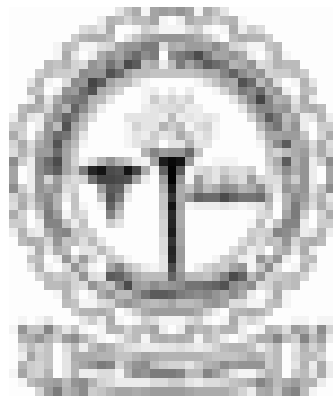


BHAGWANT UNIVERSITY

Sikar Road, Ajmer

Rajasthan



Syllabus

Institute of Life Science & Applied Sciences

M. Phil I Semester

Zoology

Course Category

MZoo : M.Phil in Zoology

CCC: Compulsory Core Course

ECC: Elective Core Course

Contact Hours:

L: Lecture

T: Tutorial

P: Practical or Other

Marks Distribution :

IA: Internal Assessment (Test/Classroom Participation/Quiz/Presentation/Assignment etc.)

EoSE: End of Semester Examination

M. Phil (ZOOLOGY)

(Course Structure)

Subject code	Subject Name	Teaching hours			Marks		
		L	T	P	External	Internal	Total
01MZOO101	Research Methodology: Theory & Techniques	3	0	0	70	30	100
01MZoo102	Environmental Biology	3	0	0	70	30	100
01MZoo103	Environmental Pollution And Eco-	3	0	0	70	30	100

	Toxicology						
01MZoo104	ANIMAL PHYSIOLOGY	3	0	0	100		100
Total		12	0	0	280	120	400

SEMESTER II

Subject code	Subject Name	Teaching hours			Marks		
		L	T	P	External	Internal	Total
02MZOO101	Advanced Research Methodology	3	0	0	70	30	100
02MZoo102	Biodiversity	3	0	0	70	30	100
02MZoo103	Comparative Animal Physiology	3	0	0	70	30	100
01MZoo201	Dissertation	3	0	0	100		100
Total		12	0	0	280	120	400

01MZOO101

Research Methodology Theory And Techniques

UNIT - I

Research – Definition – Importance and Meaning of research – Characteristics of research – Types of Research – Steps in research – Identification, Selection and formulation of research problem – Research questions – Research design – Formulation of Hypothesis – Review of Literature.

UNIT – II

Sampling techniques: Sampling theory – types of sampling – Steps in sampling – Sampling and Non-sampling error – Sample size – Advantages and limitations of sampling. Collection of Data : Primary Data – Meaning – Data Collection methods – Secondary data – Meaning – Relevances, limitations and cautions.

UNIT – III

Statistics in Research – Measure of Central tendency – Dispersion – Skewness and Kurtosis in research. Hypothesis – Fundamentals of Hypothesis testing – Standard Error – Point and Interval estimates – Important Non-Parametric tests : Sign, Run, Kruskal – Wallis tests and Mann-Whitney test.

UNIT – IV

Para metric tests : Testing of significance – mean, Proportion, Variance and Correlation – testing for Significance of difference between means, proportions, variances and correlation co-efficient. Chi-square tests – ANOVA – One-way and Two-way.

UNIT – V

Research Report : Types of reports – contents – styles of reporting – Steps in drafting reports – Editing the final draft – Evaluating the final draft.

Reference Books

1. Statistical Methods - S.P. Gupta
2. Research Methodology Methods and Techniques - C.R. Kothari
3. Statistics (Theory and Practice) - B.N. Gupta
4. Research Methodology Methods and Statistical Techniques - Santosh Gupta

01MZOO102

Environmental Biology

UNIT – I

Environmental Biology – Introduction, Biotic and A biotic factors of environment – Relationship among organisms, Animal Biodiversity.

UNIT – II

Ecosystem – Components, characteristics, Energy flow in ecosystem – Tropic levels. Chain, food web – Ecological Pyramids – Man and Biosphere – Environmental education.

UNIT – III

Population ecology – Population characteristics – Population control – Community – Characteristics, components.

UNIT – IV

Environmental pollution – In fresh water ecosystem – sources, assessment of pollution (BOD, COD) – In marine ecosystem – Sources, impact of pollution in fisheries – In terrestrial environment – Solid wastes and non-degradable wastes.

UNIT – V

Management of pollution – Sewage treatment, industrial effluent treatment, solid waste, liquid wastes, organic recycling, Biogas production, fish culture, algae production, Bio-compost. Restoration habitat – remote sensing, afforestation – mangroves, Artificial roots.

Reference:

1. Sharma, P.D. Ecology & Environment – Meerut: Rastogi Publications, Meerut, 1990.
2. Manivasakam, “Environmental Pollution”, New Delhi, Natural Book Trust of India, 1984.
3. Dara. S.S. - Text Book of Environmental chemistry & Pollution control. S.Chand & Company.
4. Biswarup Mukerjee. Environmental Biology.

01MZOO103

Environmental Pollution And Eco-Toxicology

UNIT – I

Environmental Pollutants – Definition - Classification of pollutants – Causes for pollution – Types of pollution – Air Pollution: Definition – Air pollutants – Causes of Air pollution – Biological Indicators – Ecological effects of Air Pollution – control of Air Pollution. Water Pollution: Definition – Water Pollutions – Causes of water pollution – Ecological effects of water pollution control of water pollution.

UNIT – II

Land Pollution: Definition – Land pollutants – Causes of Land Pollution – Pesticides – Radio activity – Fallows – Radioactive elements – Radiation – Source of Radiation – Natural radiation of man made radiations – Types of Atom Bomb – Internal or external Emitters – Sources of Ionizing radiation – Biological effects of radiations – Control of radioactive pollution – Human Population as Explosion – Issues – Demography – Dispersal – Causes – environmental effect – Waste Management – Types – Solid – Bio remediation.

UNIT – III

Noise Pollution: Definition – Causes of noise pollution – Ecological effects of noise pollution – Control of noise pollution. Thermal Pollution: Definition – Source of Thermal pollution: Definition – Source of thermal pollution – Ecological effects of thermal pollution – Control of thermal pollution. Pesticide Pollution:

Classification – Sources – Impact – Control General Law of control in pollution – Super Bass – Sewage Treatment.

UNIT – IV ECO-TOXICOLOGY

Introduction: Toxicology – Scope of toxicology – Basic division of toxicology – Goals of toxicology – Basic concepts of Toxicology – Factors that affect environmental concentration of Toxicants – Influence toxicity – chemical mixtures – Effect and response Dose – Response relationships – Margin of safety (slope). Toxicity testing.

Toxicants of Public Health Hazard: Black lists/ Toxic chemicals – Pesticides – Automobile emissions Heavy metals – Fertilisers – Food additives - Radioactive substances.

UNIT – V BIOLOGICAL MAGNIFICATION OF TOXIC MATERIALS:

Pesticides – microcosms - compartment models. Absorption – Translocation and Excretion of chemicals (xenobiotics) – membranes permeability and mechanisms of chemical transfer Bio-transformation of xenobiotics – Selective toxicity – Reception sites – Types of – D.D.T – anti-dotal procedures in toxicology. Biomonitoring of Toxic chemicals – Monitoring Program Parameters of biomonitoring – Bio-Indicators and Environmental monitoring Bio assay and its applications in toxicology – Environmental Legislation and Chemical Safety Evaluation.

Reference:

1. Environmental Health Publication of NEERI – Nagpur.
2. A. Arumugam – Saras Publciation.
3. Dr. Tmt. Bernice Anantharaj – Chrisolite Publciations – Ecology.
4. N.T. Krishna – Environmental Biology.

5. P.D. Sharma – Environmental Biology and Toxicology.
6. Shukia . Upadayan – Economic Zoology.

01MZOO104

Paper IV ANIMAL PHYSIOLOGY

Unit 1. Physiology

1 Excretory mechanisms: Regulatory functions of kidney, selective reabsorption, tubular secretion. The body temperature: Factors affecting body temperature, regulation, pyrexia (fever) and hypothermia, effects of exposure to high and low atmospheric temperature.

Cardiovascular mechanism: Excitatory process in heart, Special cardiac tissue and the mechanism of heart beat. O₂ and CO₂ transport

Unit 2: Physiology II

Ultrastructure and functions of mammalian Malpighian Corpuscles, proximal and distal convoluted tubules, Hensen's loop. Physiology of Urine formation. Physiology of respiration: Detailed accounts of Ventilation, diffusion and Perfusion. Ear: Organ of Corti and the physiology of hearing. Eye: Rod and Cone cells, biosynthesis of visual pigments and the photochemical reaction. Receptor cells, physiology of the sense of smell and taste.

Unit 3

Neurobiology Comparative overview of nervous system in invertebrates. Comparative overview of nervous system in vertebrates. Chemical sense (common chemical sense, internal

chemoreceptors of taste and smell). Resting, equilibrium and action potentials, generation and measurement of signals, propagation of signals in myelinated and non myelinated axons.

Unit 4

Recent advances in hypertension and hypertensive factors (brain and natriuretic factors and endothelial factors, role of CNS in blood pressure regulation).

Unit :5

Endocrinology Hormones: a) Local and Endocrine hormones, b) hormone as information carrier, c) site of hormone formation and rate of release, d) mechanism of hormone action and regulation. Adenohypophysis and its hormone secretion, regulation and functions. Neurohypophysis and its hormone secretion, regulation and functions. Endocrine pancreas and its hormone secretion, regulation and functions. Sex hormones, their hormone secretion, regulation and functions.

SEMESTER II **02MZOO101**

PAPER I- ADVANCED RESEARCH METHODOLOGY

UNIT I

Basic concepts: Research process, problem identification, research designs, informal experimental designs. Completing randomised design, randomized block design, latin square design, factorial designs

UNIT II

Sampling and testing of hypothesis: Concept of probability, probability\ distribution, Normal, Poisson, χ -square, t-test. Sampling distribution, central limit theorem, Sandler's A-test, standard error, population mean, population proportion, sample size, confidence intervals, null hypothesis and alternative hypothesis, level of significance, two tailed and one tailed tests, Z-test, t-test, χ^2 -test, F-test, testing of correlation coefficients, ANOVA one way ANOVA, two way ANOVA Tukey's HSD.

UNIT III

Non-parametric tests: Sign test, Fisher-Irwin test, Mc Nemer test, Wilcoxon Mali test, Wilcoxon, Mann-Whitnery test, Kruskal-Wallis test, one sample runs test. Spearman's rank correlation, Kendall's coefficient of concordance.

UNIT IV

Multivariate analysis: Multiple regression, multiple discriminant analysis, multiple analysis of variance, canonical correlation analysis, Factor analysis cluster analysis, path analysis. Computational techniques.

UNIT V

Computer Application, Basic of Computer, System Software & Application Software. Computer as a tool of Research: Application in data Analysis, related software. MS Office, SPSS, Data Communication, LAN & WAN Data Exploration using internet tools, e-journal, e-books, Basic concept of teleconferencing & related configuration.

REFERENCES:

1. Kothari, C.R. (2004). Research Methodology: Methods and Techniques, New Age International Publishers, New Delhi.
2. Arya., P.P. and Pal, Y.(2001) Research Methodology in Management: Theory and Case Studies. Deep and Deep Publishers Pvt. Ltd. New Delhi.
3. Bedekar V. H. 1982 – How to write assignments, research papers, dissertations, Kanak New Delhi.
4. Barzam J. and Graff Henry, 1977 – The Modern Researcher, Hercoust Brace. Javanavish Inc. 3rd Ed.
5. Gatner, E. S. M. & F. Cardasco 1970 – Research and report writing, Pb. Bernes and **Noble, N.Y.**

02MZOO102

Paper II – BIODIVERSITY.

UNIT I

BIODIVERSITY SCIENCE :Concept & definition, scope and constraints of biodiversity science. Evolution of biodiversity, factors promoting high diversity, global biodiversity. **MEASURES OF BIODIVERSITY**-Diversity indices, information statistic indices, biodiversity values.

UNIT II

SPECIES DIVERSITY: Species inventory, history and origin, species richness, future of

species diversity studies, threats to species diversity.

Taxonomical, Biological, Ethological, Biochemical and Molecular Approches

GENETIC DIVERSITY: Nature and origin of genetic variation, methods based on DNA chromosomes and determinants of genetic diversity.

ECOSYSTEM DIVERSITY :Classification, Measuring ecosystem diversity, megabiodiversity centers, hot spots.

UNIT III

THREATS TO BIODIVERSITY: Issues relating to threats to biodiversity, approaches to combat threats to biodiversity, values and uses of biodiversity, loss of biodiversity carbon dating

Biodiversity and adaptation : Morphological, Physiological, Molecular.

UNIT IV

BIODIVERSITY CONSERVATION:Goals, In –situ and Ex-Situ conservation, role of universities and colleges in conservation, biodiversity awareness programmes,

UNIT V

biodiversity education resources, media and sustainable development.

Recent Trends in insect biodiversity conservation, protection and utilization

Recommended readings:

1. An advanced Textbook on Biodiversity by K.V.Krishnamurti.
2. Biodiversity and biotechnology by Ray and Ray.
3. Biodiversity by Mandal and Nandi
4. Advancement in insect biodiversity by Rajiv K.Gupta.2004.
5. Biotechnological approaches in Entomology by T.V. Sathe 2008.
6. Molecular Entomology by J.H. Law 1987.

02MZOO103

PAPER III Comparative Animal Physiology

Unit-I Nutrition for human Performance.

- i) Carbohydrates, Fat and Proteins – Biochemical reaction and molecular interpretations
- ii) Vitamin, mineral and water.
- iii) Energy value, Energy transfer, Energy expenditure.
- iv) Energy expenditure during Hot and Physical activity.
- v) System of Energy delivery and Utilization.
- vi) Food and Nutrition relating to work exercise and Environmental Stress.
- vii) Diet Therapy

Unit-II Applied and Exercise Physiology

- i) Energy for Exercise
- ii) Enhancement of Energy capacity- Aerobic and Anaerobic power.
- iii) Obesity
- iv) Muscular strength
- v) Fundamentals of Physical exercise
- vi) Responses of body to exercise
- vii) Recovery from exercise

- viii) Special aids to performance and conditioning.
- ix) Weight control through Exercise and Diet- Physiological and Molecular Approach.
- x) Physical fitness and Risk Factors.
- xi) Effect of Exercise on Health and Fitness.
- xii) Sport and Recreation
- xiii) Doping- Biochemical and Molecular Interpretation.

Unit-III Work performance and Environmental stress.

- i) Exercise at medium to high altitude.
- ii) Exercise and physico-chemical stress.
- iii) Exercise and Biological stress.
- iv) Environmental factors: Biotic and Abiotic (with Biochemical and Molecular interpretation.

Unit-IV

Effect of physical Training

- i) Physiological profiles, training and adoption.
- ii) Physiological and Biochemical changes.

Unit-V Ergonomics and Occupational Physiology.

- i) Man- Machine and Environment.
 - ii) Man at work.
 - iii) Women at work.
 - iv) Aging Occupational stress.
- (Fundamental, Physiological, Biochemical and Molecular Approaches of above i-iv).

Recommended Reading:

1. Elder k. and Dale B. 200. In vitro fertilization 2nd (ED), Cambridge University Press.
2. Guyton A.C. 1986. Textbook of Medical Physiology 7th (ED), W.B. Saunders Company Igaku / Saunders.
3. Guyton A.C. 1992. Human Physiology and Mechanism of Diseases 5th (ED), W.B. Saundes Company Igaku / Saunders.
4. Kessele R.G. 1998. Basic Medical Histology, Oxford University Press New York.
5. Mcardle W., Katch V. and Katch F. 1986. Exercise Physiology, Lean and febiger, Philadelphia.
6. Sherwood L., Klandorf H. and Yancey P. animal Physiology from Genes to Organisms, Thomson Learning Academic Resource Centre.
7. Tortora G. and Grabwski S. 1993. Principle of anatomy and Animal Physiology, Harper Collins College Publishers.

02MZOO104