



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)

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Department of Microbiology

Board of Studies Meeting

The minutes of the 18th meeting of Board of Studies held on 08.04.2024 at 10.00 am at the Microbiology Department, Instrumentation Room (B1-1302).

Members Present:

S. No.	Name	Category
1	Dr. J. Rengaramanujam	Chairman
2	Dr. M. Gnanadesigan – Assistant Professor, Department of Microbial Biotechnology, Bharathiar University, Coimbatore.	University Nominee
3	Dr. S. Murugan – Associate Professor, Department of Biotechnology, Karunya University, Coimbatore.	Subject Expert
4	Dr. K. Vijila - Professor, Department of Agricultural Microbiology, TNAU, Coimbatore – 641 003	Subject Expert
5	Dr. N. Kuppuchamy	Co – Opted Member
6	Dr. A. Hazel Verbina	Co – Opted Member
7	Dr. P. Chidambara Rajan	Co – Opted Member
8	Dr. R. Ravikumar	Co – Opted Member
8	Dr. D. Geetharamani	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	Prof. M. Nivethitha	Member
17	Dr. J. Devakumar	Member
18	Monishkumar R	Student
19	Redhanya. V. K	Student

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 member/s to attend the meeting and requested to grant leave of absence due to their official commitment.

1. Dr. Chitra Tangavel, Scientist, Ganga Res. Center, Coimbatore -Industrial Expert
2. Ms. Durgadevi. S - Alumni

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 05.04.2024.*

The chairman of the Board presented the minutes of the previous meeting held on **05.04.2024** 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 05.04.2024.

Item 18.2: *To review and approve the syllabi for II Semester for the students admitted in UG and PG from academic year 2024-25.*

The chairman presented the detailed syllabus 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:

B. Sc Microbiology		
Course Code	Course	Reason
24MBU2CA	Microbial Physiology	Dr. M. Gnanadesigan recommended to add unusual sugars and lipids which form the basis of cell membranes and secondary metabolites to have wide exposure on diverse metabolic pathways.

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 review and approve syllabi for the IV Semester for students admitted in UG and PG from the academic year 2023-24.*

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

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 review and approve syllabi for the VI Semester for students admitted in UG from the academic year 2022-23.*

The Chairman presented the detailed syllabi for the VI semester for the students admitted from the academic year 2022-2023. The members deliberated in detail about the modification required. After discussion it is unanimously decided to adopt the following changes.

Changes Made:

B. Sc Microbiology		
Course Code	Course	Reason
223MB1A6SA	Pharmaceutical Microbiology	<p>Dr. Vijila and Dr. Murugan suggested for the following changes,</p> <p>Unit I - Remove the topic “Types of chemotherapeutic agents” since it is repeated in Unit - IV</p> <p>Unit II - Lytic and lysogenic cycle was irrelevant so it has been recommended for removal</p> <p>Unit III – To have coherent learning and understanding the members suggested to incorporate the following topics;</p> <p>a) Method of sterilization of pharma products,</p> <p>b) Microbial Spoilage of pharma products</p> <p>Unit IV - Quality control parameters, Environmental Monitoring (EM) methods and WHO guidelines have been added to acquire better managerial skills in quality assurance.</p>
223MB1A6DB	Entrepreneurial Microbiology	<p>Dr. Vijila subject expert, recommended to include biofilms as biofertilizers, Bio-resource technology to navigate the complexities of commercialization, from product development to market.</p>

New Courses Introduced:

B. Sc Microbiology		
Course Code	Course	Reason
223MB1A6CA	Environmental Microbiology	Dr. K. Vijila suggested to introduce the course Environmental Microbiology which gives profound understanding about microbial interactions, waste management and bioremediation with inclusion of “Lichens as biological indicator of air pollution” and “Bioremediation and Superbugs” as directed by Dr. S. Murugan and Dr. M. Gnanadesigan. It will enhance the possibility of exploring job opportunities in the field of conservation, pollution control and climate science.
223MB1A6CB	Agricultural Microbiology	Dr. K. Vijila suggested to introduce the course Agricultural Microbiology to maximize the employable and entrepreneurial opportunities in Agri-industry, due to increasing demand of biofertilizer and biocontrol agents for sustainable agriculture.
223MB1A6CC	Downstreaming of Microbial Products	Dr. S. Murugan and Dr. M. Gnanadesigan recommended that this course will enable the students to be upskilled in advanced optimization and product purification methods and improves employment opportunities in pharma industries.
223MB1A6CP	Core Practical: Environmental, Agricultural and Industrial Microbiology	Dr. Murugan and Dr. M. Gnanadesigan recommended introduce Microalgae Cultivation to High-Value Nutritional Products and Biofertilizers which will enable the graduate to get exposed to skill sets and motivation required for becoming an entrepreneur in Biofertilizer production.

223MB1A6DA	Phytochemical Discovery	Drug	Dr. M. Gnanadesigan recommended the course for equipping the students with skills on drug development methods for searching novel drugs as an alternative to the existing drugs and antibiotics to defer the challenge of emerging diseases and antibiotic resistance.
223MB1A6DC	Medical Techniques	Laboratory	The members recommended this course since it will make the students to get familiarized with advanced diagnostic methods and to have better job opportunities in clinical diagnostic laboratories
223MB1A6DD	Microbial Technology	Fuel	Since there is much demand for sustainable energy the learning on bio-fuel with special focus on microorganisms is need of the hour to align with sustainable development goals.
223MB1A6DE	Prospectives Microbiology Accreditation	on Lab	Dr. S. Murugan and board members suggested to introduce this course for imparting the knowledge on Lab accreditation agencies and process. This will support the graduate to set up own laboratory, be self employed as lab accreditation consultant and serve as QC manager.
223MB1A6DF	Epidemiology and Public Health		Dr. M. Gnanadesigan recommended the new course as Epidemiology and Public Health equips students with the knowledge to analyze disease patterns, risk factors, and control strategies. It opens doors to the learners with diverse roles in government, healthcare, research, and NGOs, focusing on disease prevention and health promotion.

Resolution:

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

Item 18.5: *To approve the panel of examiners for Question paper setting and evaluation of answer scripts for the Even semester of the academic year 2024-25.*

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 2024-2025.

Item 18.6: *To consider and approve the syllabi of self study paper offered in III semester for the students admitted during 2024-25.*

The chairman presented the detailed scheme and self study syllabi for the students admitted during 2025-25.

The chairman presented the detailed scheme and self study syllabi for the students admitted in UG and PG from the academic year 2024-25. 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 course offered in V semester for the UG students admitted during 2024-25.*


The chairman presented the list of courses offered by NPTEL for the exemption of the course Recombinant DNA Technology in V semester of UG students admitted during 2024-25. The members deliberated in detail about the possibility of exploring NPTEL courses having contents relevant to rDNA technology.

After discussion the following resolution was passed.

Resolution:

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

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.


BoS Chairman/HOD - 08/11/2024
Department of Microbiology
Dr. N. G. P. Arts and Science College
Coimbatore - 641 048

Date: 08.11.2024

(Dr. J. Rengaramanujam)

Syllabus Revision

Faculty: Biosciences

Board: Microbiology

Semester: VI

Course Code/ Name: 24MBU2CA / Microbial Physiology

Unit	Existing	Changes
I	Nutritional requirement Common nutritional requirement - Nutritional requirements of Microorganisms- Autotrophs, Heterotrophs, Chemotrophs, Copiotrophs and Oligotrophs- Nutrition uptake by cell wall Passive and Facilitated diffusion, Active transport, Group translocation	Macro elements, micro elements and trace elements.
II	Growth of Bacteria Growth factors-Growth curve- Microbial growth-Batch culture, Continuous, Semi continuous, Synchronous and Biphasic growth - Calculation of generation time - Estimation of Microbial growth: Microscopic count, Direct –microscopic count , Turbidometric assay and TVC - Factors influencing microbial growth	-
III	Respiration & Energy Production Aerobic respiration - EMP and its alternative pathways (HMP shunt & ED pathways) - TCA cycle – Electron transport – Energy generation via Oxidative and Substrate level phosphorylation - Calculation of ATP in aerobic cellular processes - Glyoxylate cycle	β oxidation of fatty acids
IV	Anaerobic Respiration Anaerobic respiration – Methanogens - Sulphur and nitrogenous compounds and CO ₂ as final electron Acceptor - Fermentation – Alcoholic, Propionic, lactic and Mixed acid fermentation - Oxygenic and anoxygenic photosynthesis in bacteria	-
V	Biosynthesis of amino acid, Lipid and Cell wall Biosynthesis of amino acids (Pyruvate family –Leucine and Glutamic acid family) - Lipids (Phospholipids)	Alanine, Archeal lipids and Biosynthesis of bacterial cell wall

PERCENTAGE OF SYLLABUS REVISED: 21

COURSE FOCUS ON:

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

**Syllabus Revision
New Paper**

**Faculty: Biosciences
Semester: VI**

Board: Microbiology

Course Code/ Name: 223MB1A6CA / Environmental Microbiology

Unit	Syllabus
I	Introduction to Environmental Microbiology: Environment ecosystems – types – Lithosphere, Hydrosphere, Atmosphere. Energy flow, Food chain and Food web. Microbial interactions – Positive – Neutralism - Commensalism, Synergism, Mutualism, Cooperation, Amensalism, Parasitism, Predation. Biofilm formation.
II	Microbiology of Soil: Microbes in soil: Occurrence, diversity, adaptations and potential applications of oligotrophs, thermophiles, psychrophiles, radiation tolerant, metallophiles, acidophiles, alkaliphiles and halophiles.
III	Microbiology of Air and water: Aerobiology: Introduction – Bioaerosols – Distribution of microbes in air – Transport of microbes to air – outdoor and indoor air transmission – Bioaerosol control in laboratory. Biological indicators – Lichens. Water microbiology: Microbial components of water – BoD, COD and Eutrophication - Indicator microbes and its classes.
IV	Waste management: Biomass waste management of plant residues: Lignocellulolytic microorganisms - Enzymes – Applications: Bio pulping, Biobleaching, Biofuels, Animal feed production. Treatment of sewage -Primary, secondary and tertiary treatments – Composting - Landfill development.
V	Bioremediation: Bioremediation of Environmental pollutants: Mineral leaching by bacteria -Heavy metal degradation by Bioaccumulation - Pesticides - Petroleum hydrocarbons - Microbial enhanced oil recovery - Super bugs - Biogas production - Plastic degrading microorganisms. Case study: Tamil Nadu's Vellore district is home to a major leather tanning industry, which generates significant quantities of chromium-laden wastewater. Improperly treated wastewater has led to soil and water contamination in the area. How can biosorption and bio reduction processes help in detoxifying pollutants from leather tanning industries?

PERCENTAGE OF SYLLABUS REVISED: 100

COURSE FOCUS ON:

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

**Syllabus Revision
New Paper**

Faculty: Biosciences
Semester: VI
Course Code/ Name: 223MB1A6CB / AGRICULTURAL MICROBIOLOGY

Board: Microbiology

Unit	Syllabus
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	Biocontrol agents: Types - bacterial, fungal, viral and protozoal- <i>Bacillus thuringiensis</i> , <i>Bacillus sphaericus</i> , <i>Bacillus popilliae</i> , <i>Psuedomonas</i> 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 (<i>Pseudomonas</i> sp.), Alga - azolla - cultivation and mass production, Carrier- based inoculants, application, quality control and agronomic importance.

PERCENTAGE OF SYLLABUS REVISED: 100

COURSE FOCUS ON:

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

**Syllabus Revision
New Paper**

**Faculty: Biosciences
Semester: VI**

Board: Microbiology

**Course Code/ Name: 223MB1A6CC / DOWNSTREAMING OF MICROBIAL
PRODUCTS**

Unit	Syllabus
I	Downstreaming Process: Introduction - Principles of downstream process, Characteristics of bio- molecules - Cell disruption methods (Enzymatic, mechanical and chemical). Pretreatment and stabilization of bio products
II	Separation methods: Filtration methods (microfiltration, ultrafiltration). Centrifugation principles and applications. Precipitation techniques (salting out, solvent extraction).
III	Isolation of products: 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
IV	Product Purification: Paper; TLC; Adsorption; Ion exchange, Size exclusion, affinity chromatographic Gas chromatography; HPLC; FPLC.
V	Final product formulation: Techniques for concentrating products (Crystallization, drying, evaporation, lyophilization) Formulation strategies for stability and bioactivity. Regulatory considerations and quality control in downstream processing.

PERCENTAGE OF SYLLABUS REVISED: 100

COURSE FOCUS ON:

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

**Syllabus Revision
New Paper**

Faculty: Biosciences

Board: Microbiology

Semester: VI

**Course Code/ Name: 223MB1A6CP / ENVIRONMENTAL, AGRICULTURAL AND
INDUSTRIAL MICROBIOLOGY**

Exp.	Syllabus
1	Enumeration of airborne microorganisms by settle plate method.
2	Enumeration of waterborne microorganisms using membrane filtration method
3	Estimation of BOD and COD of waste water
4	Isolation of VAM spores from rhizosphere soil
5	Isolation of free living nitrogen fixers – Azotobacter, symbiotic nitrogen fixers - Rhizobium from root nodule and Phosphate solubilizers - Pseudomonas sp
6	Alcohol production and estimation - wine
7	Immobilization of microbial cells using Sodium alginate
8	Cultivation of SCP (Spirulina) - Under DBT Star Scheme.
9	Microbial degradation of synthetic dyes - Under DBT Star Scheme
10	Production and assay of extracellular enzymes - Amylase and Protease
11	Sterility checking of pharmaceutical products - Open Inoculation method
12	Microbial limit test for a pharmaceutical products
13	Plant tissue culture -Demonstration (Under DBT Star Scheme)
14	Biofertilizer mass production and preparation - Under DBT Star Scheme

PERCENTAGE OF SYLLABUS REVISED: 100

COURSE FOCUS ON:

<input checked="" type="checkbox"/> Skill Development	<input checked="" type="checkbox"/> Entrepreneurial Development
<input checked="" type="checkbox"/> Employability	<input type="checkbox"/> Gender Sensitization
<input type="checkbox"/> Intellectual Property Rights (IPR)	<input type="checkbox"/> Social Awareness / Environment
<input type="checkbox"/> Innovations	<input type="checkbox"/> 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, Types of chemotherapeutic agents – Synthetic, Semisynthetic, Natural. Antibiotics: Chemotherapeutic agents for infectious diseases Types of antibiotics with their mode of action; antibacterial, antifungal, antiviral, antiprotozoal.	Examples of chemotherapeutic agents
II	Antibiotic resistance Development of antibiotic resistance, Mechanism of antibiotic resistance, Antimicrobial Peptides: History, properties, sources, mode of action and application. Phage therapy: introduction to phages, lytic cycle, types of phages involved in phage therapy . Plant based therapeutic agents.	Title: Antibiotic resistance and development of new therapeutics Applications of phage therapy. Plant based therapeutic agents.
III	Sterilization and Microbial spoilage of pharma products Microbial contamination spoilage and hazard: Sources of contamination, factors affecting survival and growth, breakdown of active ingredient and general formulations. Principles of sterilizations with respect to pharmaceutical industries. Methods of sterilizations: Steam , dry heat, Radiation, Gaseous and Filtration.	Microbial Types of API Moist heat Sources of contamination, factors affecting microbial growth
IV	Preservation of Pharma Products Principles and objectives of preservation. Antimicrobial preservatives and their properties: antimicrobial activity , factors affecting antimicrobial activity, preservative monographs . Preservative stability and efficacy. Methods of Preservative evaluation and testing- Preservative Efficacy test –In vitro & In vivo, Antibiotic Sensitivity test.	Types Kirby - Bauer agar diffusion method and Antimicrobial gradient method (Etest) Microbial identification by MALDI – ToF and PCR.
V	Regulatory aspects in pharmaceuticals Introduction to pharmacopoeia; FDA regulation and IP, BP, USP; Reimbursement of drugs and biological; legislative perspectives; GMP in pharmaceuticals; Quality control through WHO ; ICH process.	recall procedures SOP WHO guidelines.

PERCENTAGE OF SYLLABUS REVISED: 48

COURSE FOCUS ON:

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

**Syllabus Revision
New Paper**

Faculty: Biosciences

Board: Microbiology

Semester: VI

Course Code/ Name: 223MB1A6DA / PHYTOCHEMICAL DRUG DISCOVERY

Unit	Syllabus
I	<p>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</p>
II	<p>Extraction and Separation Techniques Methods of Extraction- Solvent extraction, steam distillation, maceration, ultrasound assisted extract, 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 -UV-visible, FT-IR, NMR spectroscopy and Mass spectrometry.</p>
III	<p>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, and intellectual property rights.</p>
IV	<p>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)</p>
V	<p>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) and WHO guidelines etc.</p>

PERCENTAGE OF SYLLABUS REVISED: 100

COURSE FOCUS ON:

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

Syllabus Revision

Faculty: Biosciences

Board: Microbiology

Semester: VI

Course Code/ Name: 223MB1A6SA / ENTREPRENEURIAL MICROBIOLOGY

Unit	Existing	Changes
I	Concept of Entrepreneurship— Definition— Role and reasons. Entrepreneurial scenario in India – Establishment of Small scale Industries– Generation of project – Project identification – Preparation of Project report - Government, NGOs, venture capitals, angel funding, crowd funding and Incubation facilities to start spin-offs	Entrepreneur development activity
II	Agriculture— biofertilizer, composting, biopesticides, bioinsecticides, biocontrol agents— Food— fermented food products, packed and canned foods— Dairy— Yoghurt, cheese— Pharmaceuticals— antibiotics, vaccines, amino acids— Diagnostics— rapid kits— Enzyme production- SCP- Mushroom. Bio-resource technology.	Microbial cells as fermentation products – Bakers yeast, food and feed yeasts, Bacterial Insecticides, Legume Inoculants, Mushrooms, Algae. Enzymes as fermentation products – Bacterial and Fungal Amylases, Proteases, Pectinases, Invertases and other enzymes.
III	Mushroom cultivation and Composting— Cultivation of Agaricus campestris, Agaricus bisporus, and Volvariella volvaceae. Preparation of compost, filling tray beds, spawning, maintaining optimal temperature, casing, watering, harvesting, storage.	Biofertilizers – Historical background – Chemical fertilizers versus biofertilizers – Organic farming – Rhizobium sp, Azospirillum sp, Azotobacter sp, as Biofertilizers.
IV	Biofertilizers— Historical background, Chemical fertilizers versus biofertilizers, organic farming. Rhizobium sp, Azospirillum sp, Azotobacter sp, Azolla, PGPR as Biofertilizers. Use of biofilms as biofertilizers, Nanobiofertilizers, and bio- organo- chemical fertilizers.	Patents and secret processes – History of patenting, composition, subject matter and characteristics of a patent, Inventor, Infringement, cost of patent – Patents in India and other countries. Fermentation Economics.
V	Brewing- Media components, preparation of medium, Microorganisms involved, maturation, carbonation, packaging, keeping quality, contamination, aging by products. Production of Industrial alcohol. Pre and pro-biotic definition, role, large scale production and side effects.	

PERCENTAGE OF SYLLABUS REVISED: 59

COURSE FOCUS ON:

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

**Syllabus Revision
New Paper**

Faculty: Biosciences

Board: Microbiology

Semester: VI

Course Code/ Name: 223MB1A6DC / MEDICAL LABORATORY TECHNIQUES

Unit	Syllabus
I	Introduction to Clinical laboratory Basic laboratory principles - Organization of clinical laboratory - Biosafety in containment laboratory - National and International GLP (Good laboratory Practices) - Role of medical laboratory technician - personnel hygiene and safety measures.
II	Hematology Blood Collection Techniques: Venipuncture, finger prick, anticoagulants used in hematology- Total Count, Differential Count, Hematocrit, Erythrocyte Sedimentation Rate, Bleeding Time & Clotting Time. ABO Blood group system.
III	Clinical Biochemistry Introduction to Clinical Biochemistry: Role of biochemistry in disease diagnosis, types of biochemical tests. Separation of serum and plasma - Detection of blood glucose, Cholesterol, creatinine, albumin and Bilirubin. Profiling - Liver function test (LDL and HDL level), Renal function tests (creatinine).
IV	Processing of Urine, Stool and Sputum sample Collection, transport and Storage of Urine, Stool and Sputum sample. Macroscopic and Microscopic examination - Urine: sugar, albumin, bile salts, Bilirubin, bile pigments and ketone bodies. Stool – Cyst, Ova, Mucus, Pus, RBC, Reduced sugar, Occult blood. Sputum –Petroff's method, AFB staining.
V	Histopathology and Biomedical Waste management Histopathological Techniques: Tissue processing (Dehydration, clearing, and embedding), fixation (formalin, alcohol, Bouin's solution), microtome, staining (Hematoxylin and eosin, special stains). Biomedical waste management – Bureau of Indian Standards- danger signs and Symbols.

PERCENTAGE OF SYLLABUS REVISED: 100

COURSE FOCUS ON:

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

**Syllabus Revision
New Paper**

Faculty: Biosciences

Board: Microbiology

Semester: VI

Course Code/ Name: 223MB1A6DD / MICROBIAL FUEL TECHNOLOGY

Unit	Syllabus
I	Introduction to Microbial Fuels: Overview of microbial fuels and their significance - Historical background and development of biofuels - Classification of microbial fuels (bioethanol, biogas, biodiesel, biohydrogen) - Advantages of microbial fuels over conventional fossil fuels - Environmental and economic impact of microbial fuel technologies
II	Bioethanol Production: Microbes in bioethanol production (yeasts, bacteria) - Substrates used - sugarcane, corn, lignocellulosic biomass, and agricultural waste - Pretreatment of substrates - Physical (size reduction, steam explosion), chemical (acid/alkali, organosolv process), Biological (microbial) - Fermentation processes - Genetic engineering approaches to enhance ethanol yield - Future prospects in bioethanol production.
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: 100

COURSE FOCUS ON:

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

**Syllabus Revision
New Paper**

Faculty: Biosciences

Board: Microbiology

Semester: VI

**Course Code/ Name: 223MB1A6DE / PERSPECTIVES ON MICROBIOLOGY LAB
ACCREDITATION**

Unit	Syllabus
I	<p>Introduction to laboratory accreditation</p> <p>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.</p>
II	<p>Quality Management System</p> <p>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.</p>
III	<p>Quality Control (QC) Techniques</p> <p>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.</p>
IV	<p>Safety and Compliance in Laboratory Procedures</p> <p>Safety Protocols and emergency procedures. Regulatory compliance requirements for microbiology laboratory at different biosafety levels. Environmental and ethical considerations associated with different laboratories.</p>
V	<p>Laboratory Information Management System</p> <p>Data reporting and traceability, ensuring data accuracy and security, Databases for sharing and comparison of inter-laboratory protocols and data.</p>

PERCENTAGE OF SYLLABUS REVISED: 100

COURSE FOCUS ON:

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

**Syllabus Revision
New Paper**

Faculty: Biosciences

Board: Microbiology

Semester: VI

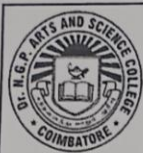
Course Code/ Name: 223MB1A6DF / EPIDEMIOLOGY AND PUBLIC HEALTH

Unit	Syllabus
I	Introduction to Epidemiology: Definition and objective of Epidemiology - Epidemiologic approach - Historical evolution of Epidemiology - Concept of health and disease - Determinants of health and diseases - Difference between epidemiology and preventive medicine.
II	Infectious disease epidemiology: Microbes in soil: Occurrence, diversity, adaptations and potential applications of oligotrophs, thermophiles, psychrophiles, radiation tolerants, metallophiles, acidophiles, alkalophiles and halophiles.
III	Epidemiology of Communicable diseases (CD): Concept, CD typology, Risk factors for CDs, Epidemiology of CDs in India, burden of CD in India, Public health interventions for CDs. Introduction to tropical diseases, Emerging and re-emerging tropical diseases. Epidemiology of major diseases of public health importance: Avian influenza (H5N1), COVID 19, Monkey pox, Kyasanur Forest Disease (KFD).
IV	Public Health Concepts and Goals: Public health, Health its determinants, medicine vs public health, definition and history, Theoretical foundations and approaches of public health, Conceptual understanding of health, disease and medicine, Review of modern public health, Health planning in India.
V	Core Competencies to Practice Public Health: Health behavior and health education- concepts, principles and models. Public health preparedness-core concepts, Public Health Response - public, private, NGOS participation in health service delivery, public health ethics.

PERCENTAGE OF SYLLABUS REVISED: 100

COURSE FOCUS ON:

<input checked="" type="checkbox"/> Skill Development	<input checked="" type="checkbox"/> Entrepreneurial Development
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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)
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Web : www.drngpasc.ac.in | Email : info@drngpasc.ac.in | Phone : +91-422-2369100

BoS

18th

FACULTY OF BIOSCIENCES DEPARTMENT OF MICROBIOLOGY BOARD OF STUDIES MEETING

VENUE : INSTRUMENTATION ROOM (B1-1302)

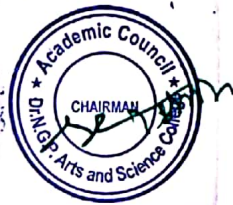
DATE : 08.11.2024

TIME : 10.00 A.M.

ATTENDANCE OF THE 18TH BOARD OF STUDIES MEETING

S. No.	NAME	POSITION	SIGNATURE
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 Karunya University Coimbatore – 641 114	Member (Subject Expert)	
3	Dr. K. Vijila Professor, Department of Agricultural Microbiology TNAU Coimbatore – 641 003	Member (Subject Expert)	
4	Dr. Chitra Tangavel Scientist Proteomics, Ganga Research Centre and Hospital Mettupalayam Road Kavundampalayam Coimbatore - 641 043	Member (Industrial Expert)	ABSENT
5	Dr. M. Gnanadesigan Assistant Professor, Department of Microbial Biotechnology Bharathiar University Coimbatore – 641 046	Member (Subject Expert Nominated by Vice Chancellor)	

6	Durgadevi. S Quality Control of Microbiologist Amway India Enterprises Pvt. Lmt, Sipcot Industry Road, Pallapati, Dhindugal – 624201	Alumini	ABSENT
7	Monishkumar. R (PG) Redhanya V. K (UG)	Student Representatives	R. Monish Redhanya V. K
8	Dr. N. Kuppuchamy Part – I (Four Semester Language)	Co – Opted Member	Dr. N. Kuppuchamy
9	Dr. A. Hazel Verbina Part – II (Four Semester Language)	Co – Opted Member	Dr. A. Hazel Verbina
10	Dr. P. Chidambara Rajan Allied	Co – Opted Member	Dr. P. Chidambara Rajan 8-11-24
11	Dr. R. Ravikumar Allied	Co – Opted Member	Dr. R. Ravikumar 8-11-24
12	Dr. D. Geetharamani Professor, Dean – Academics	Member	Dr. D. Geetharamani 8/11/24
13	Dr. S. S. Sudha Professor, CDC – Coordinator	Member	Dr. S. S. Sudha 8/11/24
14	Dr. N. Vidhya Professor	Member	Dr. N. Vidhya 8/11/24
15	Dr. S. Senthil Prabhu Professor	Member	Dr. S. Senthil Prabhu 8/11/24
16	Dr. A. M. Ramachandran Associate Professor	Member	Dr. A. M. Ramachandran 8/11/24
17	Dr. C. Sasikala Professor	Member	Dr. C. Sasikala 8/11/24
18	Dr. S. Karthiksundaram Associate Professor	Member	Dr. S. Karthiksundaram 8/11/24
19	Dr. R. Mahenthiran Assistant Professor	Member	Dr. R. Mahenthiran 8/11/24
20	Prof. M. Nivethitha Assistant Professor	Member	Prof. M. Nivethitha 8/11/24
21	Dr. J. Devakumar Assistant Professor	Member	Dr. J. Devakumar 8/11/24




 BoS Chairman/HOD – 8/11/2024
 Department of Microbiology
 Dr. N. G. P. Arts and Science College
 Coimbatore - 641 048