	<i>Dr. P. Deepak</i> 05/12/22

Date: 05/12/2022



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