

Ref: No. Y/REG/ACA/38-ACM/2020

14.05.2020

NOTIFICATION – 38-ACM/09/2020 dtd. 14.05.2020

Sub: Revision in the curriculum of M.Sc. (Bioscience)

Ref: Resolution of the Academic council at its 38th meeting held on 27.04.2020, vide agenda - 20

The Academic Council at its 38th meeting held on 27.04.2020 and subsequently the Board of Management at its 49th meeting on 30.04.2020 have resolved to approve the following revision in the curriculum of M.Sc. (Bioscience).

In the Practical examination pattern, major and minor experiments are divided as category A and category B practical exercises. All those "Major experiments" and "Minor experiments" are listed as category A and category B practical exercises respectively in the curriculum.

The notification has been issued for implementation with effect from the academic year 2020-21.

SEMESTER 1

1	Discontinuation of the elective course "Genomics and Epigenetics" All the four theory courses are considered as Core courses.
Syllabus Revision	
2	<p>Course name: Biochemistry (AP02BS-1C1)</p> <p><u>New Topics included</u></p> <p>Unit 4: "Classification, nomenclature and properties, Factors affecting enzyme activity. Enzyme inhibition" nature and physiological significance. Porphyrins chemistry and disorders".</p> <p><u>Shifting of topics to other units</u></p> <p>Unit 1: "Enzymes: Classification, nomenclature and properties, Enzyme kinetics-one</p>

Dr. Gangadhara Somayaji K S
Registrar
Yenepoya (Deemed to be University)
University Road, Deralakatte
Mangalore 575 018, Karnataka.

	<p>substrate reaction (Michaelis-Menten Equation). Factors affecting enzyme activity. Enzyme inhibition. Allosteric enzymes. Isozymes (LDH)” to Unit 4</p> <p><u>Deletion of topics</u></p> <p>Unit 1: “nucleic acids”</p> <p>Unit 2: “Electrophoresis: Moving boundary and zonal electrophoresis, paper and gel electrophoresis, PAGE and SDS-PAGE, isoelectric focusing technique”</p> <p>Topics “design of colorimeter and spectrophotometer, applications of UV-Vis spectrophotometry”</p> <p>Unit 3: “Basic law of thermodynamics, internal energy, enthalpy, entropy, concept of free energy, redox potentials, high energy compounds, structure and function of ATP”.</p> <p>Unit 5: “Evaluation of organ function tests of gastric, pancreas, kidney and liver. Bilirubin, direct and indirect V a n d e r w a l tests and their clinical significance, jaundice. Fatty liver, Bile pigments - chemical</p>
2	<p>Course name: Cell and Molecular Biology (AP02BS-1C3)</p> <p><u>New Topics included</u></p> <p>Unit 3: Specific transcription factors “polymerases, p53, IFs, EFs, TRF I, II & III”</p> <p>Unit 4: “Types of vectors”</p> <p><u>Deletion of topics</u></p> <p>Unit 3: “Genetic variations and Mutations”</p> <p>Unit 4 “gene dosage, gene amplification”</p>
3	<p>Course Name: Microbiology (AP02BS-1C3)</p> <p><u>New Topics included</u></p> <p>Unit 1 “Ananda Chakrabarty”</p> <p>Unit 4: “fungal and viral”</p> <p>Unit 5: “Anthrax, Bovine tuberculosis, Foot and Mouth Disease, Avian Influenza , Anthrax, Bovine tuberculosis, Foot and Mouth Disease, Avian Influenza”.</p> <p><u>Deletion of topics</u></p> <p>Unit 1: “Theory of spontaneous generation”</p> <p>Unit 3: “Gene Regulation, Microbial DNA Replication, Mutation”.</p> <p>Unit 5: “Biotechnological applications of Microbes in from Extreme environments: Physiological adaptations, enzyme activities and their biotechnological applications”</p>
4	<p>Course Name: Genetics (AP02BS-1C4)</p> <p><u>New Topics included</u></p> <p>Unit 1: “Autosomal, non- Mendelian inheritance”</p> <p>Unit 3. “Congenital and common genetic diseases, prevalence and databases Common syndromes due to numerical chromosome changes (Downs, Patau, Edwards, Turner, Klinefelter, Jacobs syndromes)”</p> <p>Unit 4: “Genetic mapping: Linkage analysis (RFLP/MS/SNP); Applications of mapping in normal and disease genome analysis: Gene identification using positional and functional cloning approach, Linkage mapping”</p> <p>“Human genetic diversity- Methods of study Biochemical/molecular genetic markers; some</p>

ATTESTED

Dr. Gangadhara Somayaji K S
Registrar
Yenepoya (Deemed to be University)
University Road, Derlakatte
Mangalore 575 018, Karnataka.

<p>examples. Tracing human migrations with autosomal, Y-chromosomal and mitochondrial markers”.</p> <p>Unit 5: “Gene dosage, gene amplification, molecular combing /fibre analysis”.</p> <p><u>Shifting of topics to other units</u></p> <p>Unit 1: Quantitative inheritance, Linkage Meiotic consequences in structural heterozygotes, role in speciation and evolution” to Unit 4.</p> <p>Unit 3: “Human genome mapping methods: Physical mapping: Introduction to physical map markers- Chromosomal, G/Q- banding, radiation hybrid mapping” to Unit 2 “Genetic mapping: Linkage analysis (RFLP/MS/SNP); Applications of mapping in normal and disease genome analysis: Gene identification using positional and functional cloning approach” to Unit 4 “Fluorescence in situ hybridization, comparative genome hybridization, long range restriction mapping, high resolution mapping STS/EST/MS/SNP/sequencing” to Unit 5 “Human genetic diversity- Methods of study Biochemical/molecular genetic markers; some examples. Tracing human migrations with autosomal, Y-chromosomal and mitochondrial markers” to Unit 4 “Chromosomal disorders” to Unit 5</p> <p><u>Deletion of topics</u></p> <p>Unit 5: “Pedigree analysis, Linkage mapping, Positional/structural and functional cloning”. “Statistical methods used; Pharmacogenetics: History, Early evidence; Clinical determinants; Molecular insights (genes involved in pharmacokinetics and pharmacodynamics of drugs); Applications in pre-prescription testing”.</p>

SEMESTER 2

Syllabus Revision	
1.	<p>Course name: Environment and Health (AP02BS-2O1)</p> <p><u>New Topics Introduced:</u></p> <p>Unit 1: “Flouride and thoron toxicity, health impact”.</p> <p>Unit 4: “Biomagnification”</p> <p><u>Deletion of topics</u></p> <p>Unit 2: “chemical speciation, Particles, ions and radicals in the atmosphere” “Oxygen and ozone chemistry. Chemistry of air pollutants “.</p> <p>Unit 3: “Natural and anthropogenic sources of pollution, Primary and Secondary pollutants, Transport and diffusion of pollutants”</p> <p>Unit 4: “Soil Pollution Control, Thermal Pollution”.</p>
2	<p>Course name: Nanobiotechnology (AP02BS-2C1)</p> <p><u>Change in Credits:</u> existing 4 revised to 3</p> <p><u>New syllabus</u></p> <p>Unit 1: Introduction to nanomaterials:</p>

ATTESTED


Dr. Gangadhara Somayaji K S
Registrar
Yenepoya (Deemed to be University)
University Road, Deralakatte
Mangalore 575 018, Karnataka.

	<p>Nanotechnology history and scope, nanosize and properties, classification of nanostructured materials Bio nanotechnology-biological and biomimetic nanostructures-functional biological nanomaterials-impact of nanotechnology on medicine-medical nanotechnology-nanomedicine.</p> <p>Unit 2: Synthesis of nanomaterials</p> <p>Synthesis of nanomaterials: physical methods-high energy ball milling-mechanical, evaporation-sputterdeposition-chemicalvapourdeposition-electricarc deposition. Chemical methods; synthesis of nanoparticles by colloidal route-microemulsion-sol-gel method-hydrothermal process-sonochemical synthesis-chemical precipitation-microwave synthesis and pyrolysis. Biological methods; synthesis using microorganism-plant extracts-use of protein and template like DNA.</p> <p>Unit 3: Characterization Techniques for nanomaterials</p> <p>UV-Visible spectroscopy-fourier transform infrared spectroscopy-fluorescence spectroscopy-differential thermal analysis-thermo gravimetric analysis-dynamic light scattering-X-ray diffraction-X-ray photoelectron spectroscopy-atomic force microscopy-field emission scanning electron microscopy-transmission electron microscopy-energy dispersive X-ray diffraction.</p> <p>Unit 4: Biomacromolecules</p> <p>History of macromolecular science and concept of macromolecules; Basic concepts in polymer science-classification-monomer structure and polymerizability-concept of functionality-measurement of molecular weight and size-degree of polymerization-molecular weight distribution and polydispersity-biodegradable and water soluble polymers-polymer nanogels-bioresponsive polymers and natural biopolymers.</p> <p>Unit 5: Use of nanomaterials:</p> <p>Fundamentals of nanotechnology in bio sensing-cosmetics-imaging-drug delivery system for small molecules and proteins-tissue repair-antibacterial-antifungal-antiviral agents-biopolymers in medicine-role of nanotechnology in environmental applications and toxicity.</p>
3	<p>Course name: Stem Cells and Developmental Biology (AP02BS-2C2)</p> <p><u>New Topics Introduced:</u></p> <p>Unit 3: “Research using induced pluripotent stem cells and its advantages”</p> <p><u>Deletion of topics</u></p> <p>Unit 1: “ Diversification of gene and protein expression”</p>
4	<p>Course name: Immunology (AP02BS-2C3)</p> <p><u>New Topics Introduced:</u></p> <p>Unit 2: “Cytotoxic T cells, Natural Killer Cells, ADCC, NK cell receptors, inverse correlation with target MHC expression, and missing self hypothesis, cytotoxicity reaction, hypersensitivity”</p> <p>Unit 4: “CarT cell therapy and dendritic cell vaccines”</p> <p><u>Deletion of topics</u></p> <p>Unit 4: T “Stem cell technology. Manufacturing and Clinical Trials”</p>

ATTESTED

Dr. Gangadhara Somayaji K S
Registrar
Yenepoya (Deemed to be University)
University Road, Derlakatte
Mangalore 575 018, Karnataka.

5

Course name: Toxicology (AP02BS-2C4)

New Topics Introduced:

Unit 3: "Classification of drug interaction, Drug interactions with vitamins (interactions of retinoids with Vitamin A , levodopa with Vitamin B6 , warfarin with vitamin E and vitamin K, methotrexate with folic acid), Drug interactions with minerals (interactions of tetracyclins and fluoroquinolones with calcium, aluminium and magnesium, methyldopa and proton pump inhibitors with iron, angiotensin receptor blockers and diuretics with potassium)

Drug-nutrient interactions - Mechanism based classification system (ex-vivo bioinactivations, absorption phase associated interactions, physiological action associated interactions, elimination phase associated interactions)

Drug- dietary supplement interactions (interactions of coenzyme Q10, fish oil and herbal supplements with drugs)

Drug toxicity – Mutagenecity, teratogenecity and carcinogenicity"

Unit 5: "in vitro, in vivo, molecular, epidemiological): Assessment of genetic toxicity (COMET assay, micronucleus assay), in vitro toxicity assays (MTT assay, Neutral red uptake assay), carcinogenicity (transgenic mice models, initiation/promotion models) and mutagenecity testing (Ames test, mouse lymphoma thymidine kinase assay)".

Shifting of topics to other units

Unit 1: "OECD Guidelines for the Testing of Chemicals. Various techniques for toxicity evaluation (in vitro, in vivo, molecular, epidemiological." to **Unit 5** and rearranged as "Various techniques for toxicity evaluation OECD Guidelines for the Testing of Chemicals".

Deletion of topics

Unit 3: "Basic principles and specific examples of Hepato and renal toxicology, Reproductive and developmental toxicology, Immunotoxicology, cutaneous and pulmonary hypersensitivity".

"Persistent Organic Pollutants (POPs) and dioxins. Neurotoxicology, Metal toxicology: mercury, cadmium. Ozone, a criteria for air pollutant. Nanoparticle toxicology. Environmental diseases: Asbestosis, silicosis, synopsia, asthma, fluorosis and allergies, epidemiological issues – Malaria, Kala azar and water borne diseases. Properties and toxicities of animal venoms with special reference to scorpions, spiders, ticks, centipedes, millipedes, ants, bees, wasps, snails, lizards and snakes. Anti-venoms. Toxic effects of plant, fungi and algae".

SEMESTER 3

Course Structure:

i.	Discontinuation of " Biostatistics and Bioinformatics (code): Theory 4 credit course"
ii.	Introduction of "Biostatics" practical course (3 credits)
iii.	Introduction of "Research Methodology" course (4 credits)

ATTESTED

Dr. Gangadhara Somayaji K S
Registrar
Yenepoya (Deemed to be University)
University Road, Deralakatte
Mangalore 575 018, Karnataka.

iv.	Discontinuation of “Cell Culture Techniques” theory course
v.	Increase in credit for “Cell Culture Techniques” Practical course from 2 credits to 3 credits
vi.	Renaming of “Systems Biology and Omics Technology” as “Bioinformatics and Omics Technology”
vii.	Renaming of “Systems Biology and Omics Technology” as Omics Technology and Systems Biology”
Syllabus Revision	
1.	<p>Course Name: Omics Technology and Systems Biology (AP02BS-3C2)</p> <p><u>Deletion of topics</u></p> <p>Unit-2: “Epigenetics, CpG island methylation, Histone acetylation, Bisulfite sequencing”</p> <p>Unit 3: “Protein sequence and spectral databases/ libraries, de-novo sequencing”</p> <p>Unit 5: “Proteogenomics-concepts”</p>
2.	<p>Course Name: Genetic Engineering (AP02BS-3C3)</p> <p><u>Rearrangement of topics</u></p> <p>Unit 1: “Plasmid vectors, Vectors_based on the lambda Bacteriophage, Cosmids, M13 vectors, Expression vectors, Vectors for cloning and expression in Eukaryotic cells, Super vectors, YACs and BACs.” as “Structural and functional organization of plasmids, plasmid replication, stringent and relaxed plasmids, incompatibility of plasmid maintenance. Lambda phage vectors”</p> <p><u>Deletion of topics</u></p> <p>Unit 2: “Use of Phage display techniques to facilitate the selection of mutant peptides, Gene shuffling, production of chimeric proteins”</p> <p>Unit 5: “site-directed mutagenesis and Protein engineering: Primer extension, PCR based site directed mutagenesis, Random mutagenesis, Ethical considerations, epigenetic modification”.</p>



REGISTRAR

To,

The Dy. Director, YRC

Copy to:

1. Controller of Examinations
2. File copy

ATTESTED



Dr. Gangadhara Somayaji K S
 Registrar
 Yenepoya (Deemed to be University)
 University Road, Derlakatte
 Mangalore 575 018, Karnataka.