MINUTES OF THE FOURTEENTH BOARD OF STUDIES MEETING

Faculty: Biosciences **Board: Microbiology**

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

Name of the Body	**BoS**
Department	**Microbiology**
Meeting No.	**14**
Date and Time	**02/12/2022 and 10.a.m.**
Venue	**Microbiology Department (Instrumentation 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 Chemistry for the Batch:2022-23 and onwards
3.	Discussion on Part I (Tamil - II/Hindi-II /French- II/Malayalam - II) 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) Basic Tamil / Advanced Tamil /Human rights and women's rights offered by Tamil Department and department of Commerce with Corporate Secretaryship with CA respectively for 2022-23 batch and onwards
6.	Discussion on credits for Part V Extension Activity for 2022-23 Batch and onwards
7.	Discussion on PG syllabi for second semester courses 2022-23 Batch and onwards
8.	Discussion on PG DSE offered by Department of Microbiology to other departments for 2022-23 Batch and onwards
9.	Discussion on Value Added Certificate Courses (VACC)
10.	Any other matter

MINUTES OF THE FOURTEENTH BOARD OF STUDIES MEETING

Faculty: Biosciences **Board: Microbiology**

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	**223MB1A2CA- Microbial Physiology** Dr. Murugan and Dr. Vijila recommended the following topics to provide knowledge on Archeabacteria; **Unit I:** Common nutritional requirement – Macro-, micro-, and trace- elements. Classification of microorganisms based on nutritional sources- Autotrophs, Heterotrophs, Chemotrophs, Copiotrophs and Oligotrophs. Nutrient Transport - Group translocation. Microbial growth and factors influencing it. **Unit IV:** The existing topic Methanogens is replaced as CO_2 as final electron acceptor. Lactic acid fermentation is included in types of fermentation. **Unit V:** The unit title to be changed as Biosynthesis of amino acids and Lipids. **223MB1A2CB - Microbial Genetics** To be familiar in bacterial communication and gene regulation Dr. Chitra Thangavel and Dr. Vijila suggested to add the following topics **Unit I:** RNA as genetic material Semi conservative by Meselson and Stahl's Experiment. **Unit II:** Central Dogma, Co linearity of gene and polypeptide in Genetic code and Post translational modification. **Unit III:** Quorum Sensing - Genetic regulation of Sporulation in *Bacillus subtilis* - Gene regulation in Eucarya and Archaea. **Unit V:** Transposable elements - Bacterial plasmids

	223MB1A2CP - Core Practical: II - Microbial Physiology and Microbial Genetics To meet the need for microbiologists with expertise in molecular methods Dr. Vijila recommended to add the following • Effect of pH and Temperature on microbial growth • Extraction of chromosomal DNA from Bacteria • Extraction of plasmid DNA from Bacteria • Estimation of DNA by Diphenylamaine reaction • Separation of DNA using agarose gel electrophoresis • Isolation of antibiotic resistant bacterial colonies through gradient plate technique
Resolution	The Board unanimously approved the syllabus.
Item - 02	**Discussion on syllabus for Part III - Inter Disciplinary Course (IDC) offered by Department of Chemistry for the Batch:2022-23 and onwards**
Discussion	222CE1A2IQ **-Applied Chemistry** The syllabus approved by the Board of Studies in chemistry was placed for endorsement.
Resolution	The Board unanimously approved the syllabus.
Item - 03	**Discussion on Part I (Tamil - II/Hindi - II/French - II/Malayalam -II) offered by Language 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** The unified syllabus approved by the Board of Studies in Languages was placed for endorsement.
Resolution	The Board unanimously approved the syllabus.
Item – 04	**Discussion on Part II (English) offered by English Department for 2022-23 Batch and onwards**
Discussion	**221EL1A2EA : Part II: Professional English II (New Course)** The unified syllabus approved by the Board of Studies in English was placed for endorsement.
Resolution	The Board unanimously approved the syllabus
Item – 05	**Discussion on Part IV (AECC) Basic Tamil / Advanced Tamil /Human rights and women's rights offered by Tamil Department and department of Commerce with Corporate Secretaryship with CA respectively for 2022-23 batch and onwards**
Discussion	**221TL1A2AA: Basic Tamil** **221TL1A2AB: Advanced Tamil** **225CR1A2AA: Human rights and women's rights** The unified syllabus approved by the Board of Studies in Tamil and Commerce with Corporate Secretaryship was placed for endorsement.
Resolution	The Board unanimously approved the syllabus.
Item – 06	**Discussion on credits for Part V Extension Activity for 2022-23 Batch and onwards**
Discussion	One credit to be awarded for participation in each Extension activity like YRC/RCC//NSS/ RRC/Yoga/Sports/Clubs

Resolution	The Board members approved one credit for each Extension activity
Item – 07	**Discussion on PG syllabi in second semester courses for 2022-23 Batch and onwards**
Discussion	**223MB2A2CA - Microbial Genetics** Dr. Chitra Thangavel and Dr. Murugan suggested to include: **Unit III:** Transcription in prokaryotes and eukaryotes – structures of rRNA, tRNA and mRNA. Inhibitors of transcription. Reverse Transcription. Antisense RNA and its significance. **Unit IV:** Molecular Markers, RFLP, RAPD, AFLP and Isozyme Loci, CRISPR gene editing For being aware of markers used in molecular studies **223MB2A2CC – Virology** Dr. Vijila suggested inclusion of following topics in emerging food borne viral infections and their detection: **Unit III:** Pathogenecity of H1N1 virus and Emerging food borne viruses (Noro virus, Infectious hepatitis-HAV) are to be added. **Unit V:** Microarray for detecting proteins and nucleotides is to be included. **223MB2A2CD - Medical Bacteriology** Dr. Chitra Thangavel and Dr. Vijila suggested including the following to emphasize the significance of Nobel bacteria and waste management system. **Unit IV:** *Helicobacter pylori* **Unit V:** Plastic, Gloves and Paper disposal Antimicrobial resistance and Multi drug resistance (AMR &MDR). **223MB2A2CE - Recombinant DNA Technology** Dr. Chitra Thangavel and Dr. Vijila, suggested to add following topics **Unit I:** History and Scope of rDNA technology, Restriction Exonucleases, Polymerases, Reverse Transcriptase, Terminal Transferases, polynucleotide Kinases, alkaline phosphatases. **Unit V:** Gene silencing techniques: Introduction to siRNA and siRNA technology, micro RNA, construction of siRNA vectors, principle and application of gene silencing. CRISPR, CRISPR/Cas9 technology. Gene knockouts and Gene Therapy: Creation of knockout mice, suicide gene therapy, gene replacement, gene targeting. Other applications: Transgenic, Genome projects and their implications, application in global gene expression analysis. Applications of recombinant DNA technology in medicine, agriculture, veterinary sciences and protein engineering. **223MB2A2CP - Core Practical: II – Immunology and Molecular Techniques**

	Dr. Chitra Thangavel suggested to add the following experiments with specificity in methods • Restriction Digestion of Bacterial Chromosomal DNA • Antigen and Antibody detection by Dot ELISA • Detection of Protein by Western Blotting
Resolution	The Board unanimously approved the syllabus.
Item – 08	**Discussion on PG DSE offered by Department of Microbiology to other departments for 2022-23 Batch and onwards**
Discussion	**223MB2A2DA - Bionanotechnology** To be more employable in industries with nano-tech applications, Dr. Murugan suggested for addition of the following topics **Unit II:** Synthesis - Top-down approach & bottom-up approach - principle and mechanism of synthesis – physical - Sonicator, Ball mill, ablation, evaporation-condensation; chemical - reducing method - chemical reduction, irradiation, electrochemical, photoreduction; biological - microbes, plants. Green synthesis. **Unit IV:** Targeted drug delivery, biosensors and biomarkers, food and agriculture, DNA nanotech, nanoviricides, tissue engineering, Molecular nanotechnology – nanomachines – collagen. Cytoskeleton and cell organelles.
Resolution	The Board unanimously approved the syllabus.
Item – 09	**Discussion on Value Added Certificate Courses (VACC)**
Discussion	The following Value Added Certificate Course is to be offered in the second semester by internal faculty for interested students belonging to all batches from our department and across disciplines **Spirulina cultivation and its value addition**
Resolution	The Board unanimously approved the syllabus.
Item – 10	**Any other matter**
Discussion	Board members discussed the Panel of Examiners.
Resolution	The board approved the Panel of Examiners.

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

Date: 02/12/2022

2/12/22

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

Syllabus Revision

Faculty: Biosciences **Board : Microbiology**

Course Code/ Name: 223MB1A2CA MICROBIAL PHYSIOLOGY **Semester: II**

Unit	Existing	Changes
I	~~Basic Concepts of Microbial Physiology Definition, Introduction, Terminologies and Basic concepts of Microbial physiology -~~ Nutritional requirements and up take by vegetative and dormant stage of microbes - Factors influencing microbial growth – Growth curve.	Nutritional Requirement Common nutritional requirement-macro elements, micro elements and trace elements. Nutritional requirements of Microorganisms- Autotrophs, Heterotrophs ,Chemotrophs, Copiotrophs and Oligotrophs- Group translocation
II	Growth of Bacteria Different phases of growth in Batch culture, Ccontinuous, Semi continuous, Synchronous and Biphasic growth - Calculation of generation time - Estimation of Microbial growth: ~~Direct method~~ - Microscopic count, Turbidometric assay and TVC - ~~Indirect Method - CO2 liberation.~~	Factors influencing microbial growth – Growth curve.
III	Respiration & Energy Production Aerobic respiration - EMP and its alternative pathways (HMP shunt & ED pathways) - TCA cycle – Electron transport - Calculation of ATP in aerobic cellular processes -Glyoxylate cycle - β oxidation of fatty acids.	Energy generation via Oxidative and Substrate level phosphorylation
IV	Anaerobic Respiration Anaerobic respiration – Methanogens - Sulphur and Nitrogen metabolism -Nitrogen fixation in legumes by Rhizobium sp - Fermentation – Alcoholic,Propionic and Mixed acid fermentation - Oxygenic and anoxygenic photosynthesis in bacteria.	CO2 as final electron Acceptor Fermentation – lactic
V	~~Microbial Metabolism~~ Biosynthesis of amino acids (Pyruvate family – Alanine, Leucine and Glutamic acid family) - Lipids (Phospholipids and Archeal lipids) -Biosynthesis of bacterial cell wall – ~~Bioluminescence Biotransformation in antibiotics production.~~	Biosynthesis of amino acid and Lipid

PERCENTAGE OF SYLLABUS REVISED: 30

COURSE FOCUSES ON:

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

Syllabus Revision

Faculty: Bioscience **Board : Microbiology**
Course Code/ Name: 223MB1A2CB MICROBIAL GENETICS **Semester: II**

Unit	Existing	Changes
I	DNA: DNA as genetic material - Structure of DNA and RNA - DNA Replication: Semiconservative, enzymology and mechanism.	RNA as genetic material - Semi conservative by Meselson and Stahl's Experiment.
II	Transcription: Transcription - Genetic Code: Organization of the code, Establishment of genetic code - Translation – Initiation, Elongation and Termination – ~~Protein splicing.~~	Central Dogma - Co linearity of gene and polypeptide - Post translational modification.
III	Mutation: Mutation – definition, types – silent, missense, non – sense, insertion, deletion, substitution - spontaneous and induced. Repair – light – dark – SOS – Recombinant.	Interchanged with Unit V about Gene Expression. Quorum Sensing - Genetic regulation of Sporulation in Bacillus subtilis - Gene regulation in Eucarya and Archaea.
IV	Bacterial Genetics: Bacterial Genetics (Mutant phenotype, DNA mediated Transformation; Conjugation (Cointegrate Formation and Hfr Cells, Time-of-Entry Mapping, F′ Plasmid); Transduction (Generalized transduction, Specialized Transduction) - gene mapping.	Interchanged with III Unit about Mutation and Repair.
V	Gene Regulation: Molecular Mechanism of gene regulation in prokaryotes - Lac, Trp, ~~Ara operons~~. Eukaryotic gene regulation – ~~important differences in the genetic organization of Prokaryotes and Eukaryotes – Gene rearrangement. Yeast mating type.~~	Interchanged from Unit IV about Bacterial genetics - Transposable elements - Bacterial plasmids

PERCENTAGE OF SYLLABUS REVISED: 52
COURSE FOCUSES ON:

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

Syllabus Revision - Practical

Faculty: Bioscience **Board: Microbiology**
Semester: II
Course Code/ Name:
223MB1A2CP CORE PRACTICAL II: MICROBIAL PHYSIOLOGY AND MICROBIAL GENETICS

Exp. No.	Existing	Changes
1.	Measurement of Microbial Growth- ~~TVC~~ Heamocytometer- ~~Turbidity method~~	Measurement of Microbial growth – Haemocytometer
2.	Measurement of Growth curve of bacteria	Measurement of Microbial growth – Bacterial growth Curve
3.	Utilization of amino acid as carbon source	Utilization of Amino Acid as Carbon source - Indole test
4.	Mixed acid fermentation test	Acid and Non acid end products (MR-VP test)
5.	Acid end product test	Catalase test and Oxidase test
6.	~~Non acid end product test~~	Preferential sugar utilization and H2S production test – TSI
7.	~~Carbohydrate fermentation test~~	Starch hydrolysis, Casein hydrolysis test, Gelatin liquefaction
8.	Preferential sugar utilization and H2S production test-TSI	Urease, Citrate utilization test and Nitrate Reduction Test
9.	Starch hydrolysis, casein hydrolysis test, gelatine liquefaction	Effect of pH and Temperature on microbial growth (Under DBT Star scheme)
10.	Catalase test, Oxidase test, Urease test	Extraction of chromosomal DNA from Bacteria
11.	~~Nitrate reduction test~~	Extraction of plasmid DNA from Bacteria
12.	~~Microbial degradation of textile dyes~~	Estimation of DNA by Diphenylamaine reaction (Under DBT Star scheme)
13.	-	Separation of DNA using agarose gel electrophoresis (Under DBT Star scheme)
14.	-	Isolation of antibiotic resistant bacterial colonies through gradient plate technique

Note: End Semester Practical Examination requires completion of 12 experiments out of 14.

PERCENTAGE OF SYLLABUS REVISED: 50
COURSE FOCUSES ON:

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

Syllabus Revision

Faculty: Biosciences **Board: Microbiology**
Course Code/ Name: 223MB2A2CA MICROBIAL GENETICS **Semester: II**

Unit	Existing	Changes
I	Mendel's Laws: Monohybrid - Dihybrid - Test cross, concept of dominance, segregation, independent assortment; Chromosome theory of inheritance. Chromosomes & crossing over. Sex-influenced and limited inheritance.	Chromatin structure and organization.
II	DNA and RNA as genetic material. Nucleic Acid chemical composition, C value paradox, Physical structures of DNA, Circular and Superhelical DNA. RNA Structure and types. DNA Replication – Basic rule for replication of all nucleic acids – Enzymology.	Geometry of DNA replication
III	Transcription – ~~Enzymatic synthesis of RNA – polymerases – RNA chain initiation – Elongation – Termination and release of newly synthesized RNA. Transcription in Eukaryotes – Transcription unit concept~~. Genetic code. Translation – Transfer of RNA and aminoacylsynthetases – codon, anticodon interactions – Wobble hypothesis. Post transcriptional and translational modification.	Transcription: Transcription in prokaryotes and eukaryotes – structures of rRNA, tRNA and mRNA. Inhibitors of transcription. Reverse Transcription. Antisense RNA and its significant.
IV	Mutation – types of Mutation - ~~Biochemical basis of mutation~~ –Spontaneous and induced mutation. ~~Mutagenicity testing~~. DNA repair mechanisms: Photo reactivation – Excision repair – Recombination repair – SOS repair.	Molecular Markers, RFLP, RAPD, AFLP and Isozyme Loci. CRISPR gene editing.
V	Mechanisms of Gene transfer in bacteria – Transformation – Transduction and Conjugation. Phage genetics, Phage T mutants, Genetic recombination, Regulation of gene activity – Operon model- positive and negative operon: (Lac, Trp), Autoregulation – translational regulation.	Genetic mapping of T4 Phage.

PERCENTAGE OF SYLLABUS REVISED: 25
COURSE FOCUSES ON:

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

Syllabus Revision

Faculty: Biosciences **Board: Microbiology**
Semester: II
Course Code/ Name: 223MB2A2CB IMMUNOLOGY AND IMMUNOTECHNIQUES

Unit	Existing	Changes
I	Historical background and scope of Immunology, ~~Basis of Human Defence mechanisms~~ - First line defence – Anatomical and physiological barriers – Second line defense – Fever, inflammation, Phagocytosis ~~and interferon~~ – Third line defence - Cells and organs of immune system.	Defence mechanisms of human body
II	Immunity – types of immunity – Natural, acquired, specific and non specific, cell mediated and humoral, active and passive immunity. Antigens - properties, Epitopes, cross reactivity. Antibodies - properties, structure (primary & secondary) and isotypes. Diversity and specificity. Anti antibodies. Complement pathway.	Haptens, adjuvants in Antigen
III	Antigens and antibody reactions - Introduction and classification of antigens and antibody reactions - Agglutination and precipitation reaction. Strength of antigen and antibody binding - affinity & avidity. Therapeutic applications of monoclonal antibodies and Complement fixation reaction. Immunofluorscence, , ELISA and Flow cytometry.	Serology RIA, RAST and RT- PCR (Reverse transcriptase PCR)
IV	Response of B-cell and T-cell to antigens. B-cell and T-cell products. Hyper sensitivity - Type I, II, III and IV - MHC antigens - types and functions. Immunity to infectious diseases - Bacterial and protozoan.	Immunity to infectious diseases - Viral
V	Transplantation immunology - Tissue transplantation and grafting - Mechanism of graft acceptance and rejection - HLA typing - Tumor immunology - Immunodeficiency ~~diseases~~ and auto immunity. Vaccines - Types and vaccination methods.	Primary immunodeficiency disorders: severe combined immunodeficiency (SCID disorders) and Secondary immunodeficiency disorders (AIDS)

PERCENTAGE OF SYLLABUS REVISED: 22
COURSE FOCUSES ON:

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

Syllabus Revision

Faculty: Biosciences **Board : Microbiology**
Course Code/ Name: 223MB2A2CC VIROLOGY **Semester: II**

Unit	Existing	Changes
I	General properties and Classification of Viruses - Cultivation and purification of viruses - ~~In vivo and in vitro systems for virus growth~~ - Principles of bio-safety-Containment facilities - Maintenance and handling of laboratory animals - Requirements of virology laboratory.	Baltimore system Infective amino acids: Virions and Prions. Basic immune response to viral infection.
II	Structure, genome replication, protein synthesis and assembly of DNA containing Bacteriophages – T4, lambda, Mu, ΦX174 & M13 phages - RNA containing Bacteriophages - MS2 and Φ6 group ~~Mechanism of viral entry, multiplication and release from host cell of DNA containing~~ Plant viruses – CaMV and Gemini Virus - RNA containing plant viruses - TMV, Cowpea mosaic viruses, Bromo mosaic viruses and Satellite viruses.	Lytic and lysogenic cycle of bacteriophages
III	Mechanism of viral entry, multiplication and release from host cell – Pathogenicity ~~and Clinical manifestation~~ of DNA containing animal viruses - Adeno viruses, Herpes viruses, Pox viruses, ~~Variola virus~~ - RNA containing animal viruses - ~~Picorna virus,~~ Rhabdo virus, Hepatitis viruses, Orthomyxo virus, H1N1, Paramyxovirus, ~~Retroviruses~~ - HIV and Rubella virus - ~~Emerging viruses – Ebola, Dengue, Chikungunya – Covid 19 – Virions and Prions.~~	Emerging foodborne viruses- Noro virus, Hepatitis A Virus
IV	Immunodiagnosis – Haemagglutination, ~~Haemagglutination inhibition~~, Complement fixation, Neutralization, Western blot, RIPA, Flowcytometry and Immunohistochemistry - Nucleic acid based diagnosis - Nucleic acid hybridization, Polymerase chain reaction, Microarray ~~and Nucleotide sequencing.~~	Staining and microscopy for viral inclusion bodies Electron microscopy To detect protein and nucleotides.
V	Viral Vaccines - Conventional vaccines and recombinant vaccines immunomodulators (cytokines). Antivirals – anti retrovirals – mechanism of action and drug resistance. Modern approaches of virus control - Anti-sense RNA, siRNA.	Interferon: Definition and its types Mass production of Interferon

PERCENTAGE OF SYLLABUS REVISED: 31
COURSE FOCUSES ON:

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

Syllabus Revision

Faculty: Biosciences **Board : Microbiology**
Course Code/ Name: 223MB2A2CD MEDICAL BACTERIOLOGY **Semester: II**

Unit	Existing	Changes
I	Indigenous normal microbial flora of human body. General attributes and virulence factors of bacteria causing infections. Host Parasite relationships – Ground rules for collection and dispatch of clinical specimens for microbiological diagnosis.	Nonspecific host immune mechanisms
II	Gram positive organisms - Morphology, cultural characteristics, pathogenicity and laboratory diagnosis of *Staphylococcus aureus, Streptococccus pyogenes, Pneumococcus, Bacillus anthracis, Corynebacterium diphteriae, Mycobacterium tuberculosis.*	*Mycobacterium leprae*
III	Gram negative organisms - Morphology, cultural characteristics, pathogenicity and laboratory diagnosis of *E. coli, Klebsiella pneumoniae, Salmonella typhi, Shigella dysenteriae, Pseudomonas aeruginosa, Vibrio cholerae, Bordetella pertussis, Neisseria gonorrhoeae* and *Neisseria meningitidis.*	Gram negative Cocci - *Neisseria gonorrhoeae,* and *Neisseria meningitides*
IV	Cultural and morphological characteristics, pathogenicity, clinical manifestations and laboratory diagnosis of Actinomycetes (*Actinomyces* and *Nocardia*) and Spirochaetes (*Treponema, Borrelia, Leptospira*), Brucellae, Listeria monocytogenes, *Mycoplasma, Rickettsia, Chlamydiae,*	*Helicobacter pylori.*
V	Zoonotic diseases and their control – Hospital acquired infections – Hospital Infection control committee – functions – Hospital waste disposal. Ethical committee – functions.	Plastic, Gloves and Paper disposal Antimicrobial resistance and Multi drug resistance (AMMR & MDR).

PERCENTAGE OF SYLLABUS REVISED: 20
COURSE FOCUSES ON:

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

Syllabus Revision

Faculty: Biosciences **Board : Microbiology**

Course Code/ Name: 223MB2A2CE RECOMBINANT DNA TECHNOLOGY **Semester: II**

Unit	Existing	Changes
I	~~Cloning – Isolation and purification of nucleic acids (chromosomal DNA, RNA & Plasmids) – Methods of handling and quantification of DNA and RNA –~~ Restriction endonucleases: types and characteristics - DNA methylases – Ligases – ~~Adapters, Linkers and Homo polymer tailing.~~	History and Scope of rDNA technology - Restriction Exonuclease, Polymerases, Klenow, DNA dependent RNA polymerase, Reverse Transcriptase, Terminal Transferase, polynucleotide Kinase, alkaline phosphatase.
II	~~Vectors – properties – types of vectors~~ – plasmids– host range and incompatibility – Vectors constructed based on bacteriophages (M13 & Lambda), cosmids, phagemids and BACs - Eukaryotic vectors - Yeast vectors (YAC) – animal (retroviruses, adenoviruses) and plant vectors (Ti plasmid based vectors and caulimoviral vector) – expression vectors - shuttle vectors.	Introduction to vectors and types - Host cells and vectors – Host cell types (prokaryotic and eukaryotic) pBR322, pUC18/19; fosmid; Expression vectors for prokaryotes and eukaryotes; Vectors with tags - Histidine tags.
III	Gene transfer techniques in plants, animals and microbes - Transformation, electroporation, microprojectile system, liposome mediated transfer, genegun etc. ~~Agrobacterium-mediated gene transfer in plants – Ti plasmid: structure and functions, Ti plasmid based vectors – advantages. Chloroplast transformation. Screening: Direct: Insertional inactivation, plaque phenotype and indirect methods: Immunochemical detection – Nucleic acid hybridization, Blotting – Dot and Colony Blotting. Chromosome walking. Chromosome jumping.~~	Cloning strategies - DNA cloning a) Sticky ends b) Blunt ends c) Homopolymeric tailing d) Use of adapters & linkers; Construction of genomic DNA libraries (shotgun cloning) and cDNA libraries;
IV	Characterization of cloned DNA: Restriction mapping - restriction fragment length polymorphism (RFLP) - Polymerase chain reaction (PCR) - Types of PCR and their applications. DNA sequencing: Primer walking, Maxim and Gilbert method, dideoxy method, ~~automated sequencing and~~ micro array. ~~Genomic DNA libraries – cDNA libraries.~~	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.
V	~~Site directed mutagenesis, Protein Engineering. Design and construction of novel proteins and enzymes. Protein Folding – Designer Enzymes – Semi synthetic enzyme used in organic solution, Abenzyme and other antibody protein conjugates.~~	Gene silencing techniques: Introduction to siRNA and siRNA technology, micro-RNA, construction of siRNA vectors, principle and application of gene silencing. CRISPR, CRISPR/Cas9 technology. Gene knockouts and Gene Therapy: Creation of knockout mice, suicide gene therapy, gene replacement, gene targeting. Other applications: Transgenic, Genome projects and their implications, application in global gene expression analysis. Applications of recombinant DNA technology in medicine, agriculture, veterinary sciences and protein engineering.

PERCENTAGE OF SYLLABUS REVISED: 64%

COURSE FOCUS ON:

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

Syllabus Revision - Practical

Faculty: Bioscience **Board: Microbiology**
Semester: II
Course Code/ Name:
223MB2A2CP CORE PRACTICAL II: IMMUNOLOGY AND MOLECULAR TECHNIQUES

Exp. No.	Existing	Changes
1.	Serological test for HBsAg	Serological test for HBsAg and HBcAg
2.	Dot ELISA	Antigen, Antibody detection by Dot ELISA
3.	Immunodiffusion - Radial	Immunodiffusion - Ouchterlony method
4.	Isolation & Identification of bacteria from clinical samples - Urine, Pus, Sputum, Stool, ~~Wound samples~~	Removed Wound Sample
5.	Transformation, Conjugation, ~~Screening by Blue white selection~~	Bacterial Transformation, Conjugation
6.	Restriction Digestion Analysis	Restriction Digestion of chromosomal DNA
7.	Western Blotting	Detection of Protein by Western Blotting
8.	Isolation and separation of chromosomal DNA from bacteria	
9.	Isolation and titration of coli phages	Isolation and titration of coli phages from sewage sample
10.	Determination of Minimal Inhibitory Concentration	Determination of Minimal Inhibitory Concentration - Broth dilution method
11.	Cultivation of virus by Egg inoculation - Demonstration	Cultivation of animal virus by Egg inoculation - Yolk sac, Amniotic cavity Demonstration
12.	Production of Chick Antibodies - Demonstration	Production of Chick Antibodies (IgY) - Demonstration

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

PERCENTAGE OF SYLLABUS REVISED: 30
COURSE FOCUS ON:

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

Syllabus Revision

Faculty: Biosciences **Board : Microbiology**
Course Code/ Name: 223MB2A2DA BIONANOTECHNOLOGY **Semester : II**

Unit	Existing	Changes
I	History – concept and future prospects – application in Life Sciences. Terminologies- nanotechnology, bionanotechnology, nanobiomaterials, biocompatibility, nanomedicine, nano tube, nanowires, quantum Dots, nanocomposite, nanoparticles, nanosensors.	Emergence of Bionanotechnology
II	Molecular nanotechnology – nanomachines – collagen. Applications of nanoparticles – cancer therapy – nanoparticles in manipulation of biomolecules and cells. Cytoskeleton and cell organelles. Types of nanoparticles production – physical, chemical and biological. Microbial synthesis of nanoparticles - bacteria, fungi and yeast – principle and mechanism of synthesis	Synthesis - Top-down approach & bottom-up approach - principle and mechanism of synthesis – physical - Sonicator, Ball mill, ablation, evaporation-condensation; chemical - reducing method - chemical reduction, irradiation, electrochemical, photoreduction; biological - microbes, plants. Green synthesis.
III	Types of Nanoparticles – Silver, Gold and Titanium. Physical and chemical properties of nanoparticles. Characterization– UV-Vis spectroscopy, particle size analyzer, Electron Microscopy – HRTEM, SEM, AFM, EDS, XRD. Other tools and techniques required for bionanotechnology: X- Ray crystallography, NMR, ~~rDNA technology, site directed mutagenesis, fusion proteins.~~	FTIR
IV	Drug and gene delivery – protein and nanoparticle mediated. Nanoparticles in drug targeting, MRI, DNA and Protein Microarrays. Nanotechnology in health sectors - Development of green chemistry – commercial viability of nanoparticles. Nanomedicines, Antibacterial activities of nanoparticles. Nanotechnology in agriculture. Toxicology in nanoparticles – Dosimetry. Advantages of nanoparticles- drug targeting, protein detection, MRI.	Targeted drug delivery, biosensors and biomarkers, food and agriculture, DNA nanotech, nanoviricides, tissue engineering, Molecular nanotechnology – nanomachines – collagen. Cytoskeleton and cell organelles.
V	Health and safety implications from nanoparticles: Health issues – Environmental issues – Need for regulation – Societal implications - Possible military applications-Potential benefits and risks for developing countries – Intellectual property issues.	Bioinformatics: molecular modeling, docking, computer assisted molecular design.

PERCENTAGE OF SYLLABUS REVISED: 36
COURSE FOCUSES ON:

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

FACULTY OF BIOSCIENCES
DEPARTMENT OF MICROBIOLOGY
BOARD OF STUDIES MEETING

VENUE : INSTRUMENTATION ROOM
DATE : 02.12.2022
TIME : 10.00AM

ATTENDANCE OF THE FOURTEENTH BOARD OF STUDIES MEETING

S. NO	NAME	POSITION	SIGNATURE
1	Dr. J. Rengaramanujam	Chairman	
2	Dr. S. Murugan Associate Professor Karunya University Coimbatore - 641114	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 Mettupalayam Road Kavundampalayam Coimbatore - 641 043	Member (Industrial Expert)	
5	Dr. M. Gnanadesigan Assistant Professor, Department of Mivcrobial Biotechnology Bharathiar University Coimbatore – 641 046	Member (Subject Expert Nominated by Vice Chancellor)	ABSENT
6	Durgadevi . S	Alumini	ABSENT

	Quality Control of Microbiologist Amway India Enterprises Pvt. Lmt, Sipcot Industry Road, Pallapati, Dhindugal - 624201		ABSENT
7	Selvaraj. C (PG)	Student Representatives	
	Santhiya. R (UG)		
8	Dr. N. Kuppusamy Part – I (Four Semester Language)	Co – Opted Member	
9	Dr. N. Vithya Prabha Part – II (Four Semester Language)		
10	Dr. M. Suganthi Allied		
11	Dr. S. S. Sudha Professor	Member	
12	Dr. N. Vidhya Professor	Member	
13	Dr. S. Senthil Prabhu Associate Professor	Member	
14	Dr. A. M. Ramachandran Associate Professor	Member	
15	Dr. C. Sasikala Assistant Professor	Member	
16	Dr. S. Karthiksundaram Assistant Professor	Member	
17	Dr. R. Mahenthiran Assistant Professor	Member	
18	Prof. M. Nivethitha Assistant Professor	Member	
19	Dr. J. Devakumar Assistant Professor	Member	

Date: 02/12/2022

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

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