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: +91-422369100

Department of Microbiology
Board of Studies Meeting

The minutes of the 20th meeting of Board of Studies held on 11.11.2025 at 10.00 am

Members Present:

S. No.	Name	Category
1	Dr. J. Rengaramanujam Professor and Head Department of Microbiology, Dr. N.G.P Arts and Science College, Coimbatore – 641 048	Chairman
2	Dr. S. Murugan – Associate Professor, Department of Biotechnology, Karunya University, Coimbatore.	Subject Expert
3	Dr. M. Kulandhaivel - Associate Professor, Department of Microbiology, Karpagam Academy of Higher Education, Coimbatore – 641 021.	Subject Expert
4	Mrs. V. Pradeepa, Tutor in Department of Microbiology Nandha Medical College and Hospital, Perundurai, Erode.	Alumni
5	Dr. N. Kuppuchamy Part – I (Four Semester Language)	Co – Opted Member
6	Dr. A. Hazel Verbina Part – II (Four Semester Language)	Co – Opted Member
7	Dr. P. Chidambara Rajan Allied	Co – Opted Member
8	Dr. R. Ravikumar Allied	Co – Opted Member
9	Dr. S. S. Sudha	Member
10	Dr. N. Vidhya	Member
11	Dr. S. Senthil Prabhu	Member
12	Dr. A. M. Ramachandran	Member
13	Dr. C. Sasikala	Member
14	Dr. S. Karthik Sundaram	Member
15	Dr. R. Mahenthiran	Member
16	Dr. J. Devakumar	Member
17	Aromah Jeso J (PG)	Student Representatives
20	Vignesh T (UG)	Student Representative

The HoD and Chairman of the Department of Microbiology 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 due to their official commitment.

1. Dr. M. Gnanadesigan – Assistant Professor, Department of Microbial Biotechnology, Bharathiar University, Coimbatore.

2. Dr. C. Balakumar, General Manager – Technical Services, Velam Agri Services, Manupatti, Udumalpet – 642 112.

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

Item 20.1 *To review and approve the minutes of the previous meeting held on 28.06.2025*

The chairman of the Board presented the minutes of the previous meeting held on 28.06.2025 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 28.06.2025.

Item 20.2: *To consider and approve the syllabi offered in II semester for students admitted in UG and PG from the academic year 2025-26.*

The chairman presented the detailed scheme and syllabi for the students admitted in UG and PG from the academic year 2025-26.

The chairman presented the detailed scheme and syllabi for the students admitted in UG and PG from the academic year 2025-26.

After discussion the following resolution was passed.

Resolution:

Resolved to retain the existing syllabus of 2024-25 batch without any modification for the students admitted from the academic year 2025-26.

Item 20.3: *To review and approve the syllabi for IV Semester for the students admitted in UG and PG from the academic year 2024-25*.

The chairman presented the detailed syllabus for the IV semester. The members deliberated in

detail about the modification required. After discussion it is unanimously decided to adopt the following changes.

After discussion the following resolution was passed.

Changes Made:

B. Sc Microbiology		
Course Code	**Course**	**Reason**
24MBU4CA	**IMMUNOLOGY**	Unit III: Dr. Murugan and Dr. Kulandhaivel recommended the inclusion of cord blood bank and colostrum, which has become the need of the hour in helping the graduates in exhibiting graft transplantation and its issues, providing opportunities in health and pharmaceutical sectors.
233MB1A4EP	**FOOD MICROBIOLOGY**	Unit V: Dr. Murugan has recommended to include Ancient Fermentation Techniques, Traditional Fermented Foods under IKS to impart cultural heritage and align with sustainable development goals.

M. Sc Microbiology		
Course Code	**Course**	**Reason**
24MBP4DA	**MOLECULAR DIAGNOSTICS AND BIOINFORMATICS**	Unit III: Dr. Kulanthaivel has recommended inclusion of gene editing tool CRISPR Cas9 enabling the graduate to get employed in the diagnosis of cancer and other infectious diseases.

Resolution:

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

Item 20.4: *To review and approve syllabi for the VI Semester for students admitted in UG from the academic year 2023-24.*

The Chairman presented the detailed syllabi for the V semester to the students admitted from the academic year 2023-2024. The members deliberated in detail about the modification required.

Changes Made:

B.Sc Microbiology		
Course Code	**Course**	**Reason**
233MB1A6SA	**Pharmaceutical Microbiology**	Unit IV: Dr. Kulanthaivel and Ms. Pradeepa have recommended to align students with industry-relevant processes by including manufacturing hygiene and contamination prevention
233MB1A6DA	**DSE I Phytochemical Drug Discovery**	Unit II: Dr. Murugan and Board chairman suggested to include Plant Identification and Authentication like BSI to have improvised knowledge on medicinal plants.
233MB1A6DF	**Epidemiology and Public Health**	Unit IV: Dr. Kulandhaivel recommended to include Government based health schemes, Indian Knowledge Systems (IKS) in healthcare to make graduates to be more innovative and to execute culturally rooted approaches in public health planning and delivery.

Resolution:

Resolved to approve the above modification and adopt the revised syllabus for the UG students admitted for the academic year 2023-24.

Item 20.5: *To discuss and approve the list of Extra credits to be include for Final Year UG and PG Students*

- Best Paper/Poster Award in National/International Conference
- Sponsored Workshop attended at National/International level
- Sponsored Internship like INSA at National Institutes of Eminence shall be considered for both internships as well extra credit
- Start ups registration/Incubation/IPR Registration shall be considered
- Publications – Book Chapter/Articles in Peer Reviewed journals
- e – content/Channels developed and published (Subject to consistency and viewers)

Resolution:

Resolved to approve the panel of examiners for question paper setting and evaluation of answer scripts for the even semester of the academic year 2025-2026.

Item 20.6: *To approve the panel of examiners for Question paper setting and evaluation of answer scripts for the Even semester of the academic year 2025-26.*

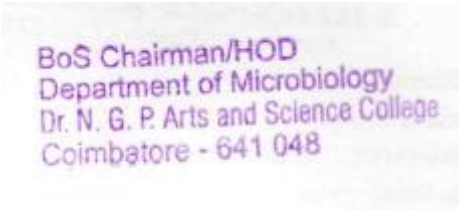
The Chairman presented the panel of Examiners for question paper setting, question paper scrutiny and conduct of practical and theory of examinations are Submitted to CoE for Exam related work.

Resolution:

Resolved to approve the panel of examiners for question paper setting and evaluation of answer scripts for the even semester of the academic year 2025-2026.

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. J. Rengaramanujam, Head and Chairman – Microbiology.

Date: 11.11.2025 **(Dr. J. Rengaramanujam)**



Syllabus Revision

Faculty: Biosciences **Board: Microbiology**
Semester: IV
Course Code/ Name:24MBU4CA/ IMMUNOLOGY

Unit	Existing	Changes
I	**History and Scope of Immunology** History and Scope of Immunology. The basis of defence mechanisms. Cells of immune system- Hematopoiesis, Lymphoid cells and Myeloid cells and Organs of immune system- Primary and Secondary lymphoid organs (Thymus, Bone marrow, Lymph node, Spleen). Phagocytosis	
II	**Types of immunity** Types of immunity- Cell mediated immunity, humoral immunity, Antigen and Antibody types, Complement pathways -Classical, alternate and lectin pathway; Apoptosis-types, inflammation. Immunoglobulin – structure, Isotypes, and functions.	
III	**Allergy and Hypersensitivity** Allergy and Hypersensitivity - Classification types and Mechanisms. Autoimmunity mechanisms and autoimmune response diseases: cell specific: Systemic Lupus Erythematosis and Organ Specific: Myasthenia gravis.	
IV	**Antigen-Antibody reactions** Antigen-Antibody reactions - Agglutination: Direct, indirect, RPR and Hemagglutination. Precipitation: Counter Current electrophoresis, rocket electrophoresis, Double Immuno Diffusion. ELISA. Radio immune assay (RIA). Monoclonal antibodies and its applications.	
V	**Immuno hematology** Immuno hematology - Blood transfusion - ABO grouping - Rh factor. Tissue transplantation - HLA typing - Mechanism of acceptance and rejection. Immunodeficiency disease: primary (Bruton disease), secondary (AIDS).	

PERCENTAGE OF SYLLABUS REVISED: 20

☑ Skill Development	☑ Entrepreneurial Development
☑ Employability	☐ Gender Sensitization
☑ Intellectual Property Rights (IPR**)**	☑ Social Awareness / Environment
☐ Innovations	☐ Constitutional Rights / Human Values / Ethics

Syllabus Revision

Faculty: Biosciences **Board: Microbiology**
Semester: IV
Course Code/ Name: 233MB1A4EP/ Food Microbiology

Unit	Existing	Changes
I	**Importance of microbes in food** Food and Microorganisms – Important microorganisms in food (Bacteria, Mold, Yeast and Black fungus); Factors affecting the growth of microorganisms in food –pH, temperature moisture, Osmotic pressure, Nutrient content, Inhibitory substances and biological structure. Practical 1 Factors affecting growth of microbes in food - pH 2 Factors affecting growth of microbes in food - temperature 3 Factors affecting growth of microbes in food -osmotic pressure	-
II	**Food borne diseases** Food borne diseases – Food poisoning -- Food borne infections –Bacterial and Mycotoxins- Investigation of food poisoning outbreaks. Practical 1 Evaluation of milk quality – Resazurin test 2 Microbial Limit test	-
III	**Spoilage of food** Spoilage of food - meat – canned foods. Practical 1 Isolation of microbes from spoiled meat. 2 Isolation of microbes from canned foods.	-
IV	**Fermented food and dairy products** Fermented food – Bread, fermented fish and meat products – Fermented dairy products – Yoghurt and cheese, Prebiotics and Prebiotics. Fermented beverages: Wine and sauerkraut. Practical 1 Preparation of Wine from fruits 2 Isolation of Lactobacillus from curd 3 Preparation of Sauerkraut	-
V	**Microbiology in Food Sanitation** Bacteriology of Water - Microbiology of Food Product – Good Manufacturing Practices – Hazard Analysis – Critical Control Points Practical 1 Isolation of indicator in water- E. coli 2 Isolation of indicator organisms in food- Salmonella sp. and Shigella sp.	AI& IKS: AI-Based Food Contamination and Spoilage Prediction, AI Based Food Pathogen Detection IKS: Ancient Fermentation Techniques, Traditional Fermented Foods of India

PERCENTAGE OF SYLLABUS REVISED: 5%

COURSE FOCUS ON:

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

Syllabus Revision

Faculty: Bioscience **Board: Microbiology**
Semester: IV
Course Code/ Name: 24MBU4SA /Recombinant DNA Technology

Unit	Existing	Changes
I	Introduction to rDNA Technology History and Scope of rDNA technology - Restriction modification system - Gene manipulating enzymes – Restriction Enzymes – Discovery, types and mode of action, DNA Polymerases I,II & III, Taq polymerase, Klenow fragment - Ligases - Methylases - Reverse transcriptase. Applications of Gene cloning.	Nil
II	Isolation of Purified Polynucleotide Isolation and Purification of DNA (Chromosomal and Plasmid)- Isolation and Purification of RNA - Chemical Synthesis of DNA – Development of Genomic DNA Library and cDNA Library.	Nil
III	Vectors Plasmid based Vectors - Natural vectors – pSC101, pSF2124 and pMB1.Artificial vectors - pBR322 & pUC. Phage based Vectors- ʎ phageandM13. Hybrid Vectors - Phagemid, Phasmid and Cosmid. Artificial chromosomes - BACs; - Eukaryotic vectors –YAC, Shuttle vectors.	Nil
IV	Gene Transfer Techniques Biochemical methods - calcium phosphate, DEAE dextran mediated, Lipofection. Physical methods - Electroporation, Microinjection, Particle bombardment, Ultra. Biological - Viral mediated transduction.	Nil
V	Screening and Characterization of recombinant DNA Screening: Direct - Antibiotic resistance, lacZ complementation (Blue-white selection), plaque phenotype; Indirect: Immunochemical detection - Nucleic acid hybridization, Blotting - Dot and Colony Blotting. Chromosome walking. Chromosome jumping. Case study: In 2020 there was a viral pandemic disease that shook the entire world. Design a recombinant product that could have tackled the virus by developing immunity in individuals, in the form of an active or passive vaccine.	Nil

PERCENTAGE OF SYLLABUS REVISED: Nil
COURSE FOCUS ON:

☑ Skill Development	☑ Entrepreneurial Development
☑ Employability	☐ Gender Sensitization
☑ Intellectual Property Rights (IPR**)**	☑ Social Awareness / Environment
☐ Innovations	☐ Constitutional Rights / Human Values / Ethics

Syllabus Revision

Faculty: Biosciences **Board: Microbiology**
Semester: V
Course Code/ Name: 24MBP4CA / Fermentation Technology

Unit	Existing	Changes
I	**Introduction to Fermentation Process** The range of fermentation process - Microbial biomass, Enzymes, Metabolites, Recombinant products, Transformation processes - Component parts of Fermentation process – Fermentor types – Bioreactors for Aerobic fermentation - Stirred Bioreactors - Reactors for immobilized cells - Heat exchange, Stirring and Mixing, Gas exchange and Mass transfer.	--
II	**Industrially important Microorganisms** Isolation (Primary and Secondary screening), Preservation and Strain improvement (Mutation, Recombination, Regulation, Gene technology and Use of Genetic methods.	--
III	**Upstream processing** Development of Inoculum for Fermentation process - Media for Industrial Fermentation – Formulation, Optimization and Sterilization, Various stages in Upstream (Inoculum preservation, Growth of the inoculum, Fermenter preculture and Production fermentation).	--
IV	**Fermentation Types and Cultures** Batch, Continuous, Fed-batch - Basic Growth Kinetics - Submerged and Solid state Fermentation - Downstream Processing - Recovery and Purification of Intracellular and Extracellular Products (Flocculation, Flotation, Filter systems, Centrifugation, Disintegration, Chromatography, Extraction, Crystallization, Precipitation and Drying).	--
V	**Microbial production of Commercial Products** Microbial production of Organic acids (Citric acid and Acetic acid), Enzymes (Amylase and Protease),	--

	Aminoacids (Lysine and Glutamic acid), Antibiotics (Penicillin, Streptomycin and Griseofulvin), Vitamins (Riboflavin, Cyanocobalamine and Ascorbic acid) - Biosynthesis of Ergot alkaloids - Microbial transformation - Steroids and Sterols, Non-steroid compounds, Antibiotics and Pesticides.	

PERCENTAGE OF SYLLABUS REVISED: --

COURSE FOCUS ON:

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

Syllabus Revision

Faculty: Biosciences **Board: Microbiology**
Semester: IV
Course Code/ Name: 233MB2A4CB / BIOETHICS, BIOSAFETY AND IPR

Unit	Existing	Changes
I	**Introduction to Intellectual Property Rights** Concepts of IPR - Designs - Trademarks - Trade secrets - Domain name - Geographical indications - Copy Rights - Evolution of patent law - History of Indian patent system - International conventions and treaties.	Definition and importance of IPR.
II	**Patents** Classification of patents by WIPO - Classification of patents in India - Categories of patent - Special patent - Patenting of biological products - Patentable and non-patentable inventions in India and abroad - Rights of patent holder and co-owner - Infringement of patent rights and offenses - ~~Patenting life forms~~ - Biodiversity and IPR - Bioinformatics patenting - Gene Patenting. Case study on Patenting Process Overview.	-
III	**Introduction to Biosafety** Risk assessment - Cartagena protocol on biosafety - Capacity building - Biosafety guidelines in India evolved by DBT - Rules for the storage and manufacture of hazardous microorganisms and GMO - Bio safety management.	Biosafety Regulations and Frameworks.
IV	**Biological Agents** Classification of biological agents - Categories of bio	Emergency response plans for accidental exposure and spills.

	hazardous waste - Labelling and disposal. General safety - Permit for the movement and import of GMOs - Biosafety issues of products developed by rDNA technology - Ecological safety assessment of recombinant organisms - Web based information on biosafety of GMOs.	
V	**Bioethics** Bioethics in research – cloning and stem cell research, Human and animal experimentation, animal rights/welfare, Agricultural biotechnology - Genetically engineered food, environmental risk, labeling and public opinion. Sharing benefits and protecting future generations - Protection of environment ~~and biodiversity~~ – Biopiracy.	-

PERCENTAGE OF SYLLABUS REVISED: 20
COURSE FOCUS ON:

☑ Skill Development	☑ Entrepreneurial Development
☑ Employability	☐ Gender Sensitization
☑ Intellectual Property Rights (IPR**)**	☐ Social Awareness / Environment
☑ Innovations	☐ Constitutional Rights / Human Values / Ethics

Syllabus Revision

Faculty: Biosciences **Board: Microbiology**
Semester: IV
Course Code/ Name: 233MB2A4DA/ MOLECULAR DIAGNOSTICS AND BIOINFORMATICS

Unit	Existing	Changes
I	**Introduction to Molecular diagnosis and Immunoglobulins in diagnosis** History and Transcending of diagnostics over time – Traditional and molecular diagnostics – Significance of molecular diagnostics – Scope for Molecular diagnostics - Rise of diagnostic industry in Indian and global scenario. Monoclonal and polyclonal antibodies. Agglutination - RIA, ELISA, chemiluminescence, immunofluorescence, Western blots.	-
II	**Molecular Diagnosis using Nucleotides** Automated DNA sequencing- Principles, Methods and Instrumentation Advances in DNA sequencing - Whole Genome Sequencing, Target Sequencing, New Generation sequencing Methods, Pyrosequencing,	-

	Microarrays, Metagenomics.	
III	**PCR and Hybridization** Nucleic acid amplification methods and types of PCR: Reverse Transcriptase-PCR, Real-Time PCR, Inverse PCR, Ligase Chain Reaction, ~~RNA fingerprinting;~~ Nucleic acid and Protein extraction and analysis (AGE & PAGE); ~~Western Blot,~~ Southern, northern, dot/slot blot; electrophoresis, nucleic acid probe preparation	Gene editing: CRISPR Cas9
IV	**Introduction to bioinformatics** Definition, Basics of Bioinformatics, Scope and Applications. Introduction and types: Biological data bases, Importance of databases, DNA sequence databases (NCBI, EMBL, DDBJ, Genbank)- Protein databases (UniProt, Swissprot, PROSITE) and Structural databases (PDB, CATH).	-
V	**Bioinformatics tools** Drug designing Software's (AutoDock, Schrodinger, ChemSketch) - DNA and Protein similarity searching: BLAST and FASTA, Multiple sequence alignment (ClutalW). Phylogenetic tree types and construction (MEGA).	AI in image Genomic data analysis for disease diagnosis

PERCENTAGE OF SYLLABUS REVISED: 5

☑ Skill Development	☑ Entrepreneurial Development
☑ Employability	☐ Gender Sensitization
☑ Intellectual Property Rights (IPR**)**	☐ Social Awareness / Environment
☑ Innovations	☐ Constitutional Rights / Human Values / Ethics

Syllabus Revision

Faculty: Biosciences **Board: Microbiology**

Semester: VI

Course Code/ Name: 233MB1A6CB / AGRICULTURAL MICROBIOLOGY

Unit	Existing	Changes
I	**Basics of soil** Soil - Physical and Chemical properties –kinds of soil microorganisms – nutritional types – organotrophs, litho, auto, chemoautotrophs, chemoorganotrophs and heterotrophs - Factors influencing microbial growth.	--

II	**Plant and microbial interactions** Role of microbes in nutritional transformation – carbon - humus formation, nitrogen, phosphorous, sulphur. Plant - microbe interactions – rhizosphere. Biological nitrogen fixation – biochemistry of nitrogen fixation. Rhizobium - legume symbiosis, azospirillum, azotobacter. Mycorrhiza. Phyllosphere microorganisms – endophytes.	--
III	**Plant diseases** Bacterial disease – citrus canker, blight of paddy, fungal diseases- tikka leaf spot, Wilt of cotton, Viral disease – TMV, Vein clearing disease. Principles and methods of plant disease management.	--
IV	**Bio-control agents** Types - bacterial, fungal, viral and protozoal- Bacillus thuringiensis, Bacillus sphaericus, Bacillus popilliae, Pseudomonas sp., Microbial control of plant pathogens Trichoderma, Use of Baculovirus, NPV virus, Microbial herbicides.	--
V	**Biofertilizer – Bio inputs for agriculture** Commercial production methods of bacterial biofertilizers - Nitrogen fixing organism (Rhizobium, Azobacter, Azospirillum), phosphate solubilizing bacteria. Mycorrhizal biofertilizer (AM), PGPR (Pseudomonas sp.,), Alga - azolla - cultivation and mass production, Carrier- based inoculants, application, quality control and agronomic importance.	--

PERCENTAGE OF SYLLABUS REVISED: Nil

COURSE FOCUS ON:

☑ Skill Development	☑ Entrepreneurial Development
☑ Employability	☐ Gender Sensitization
☐ Intellectual Property Rights (IPR**)**	☐ Social Awareness / Environment
☑ Innovations	☐ Constitutional Rights / Human Values / Ethics

Syllabus Revision

Faculty: Bioscience **Board: Microbiology**
Semester: II
Course Code/ Name: 233MB1A6CC/ Down Streaming of Microbial Products

Unit	Existing	Changes
I	Introduction - Principles of downstream process, Characteristics of bio- molecules - Cell disruption methods (Enzymatic, mechanical and chemical). Pretreatment and stabilization of bio products	Nil
II	Filtration methods (microfiltration, ultrafiltration). Centrifugation principles and applications. Precipitation techniques (salting out, solvent extraction) Data-driven design of multi-stage centrifugation systems using with AI.	Data-driven design of multi-stage centrifugation systems using with AI.
III	Isolation of products – Adsorption, liquid-liquid extraction, two-phase extraction Membrane separation Types of membranes; Types of membrane processes (Dialysis; Ultrafiltration; microfiltration and Reverse Osmosis,) Precipitation of proteins	Nil
IV	Paper; TLC; Adsorption; Ion exchange, Size exclusion, affinity chromatographic Gas chromatography; HPLC; FPLC. Apply AI for automated peak integration, anomaly detection, and process control.	Apply AI for automated peak integration, anomaly detection, and process control.
V	Techniques for concentrating products (Crystallization, drying, evaporation, lyophilization) Formulation strategies for stability and bioactivity. Regulatory considerations and quality control in downstream processing. Case study: A biotech company is producing a microbial enzyme using a fermentation process, but struggles with low purity and high operational costs in downstream processing. Analyze the challenges in product recovery, purification, and yield optimization. Suggest cost-effective methods to enhance downstream efficiency while maintaining product integrity. What key factors should be prioritized for scale-up?	Nil

PERCENTAGE OF SYLLABUS REVISED: 10%
COURSE FOCUS ON:

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

Syllabus Revision

Faculty: Biosciences **Board: Microbiology**

Semester: VI

Course Code/ Name: 223MB1A6SA/PHARMACEUTICAL MICROBIOLOGY

Unit	Existing	Changes
I	**Introduction to Chemotherapeutic agents** History and development of chemotherapeutic agent- properties of antimicrobial agents: natural, semisynthetic and synthetic - Chemotherapeutic agents for infectious diseases with their mode of action; antibacterial, antifungal, antiviral, antiprotozoal.	
II	**Antibiotic resistance and development of new therapeutics** Development of antibiotic resistance- mechanism of antibiotic resistance- antimicrobial peptides: properties, sources and applications. Phage therapy: introduction, types of phages involved in phage therapy and applications of phage therapy - plant based therapeutic agents-, eugenol and curcumin.	
III	**Active pharmaceutical Ingredients and aseptic process** Types of active pharmaceutical ingredients and general formulations - principles of sterilizations with respect to pharmaceutical industries- sterilization methods of pharma products: Moist heat, dry heat, Radiation, gaseous and filtration -microbial spoilage of pharma products, sources of contamination. Contamination control in aseptic manufacturing.	
IV	**Quality control of pharmaceutical products** Introduction to quality control- quality control parameters – methods involved in quality control: environmental monitoring – settling plate method, air sampling, surface monitoring, personnel monitoring. Quality Risk Management (QRM) in Microbial Control. Product quality control: microbial limit test, Bacterial endotoxin test, sterility test, microbial identification by MALDI – ToF and PCR. Pharmaceutical product validation and its types.	
V	**Pharmacopoeia and regulatory agencies** Introduction to pharmacopoeia; FDA regulation and Indian Pharmacopoeia, British Pharmacopoeia, US Pharmacopoeia; Reimbursement of drugs and biological; recall procedures, legislative perspectives; GMP and SOP in pharmaceuticals; WHO guidelines, ICH process.	

PERCENTAGE OF SYLLABUS REVISED: Nil

COURSE FOCUS ON:

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

Syllabus Revision

Faculty: Biosciences **Board: Microbiology**

Semester: VI

Course Code/ Name: 233MB1A6DA /DSE PHYTOCHEMICAL DRUG DISCOVERY

Unit	Existing	Changes
I	**Introduction to phytochemicals** Overview of phytochemicals- Definition, classification (primary and secondary metabolites), and significance in plants. Historical context- traditional uses of plants in medicine and the evolution of phytochemical research - ethnopharmacology- study of how different cultures utilize plant-based medicines, AI-Powered Plant Identification.	AI-Powered Plant Identification.
II	**IKS based extraction and separation techniques** IKS method of phytoconstituents extraction- solvent extraction, steam distillation, maceration, and ultrasound assisted extraction. Modern techniques used in conjunction with IKS- microwave assisted extraction, pressurized liquid extraction, supercritical fluid extract and enzyme assisted extraction - separation techniques- chromatography (TLC, Column, HPLC, HPTLC and GC) - spectroscopic techniques for the structural characterization of bioactive phytochemicals - FT-IR, NMR spectroscopy and mass spectrometry.	**IKS based extraction and separation techniques** IKS method of phytoconstituents extraction. Modern techniques used in conjunction with IKS- microwave assisted extraction,
III	**Bioactivity screening** In vitro – antibacterial, antifungal, antiviral, anti-inflammatory, cytotoxic and antioxidant activity. In vivo - antidiabetic, anticancer studies- pharmacokinetics - ADME, toxicology – pharmacodynamics - ethical considerations- ethnobotany, biodiversity conservation- IKS-Based Conservation Practices, and intellectual property rights.	IKS-Based Conservation Practices, and intellectual property rights.

IV	**Structure-Activity Relationship (SAR) and optimization** SAR principles- correlating chemical structure with biological activity -lead optimization- strategies for modifying structures to enhance efficacy and reduce toxicity - computational methods - use of bioinformatics and cheminformatics in drug design (molecular modeling, docking, QSAR).	--
V	Regulatory and quality control Regulatory framework - overview of drug approval processes for phytochemicals- quality control - Identification and authentication of plants - organoleptic, phytochemical analysis – morphological and physico-chemical properties mentioned in Indian Pharmacopoeia (IP), British Herbal Pharmacopoeia (BHP), Ayurvedic Pharmacopoeia of India (API) - WHO guidelines.	--

PERCENTAGE OF SYLLABUS REVISED: 10
COURSE FOCUS ON:

☑ Skill Development	☑ Entrepreneurial Development
☑ Employability	☐ Gender Sensitization
☑ Intellectual Property Rights (IPR**)**	☑ Social Awareness / Environment
☑ Innovations	☑ Constitutional Rights / Human Values / Ethics

Syllabus Revision

Faculty: Biosciences **Board: Microbiology**
Semester: V
Course Code/ Name: 223MB1A6DB / ENTREPRENEURIAL MICROBIOLOGY

Unit	Existing	Changes
I	Introduction to Entrepreneurship Entrepreneur development activity – Government, private and NGOs contributions to entrepreneurs- risk assessment - Generation of project – project identification – preparation of project report- Establishment of small scale industries.	
II	Entrepreneurship in Microbiology Microbial cells as fermentation products – Baker's yeast, food and feed yeasts- yogurt and cheese- Bacterial insecticides - Legume inoculants – Algae (Spirulina). Enzymes as fermentation products – Bacterial and Fungal amylases, proteases, pectinases, invertases and other enzymes.	

III	Mushroom and biofertilizer production Mushroom cultivation and composting –Agaricus campestris, Agaricus bisporus, and Volvariella volvaciae; preparation of compost, filling tray beds, spawning, maintaining optimal temperature, casing, watering, harvesting and storage. Biofertilizers – Historical background – Chemical fertilizers versus biofertilizers – Organic farming – Rhizobium sp, Azospirillum sp and Azotobacter sp.	
IV	Large scale production of breweries Brewing: Beer and wine – media components, preparation of medium, Microorganisms involved, maturation, carbonation, packaging, keeping quality, contamination, by products. production of Industrial alcohol-ethanol- Fermentation Economics.	
V	Patents for Entrepreneurs Patents and secret processes –procedure of patenting, composition, subject matter and characteristics of a patent, inventor, infringement, cost of patent – patents in India and other countries.	

PERCENTAGE OF SYLLABUS REVISED: Nil

☑ Skill Development	☑ Entrepreneurial Development
☑ Employability	☐ Gender Sensitization
☑ Intellectual Property Rights (IPR**)**	☑ Social Awareness / Environment
☑ Innovations	☑ Constitutional Rights / Human Values / Ethics

Syllabus Revision

Faculty: Biosciences **Board: Microbiology**

Semester: V

Course Code/ Name: 233MB1A6DD / DSE III Microbial Fuel Technology

Unit	Existing	Changes
I	Introduction to Microbial Fuels Overview of microbial fuels with insights from ancient Indian texts on biofuels. Historical development, including traditional biomass systems like gobar gas. Classification, advantages, and India's environmental and economic impacts, including rural bioenergy and policies like the National Bio-Energy Mission.	insights from ancient Indian texts on biofuels, including rural bioenergy and policies like the National Bio-Energy Mission.

II	Bioethanol Production Microbial ethanol production using yeasts (Saccharomyces cerevisiae) and bacteria, with emphasis on traditional Indian fermentation practices such as tadi (palm wine), mahua fermentation, and rice beer (handia, apong). Substrates used in India (sugarcane, sweet sorghum, rice husk, and lignocellulosic biomass). Pretreatment of biomass using physical, chemical, and biological methods. Genetic engineering approaches to enhance ethanol yield and sustainable bioethanol prospects in India.	with emphasis on traditional Indian fermentation practices such as tadi (palm wine), mahua fermentation, and rice beer (handia, apong)
III	Biogas Production Anaerobic digestion process and stages (hydrolysis, acidogenesis, acetogenesis, methanogenesis) - Microbial communities and metabolic pathways in biogas production - Feedstock for biogas production: agricultural waste, food waste, wastewater sludge - Design and operation of biogas plants (small-scale vs. industrial-scale) - Applications, limitations, and advancements in biogas technology.	--
IV	Biodiesel and Algal Fuels Microorganisms used in biodiesel production (algae, bacteria) - Biochemical pathways for lipid production in microalgae - Cultivation techniques for algal biomass (open ponds, photobioreactors) - Extraction and transesterification process for biodiesel production – Approaches to enhance lipid yield from algae.	--
V	Biohydrogen and Emerging Microbial Fuel Technologies Microbial pathways for hydrogen production (dark fermentation, photo-fermentation) - Role of photosynthetic bacteria and cyanobacteria in biohydrogen production - Design and optimization of microbial fuel cells (MFCs) - Electrogenic bacteria and electron transfer mechanisms in MFCs - Integration of microbial fuel technologies for sustainable energy solutions - Future trends and innovations in microbial fuels research.	--

PERCENTAGE OF SYLLABUS REVISED: 15%
COURSE FOCUS ON:

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

Syllabus Revision

Faculty: Biosciences **Board: Microbiology**

Semester: VI

Course Code/ Name: 233MB1A6DE / **DSE PROSPECTIVES ON MICROBIOLOGY LAB ACCREDITATION**

Unit	Existing	Changes
I	Introduction to laboratory accreditation Definition and importance of laboratory accreditation, overview of accreditation bodies at national (NABL – National Accreditation Board for Testing and Calibration Laboratories; BIS – Bureau of Indian Standards) and international levels (ILAC – International Laboratory Accreditation Cooperation; ISO/IEC 17025) -The role and importance of accreditation in ensuring quality and reliability.	--
II	Quality management system Components of QMS (Quality Management System) - development and implementation of QMS in microbiology labs - quality assurance guidelines from relevant regulatory agencies. Standard operating procedures (SOPs) for specific microbiological tests in soil, water, and food samples	--
III	Quality Control (QC) techniques Routine QC practices in microbiology- Use of reference materials and calibration Standards - Internal quality control protocols. Conducting internal and external audits – checklist, procedures, and reporting.	--
IV	Safety and compliance in laboratory procedures Safety Protocols and emergency procedures- regulatory compliance requirements for microbiology laboratory at different biosafety levels -environmental and ethical considerations associated with different laboratories.	--
V	Laboratory information management system Data reporting and traceability -ensuring data accuracy and security- Databases for sharing -comparison of inter-laboratory protocols and data. Case Study: Visit Kovai Medical Centre and Hospital, Coimbatore, microbiology laboratory and submit your observations as report.	--

PERCENTAGE OF SYLLABUS REVISED: Nil
COURSE FOCUS ON:

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

Syllabus Revision

Faculty: Biosciences **Board: Microbiology**

Semester: VI

Course Code/ Name: 233MB1A6DF / EPIDEMIOLOGY AND PUBLIC HEALTH

Unit	Existing	Changes
I	**Introduction to Epidemiology** Definition and objectives of Epidemiology - Historical evolution of Epidemiology - Epidemiological approach - Concept and determinants of health and disease - Difference between Epidemiology and preventive medicine.	-
II	**Infectious disease Epidemiology** Basic concepts of outbreak investigation - Case studies on Field Epidemiology - transmission dynamics models: SIS and SIR models - Basic reproductive number (R0) - Endemic vs. epidemic - Effective reproductive number (Rt) - Eradication threshold - Estimating R0 - Vaccine efficacy.	-
III	**Epidemiology of Communicable diseases** Communicable diseases: Concept, typology, Risk factors. Epidemiology and burden of Communicable diseases in India - Public health interventions - Emerging and re-emerging tropical diseases - Epidemiology of major diseases of public health importance: Avian influenza (H5N1), COVID 20, Monkey pox, Kyasanur Forest Disease (KFD).	Nipah virus, Scrub Typhus, Malaria and Leptospirosis
IV	**Public Health Concepts and Goals** Public health: Introduction, definition and history - Conceptual understanding of health, disease and medicine - Review of modern public health - Evidence based health policy - Health planning in India - Primary health care as an approach to public health.	National Health Mission, Integrated Child Development Services, Ayushman Bharat. Case Study Analyze how modern technologies like AI and traditional health knowledge (IKS) can be used together for public health planning, disease controlling and prevention of Dengue outbreaks in rural and urban zones of Tamil Nadu with reference to national programs such as the National Health Mission, Ayushman

		Bharat, and ICDS.
V	**Core Competencies to Practice Public Health** Public health preparedness - Public Health Response - Public, private, NGOS participation in health service delivery - Public health surveillance - Health impact assessment and Public health ethics - Conceptual framework of one health. ~~Case Study: A rural area with many migrant workers saw 25 cases of Tuberculosis (TB) over six months, largely due to overcrowded housing and limited ventilation. Educational sessions on TB symptoms and prevention were offered in multiple languages to address language barriers. Community health workers were also trained to improve outreach. The health department provided mass screenings, free tests, and implemented directly observed therapy (DOT) for confirmed cases to ensure treatment completion. Why is DOT important for TB treatment?~~	Case study: Explore the use of AI in analyzing traditional Indian knowledge of organic farming and microbial inoculants for developing efficient biofertilizers.

PERCENTAGE OF SYLLABUS REVISED: 22

COURSE FOCUS ON:

☑ Skill Development	☑ Entrepreneurial Development
☑ Employability	☐ Gender Sensitization
☑ Intellectual Property Rights (IPR**)**	☑ Social Awareness / Environment
☑ Innovations	☑ Constitutional Rights / Human Values / Ethics

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: +91-422369100

Department of Microbiology

Board of Studies Meeting

The minutes of the 20th meeting of Board of Studies held on 11.11.2025 at 10.00 am

Members Present:

S. No.	Name	Category	Attendance Status
1	Dr. J. Rengaramanujam Professor and Head Department of Microbiology, Dr. N.G.P Arts and Science College, Coimbatore – 641 048	Chairman	Present
2	Dr. M. Gnanadesigan – Assistant Professor, Department of Microbial Biotechnology, Bharathiar University, Coimbatore	VC Nominee	Absent
3	Dr. S. Murugan – Associate Professor, Department of Biotechnology, Karunya University, Coimbatore.	Subject Expert	Present
4	Dr. M. Kulandhaivel - Associate Professor, Department of Microbiology, Karpagam Academy of Higher Education, Coimbatore.	Subject Expert	Present
5	Dr. C. Balakumar, General Manager – Technical Services, Velam Agri Services, Manupatti, Udumalpet – 642 112.	Industrial Expert	Absent
6	Mrs. V. Pradeepa, Tutor in Department of Microbiology, Nandha Medical College and Hospital, Perundurai, Erode.	Alumni	Present
7	Dr. N. Kuppuchamy Part – I (Four Semester Language)	Co – Opted Member	Present
8	Dr. A. Hazel Verbina Part – II (Four Semester Language)	Co – Opted Member	Present
9	Dr. P. Chidambara Rajan Allied	Co – Opted Member	Present
10	Dr. R. Ravikumar Allied	Co – Opted Member	Present
11	Dr. S. S. Sudha	Member	Present
12	Dr. N. Vidhya	Member	Present
13	Dr. S. Senthil Prabhu	Member	Present
14	Dr. A. M. Ramachandran	Member	Present

15	Dr. C. Sasikala	Member	Present
16	Dr. S. Karthik Sundaram	Member	Present
17	Dr. R. Mahenthiran	Member	Present
18	Dr. J. Devakumar	Member	Present
19	Aromah Jeso J (PG)	Student Representative	Present
20	Vignesh T (UG)	Student Representative	Present

Date: 11.11.2025

(Dr. J. Rengaramanujam)
BoS Chairman/HOD
Department of Microbiology
Dr. N. G. P. Arts and Science College
Coimbatore - 641 048