



UNIVERSITY OF GOORBANGA, MALDA
Zoology Two Years M. Phil Programme (Regular Course)
(With effect from the session 2015 - 2016)

Gross Description of Papers and Allotted Marks
[Scheme of the syllabus]

Paper	Code	Course content	Marks	Duration
Research Methodology and Computer Application	ZMT 1	Research Methodology	50	2 Semesters (1 st year)
	ZMT 2	Computer Application	50	
Modern Advancement in Zoology	ZMT 3	Entomology	50	
	ZMT 4	Microbiology	50	
	ZMT 5	Immunology	50	
	ZMT 6	Integrative Biology	50	
Dissertation	ZMD 1	Topic to be selected during study	150	2 Semesters (2 nd year)
Viva Voce	ZMV 1	On the topic of Dissertation	50	
Total			500	4 Semesters (2 years)

I. Research Methodology & Computer Application

ZMT 1: Research Methodology

[50 Marks]

Identification, selection and scope of research problems; methods of literature collection and review; planning and execution of investigation; thesis writing; preparation and presentation of research papers for journals, conferences; preparation of short communications and review articles

ZMT 2: Computer Application

[50 Marks]

Introduction to computers and their application in biology: operating system (Windows), Software (MS Word, excel, Power point), computer networks and World Wide Web; internet – e-mail. Biological Databases: database management system; information retrieval; Use of computer for statistical analysis

II. Modern Advancements in Zoology

ZMT3: Entomology

[50 Marks]

1. Insect taxonomy: Use of biochemical and molecular tools; use of SEM in taxonomy—sample preparation and application
2. Insect culture and rearing: culture of *Drosophila* sp., laboratory culture of stored grain/crop/fruit pests.
3. Insect Plant Interaction: Parametric evaluation of host plant, growth/seasonal dynamics of pests, assessment on biochemical properties of host plant. Co-evolution in plant-insect interaction.
4. Crop and Grain Loss Management: Factors determining crop losses, ETL values, important agro-climatic parameters, types of losses, grain/crop loss assessment, determination of threshold value.
5. Forensic entomology: Insect fauna, succession, methodology, application, case studies

ZMT 4: Microbiology

[50 Marks]

1. Emerging and re-emerging of infectious diseases (microbial and viral): global and national
2. Cultural aspects of microorganisms, parasites and viruses (tools and techniques)
3. Detection of pathogenic infection (viruses, bacteria, fungus and parasites): radio-imaging, molecular, immunological, biochemical, cultural, clinical and morphological aspects; role of DNA microarrays, MALDI-TOF MS (matrix-assisted laser ionization time-of-flight mass spectrometry) and PCR/ESI-MS (electrospray ionization mass spectrometry) in detecting pathogenic infection (topic to be covered with specific examples)
4. Role of microorganisms in food, medicine and agriculture
5. Bacterial biofilms and bacterial quorum sensing: concept and significance

ZMT 5: Immunology

[50 marks]

1. Immunoassays: Basic principles of assay design; Components of immunoassays; Data presentation and curve plotting; Assay performance and validation; Example of immunoassays
2. Proteomics and applications: Traditional proteomics; Array-based proteomics
3. Immunomodulation by nutraceuticals and functional foods: Current regulatory environment; Immunomodulation by natural products; Nutraceutical-drug interactions; Nutraceutical-nutraceutical interactions; Quality control issues
4. Recreational drugs, immune function, and resistance to infection: Effect of marijuana components on susceptibility to infections; Opiate effects on immunity and susceptibility to infections; Cocaine and infections; Nicotine and secondhand smoke effects on infection; Alcohol modulation of resistance to infections
5. Invertebrate Immunotoxicology: Origin and overview of invertebrate immune function; evidence for immunotoxicity in invertebrates; biomarkers and emerging techniques for studying invertebrate Immunotoxicology

ZMT 6: Integrative Biology

[50 marks]

1. Ecology biodiversity and wild life: Environmental education, planning and management; solar and tidal energy; biogas production; biodiversity – measures of diversity by different indices, Biodiversity and wildlife protection laws; remote sensing and GIS – concept and application.
2. Physiology, Biochemistry and Molecular Biology
 - a) Psychostimulant addiction/substance uses: consequences (including molecular aspects) and therapies
 - b) Glaucoma: pathophysiology, types and molecular basis
 - c) Hemoglobin: variants, classification of the disorders of hemoglobin; iron homeostasis in humans
3. Fish and Fisheries
 - a) Aquaculture, Aquaplosion, Aquaranching—definition and application
 - b) Induced breeding by hypophysation and synthetic hormones
 - c) Role of transgenesis, cryopreservation, sex reversal and hybridization in aquaculture
 - d) Fish diseases: viral, bacterial, fungal, parasitic, and miscellaneous; their remedies, and basic aspects of fish immunology.
 - e) Nutrition: types of feed; feed formulation