M. Phil. ZOOLOGY (FT / PT) PROGRAMME
(For the candidates admitted from the academic year 2007-2008 onwards)

Semester I

<table>
<thead>
<tr>
<th>Course</th>
<th>Title of the Course</th>
<th>IA</th>
<th>UE</th>
<th>Total</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course -I</td>
<td>Research Methodology</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>4</td>
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<tr>
<td>Course - II</td>
<td>Bio-Instrumentation and Biological Techniques</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>4</td>
</tr>
<tr>
<td>Course- III</td>
<td>Molecular Zoology</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>4</td>
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</tbody>
</table>

Semester II

| Course – IV | Elective (Any one)                                  | 25 | 75 | 100   | 4       |

  1 Insect Pest Management
  2 Aquaculture and Water Quality Management
  3 Environmental Toxicology
  4 Hydrobiology

Dissertation and Viva-Voce 200 (150+50) 8
Viva Voce 50 marks
Dissertation 150 marks

QUESTION PAPER PATTERN  (Course I – IV)

Part - A: Two questions from each unit (without choice). Each question carries 2 marks. (10 x 2 = 20)
Part – B: One “EITHER OR” questions from each unit Each question carries 5 marks (5 x5 = 25).
Part – C: One question from each unit. Each question carries 10 marks.
The candidate has to answer three questions out of the five questions (3 x 10 = 30)
M.Phil. Zoology
Course - I : Research Methodology

Unit : I

Research: selection of problem-stages in the execution of research: from choosing a topic to publication - MS preparation - report writing - Thesis format - proof reading - format of journals - sources of information: journals, reviews, books, monographs etc-bibliography.

Unit : II

Journals: standard of research journals-paid and refereed journals-impact factor-citation index- choice of journals for publication. Information retrieval: access to archives and databases, search engines: google, pubmed etc - national informatics center network services. online data base library

Unit : III


Unit : IV

Comparison of means: chi square and student t test: Model sums. ANOVA: partitioning of variation-F test - Model sums on one way ANOVA with interpretation of data-introduction to MANOVA-Statistical tables and their use - Brief introduction to pie chart and bar diagrams. Use and advantages of statistical software like COSTAT and STATISTICA.

Unit : V

Bivariate relationships: Uses of Correlation and regression. Correlation and regression coefficients - components of regression equation - ANOVA in regression. Confidence intervals of regression lines. Fitting simple regression lines: model sums, calculation of equation and fitting of regression line, estimated and calculated Y - confidence intervals, significance tests - fixing significance levels - interpretation of results
REFERENCES


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Course II : Bioinstrumentation and Biological Techniques

Unit I


Unit II


Unit III

**Unit IV**


**Unit V**

Geiger-Muller Counter – Basis of radioactivity and components – Liquid scintillation counter – Theory of liquid scintillation, components and correction of quenching and luminescence.


**References:**


Course III : Molecular Zoology

Unit –I

Molecular basis of heredity (review), Molecular basis of mutation and recombination- transposons- Organization of genome; definition and description of promoters, enhancers, silencers, transcription factors, RNA transcription and gene expression - regulation of gene expression – Translation- Post-translational processing and protein structure – Splicing - Alternative splicing.

Unit – II


Unit - III

The role of maternal stored mRNA in the development process- Role of the cytoplasmic determinants and morphogens - Activation of the zygotic genome - Molecular basis of cellular induction and cell differentiation - Role of homeobox genes in development - Sex determination – Molecular basis of pattern formation.

Unit -IV

Cell cycle (review)- Cell culture lab and requirements - primary cell culture - Nutritional requirements for animal cell culture- techniques for mass culture of animal cell lines- Application of animal cell culture for production of vaccines, growth hormones – interferons - cytokines and therapeutic proteins- stem cells and their applications – Cell culture as expression system.

Unit – V


Reference:


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ELECTIVE COURSE 1.1: INSECT PEST MANAGEMENT

Unit I

Major pests: Insect biology, behaviour and physiology- Damage caused and control methods of pests of paddy, sugar cane, cotton, red gram, ground nut, mango, coconut, brinjal, tomato, banana and stored products- Household insect pests: Mosquito, cockroach, housefly and termites- Mechanisms of pest resistance.

Unit II

Preventive pests control methods: Natural control: Climatic factors, physical factors, natural enemies. Physical control, Mechanical control and Cultural control.
Unit III

Chemical control methods: Chemical control: Origin, discovery and development of insecticides, classification, mode of action, formulation, appliances and application, precautions, pesticide poisoning and antidotes- Organic compound insecticides: Carbaryl and synthetic pyrethroids, mode of action.

Unit IV

Biological control methods: Botanical pesticides, insecticidal properties, mode of action- Parasitic and Predatory insects, spiders, vertebrates- Microbial pest control, viruses, bacteria, fungi, Protozoa, nematodes- Fumigants, antifeedants, sex attractants, repellants, chemosterilants, insect growth regulators- Integrated pest management.

Unit V

Biotechnological approach to insect pest control: Transgenic plants, the approaches, positive and negative consequences- Emerging approaches to pest control- Genetic improvement of biological control agents.

Reference Books


ELECTIVE COURSE I.2: AQUACULTURE AND WATER QUALITY MANAGEMENT

Unit I
Farm preparation and practices: Site selection- Farm design- Pond construction- Pond preparation for stocking- Earthening- Watering- Manuring- Accessories for farm- Seed selection criteria- Hatchery technology and nursery management- Seed and stocking.

Unit II
Culture of prawn and fish: Prawn culture- Fish culture- Ornamental fish culture- Monoculture, monosex culture and polyculture- Integrated fish farming- Culture of live feed organisms- Bioencapsulation- Assessment of growth and production- Harvest- Transport- Economics.

Unit III
Management of Feed: Types of feed- Need for supplementation- Supplementary feed- Ration and time of feeding- Feed monitoring- Growth monitoring- Methods of feed preservation and problems- Utilization of fish as products and by products- Fish and prawn and marketing.

Unit IV
Disease Management: Diseases caused by bacteria, viruses, protozoans and fungi- Deficiency diseases- Parasitic diseases- Prophylactic methods- Control of diseases by physical, mechanical, chemical, biological and antibiotic methods- Management of competitors and predators.

Unit V

Reference Books
ELECTIVE COURSE I.3: ENVIRONMENTAL TOXICOLOGY

Unit I

Unit II
Metabolism of toxic substances: Uptake- Excretion- Chemical localization of toxic substances in animals and its consequences- Hepatic metabolism and detoxification- Synergistic and antagonistic effects- Variations in metabolism between animals and comparative toxicology.

Unit III
Water pollution: Heavy metals- Pesticides- Sewage and domestic wastes- Industrial effluents- Petroleum and related compounds- Radio nuclides- Thermal pollution.

Unit IV

Unit V

Reference Books


ELECTIVE COURSE I.4: HYDROBIOLOGY

Unit-I
Water: Distribution, sources, properties, composition- Water as universal solvent- Hydrological cycle – Hydrological reserves- Water as the cradle of life

Unit II

Unit-III
Water quality: Drinking water- ROS system- Standards- Bacterial contamination - Indicator organisms.

Unit IV
Pollution: Properties of pollutants- Concentration- Long distance movement- Biological concentration and discrimination- Sources of pollution: Domestic, industrial, agricultural, oil spills, radioactive wastes, heavy metal- Preventive/control measures.

Unit-V
Instrumentation: Water quality analysis- pH meter, colorimeter, atomic absorption spectrophotometry, flameless atomic absorption spectrophotometry, gas chromatography, HPLC, ion selective electrodes- Working principles and applications.

Reference Books

