

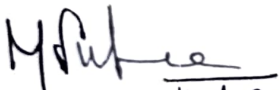
MINUTES OF THE MEETING

A meeting of Board of studies was held in the chamber of Head, Department of Zoology, on 31.05.2013 and 01.06.2013 (two days) at 10 AM to revise the syllabus and scheme of examination of Pre-Ph.D. in Zoology program. The following members were present during the meetings.

Dr. M. Sabesan : Chairman
Dr. Jagat Kumar Roy : External expert member
Dr. Seema Rai : Member

The existing syllabus of Pre-Ph.D. course was carefully scrutinized and it was revised wherever needed.

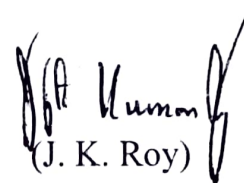
1. One new major elective as Neuroscience proposed.

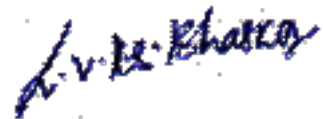

(M. Sabesan) 1st 06. 2013

Head

Department of Zoology
Guru Ghasidas Vishwavidyalaya
Bilaspur (C.G.)


(Seema Rai)


(J. K. Roy)



विभागाध्यक्ष
HEAD
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Scheme oh Pre Ph.D. Course work of Zoology

Code	Subject	End Semester exam	Passing marks (%)
101	Research methodology and Scientific communication	100	60
102	Analytical and Separation techniques	100	60
103	Optional (Any One) <ul style="list-style-type: none"> • Advances in insect Biology and Pest management • Endocrinology • Aquaculture and fisheries • Neuroscience 	100	60
		300	180

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शिक्षणप्रमुख
HEAD
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SYLLABUS FOR PRE –Ph.D. COURSE IN ZOOLOGY

Paper-I Research methodology and communication

Unit-I Research Methods and Sampling

Introduction to research methodology: Meaning of research, Objectives of research, Research and scientific methods, Research process, Criteria of good research, Defining the Research problem, Research design, Basic principles of Experimental design, Developing a research plan, sample design, Characteristics of good sampling procedure, Types of sample design.

Unit-II

Methods of data collection, Processing and Analysis of Data. Statistics in research, Measures of central tendency, Dispersion, Asymmetry, Relationship. Regression analysis, Multiple correlation and regression, Partial correlation, Association in case of Attributes. Testing of hypothesis, Chi-square test: Applications, Steps, Characteristics, limitations, Analysis of variance and Covariance.

Unit-III

Experimental Design, Analyzing and minimizing variations in experimental procedures. Quality assurance: Development, validation, optimization of analytical methods for metabolites and animal cell based products.

Unit-IV Communication and presentation

Basics of communication skill. Types of scientific communications, Importance of publishing research papers. Publishing research papers: Preliminaries, Format, Choosing journal. Title, Running title, Authorship, Abstract, Introduction, Materials and methods, Result, figures, Table components, Graphs, Discussion, Acknowledgements. Referees, Key words, Communication with the editors, Handling Referee's comments, Galey Proofs, Avoiding Plagiarism. Writing review articles.

Unit-V

IUPAC symbols and Terminology for physicochemical quantities and Units, SI Prefixes, Fundamental constants, Standard abbreviations and symbols. Exercises on animal science related research papers, preparing project proposals for funding agencies. Critical analysis of research papers, of interest published in refereed Journals with respect to language, content, title, reference style, data, figures, tables, discussion etc. and preparing a report on same. Writing and submitting a review article related to doctoral research topic for an international journal. Preparing and delivering of Oral and poster Presentations.

Reference Books: Latest editions of following books

1. Kothari, C.R., Research Methodology (Methods and techniques), New age publisher
2. Fundamentals of modern statistical methods By Rand R. Wilcox
3. Power Analysis for Experimental research, a practical guide for the Biological, Medical and Social Sciences by R. Barker Bausell, Yu-Fang Li, Cambridge University Press
4. Design of Experiments: Statistical Principles of Research Design and Analysis, by Robert O. Kuehl Brooks/Cole
5. Study of communication skills for the Biosciences by Stuart Johnson and Jon scott, Oxford university Press.
6. Write and publish a scientific paper by Robert A. Day, Oryx Press
7. Scientific Easy when you know how by Jennifer Peat, BMJ Books
8. Research Projects and Research Proposals A Guide for Scientists Seeking Funding by Paul G. Chapin Cambridge University Press.

Paper-II ANALYTICAL AND SEPARATION TECHNIQUES

Unit-I Biochemical Techniques

Introduction and types of Chromatography, Paper, thin layer, gas, Gel filtration, Ion exchange, HPLC, FPLC and affinity chromatography. Applications of Chromatographic techniques in Biology.

Unit-II

Electromagnetic spectrum, Beer Lambert's Law, Photometry, UV/VIS Spectrophotometry, ESR and NMR spectroscopy, Mass Spectroscopy (LC-MS, GC-MS), Florescent spectroscopy. Applications of different spectroscopic techniques in Biology.

Unit-III Molecular techniques

Paper and Gel Electrophoresis, Polyacrylamide gel electrophoresis (native and SDS), agarose gel electrophoresis, 2D electrophoresis, Blotting-Southern, western and Northern blotting, Immuno blotting, Immuno electrophoresis, DNA fingerprinting and ELISA.

Unit-IV

DNA microarray, Protein Microarray, Microarray analysis, DNA chip, DNA probes, Flow cytometry, Karyotyping and Idiogram. Histological and Histochemical methods, Cryostatic Photomicrography.

Unit-V

Detection and measurement of radioactivity, GM counter, Scintillation counter, Autoradiography, safety measures in handling radioisotopes, RIA, non radiolabelling. Introduction to bioinformatics tools.

M. Tubee

S. S. S. S.

P. A. Kumar

PAPER-III: ADVANCES IN INSECT BIOLOGY AND PEST MANAGEMENT**Unit-I**

Insect pests, Types of damages to plants by insects, pest surveillance and forecasting, pest outbreak, Assessment of Insect population, Estimation of damage caused by insect pests to crops.

Unit-II

Abiotic and Biotic factors in biology, Understanding insect diversity in field, Abundance and distribution of insect with special reference to diapause. Interspecific and intraspecific interaction with special reference to insect migration and pest outbreak. Insect life table and its application. Method of assessing insect pest / populations-plant resistance.

Unit-III


Chemical control of insect pest: Classification of Insecticides, mode of action of insecticides, mechanism of insecticide resistance; Chitin inhibition and their efficacy in pest management; Recent trends in pesticide application technology. Integrated Pest Management (IPM); Principles of IPM programme, its objectives and strategy.

Unit-IV

Principles of toxicology of insecticides, general bioassay of pesticides, insecticide residues, resistance of Insecticides, Factor influencing effectiveness of insecticides.

Unit-V

Statistics of toxicology; Median lethal dose – Behren's methods, Graphical methods, rapid approximate method by Huson, Finney method, Abbots Method. Insect pest control – Natural control – Biological methods, chemical methods, chemosterilant, Insect attractants, repellants, antifeedants, integrated pest controls.



Paper-III: ENDOCRINOLOGY

Unit-I

Principles of endocrinology. Functions of hormones and their regulation. Chemical signaling: endocrine, paracrine, autocrine and intracrine mechanisms; Chemical classification of hormones and their synthesis; Hormone receptor regulation; Neuroendocrine interactions: Hormones and the immune system; Hormones, growth promotion and malignancy; Genes, mutations and endocrine functions. Clinical evaluation of endocrine disorders.

Unit-II

The endocrine pancreas, Glucose turn over, Anabolic and catabolic phases of glucose metabolism; Actions of insulin and Glucagon; Lipid metabolism – Insulinopenia and diabetic ketosis; Structure, synthesis and metabolism of insulin and Glucagon. The thyroid gland, iodine intake. Anatomical features of the thyroid gland, iodine trapping and thyroid function, synthesis of thyroid hormones, Actions of thyroid hormones, control of the thyroid hormone synthesis and secretion. Hyperthyroidism and hypothyroidism, Biochemical measurements of thyroid hormone status.

Unit-III

The adrenal gland, specificity of the biological effects of adrenal steroid hormones. Cholesterol and steroid synthesis in the adrenal cortex. Dynamic tests of endocrine function. The parathyroid glands and Vitamin-D. Calcium and phosphate in serum and its measurement; Intracellular calcium concentration, calcium and phosphate balance, hormonal control of serum Ca^{2+} and P_i concentrations. Sources, metabolism and transport of vitamin-D.

Unit-IV

The gonad. Genetic determination of sexual differentiation. Sexual differentiation. Sexual differentiation of the gonads and internal reproductive tracts. Sexual differentiation of the external genitalia. Control of steroid production in the fetal gonads. GnRh and the control of gonadotrophin synthesis and secretion. The gonadotrophins – LH and FSH – and their actions. Endocrine changes in puberty. Ovarian failure. The menopause and andropause. Hormonal replacement therapy (HRT) and selective estrogen receptor modulators (SERMS).

Unit-V

The Pituitary gland. Anatomical and functional connections of the hypothalamo-pituitary axis. Growth hormone – secretory patterns and control. Actions of growth hormone and insulin like growth factors. Circadian rhythms and the suprachiasmatic nucleus. The pineal gland and melatonin. Autonomic functions of the hypothalamus. Obesity. The neural lobe of the pituitary gland – AVP and oxytocin. Cardiovascular and renal endocrinology.

M. Arora

Dr. Arora

Dr. Arora

PAPER-III: AQUACULTURE AND FISHERIES

UNIT-I

Basics of aquaculture. Introduction – India and world aquaculture-Role, status and importance of aquaculture.

UNIT-II

Capture fisheries, Major inland capture fishery resources in India – Lake and reservoir fisheries. Nursery system in Estuaries and Brackish water and its fishery resources in India.-Marine major and minor fishery resources in India and world. Fin and shell fishes.

UNIT-III

Culture fisheries, Monoculture – Poly culture – Extensive, Intensive – integrated fish farming – Paddy cum fish culture – fish and prawn culture in fresh water ponds – Fin fish and shell fish culture in Brackish water ponds – Ornamental fish culture.

UNIT-IV

Live Feed culture, Taxonomy of live feeds – General collecting method – Culture and Nutritional value of Rotifers, Artemia, Copepods and Daphnia – Molluscan culture and its status. Culture of Zooplankton.

UNIT-V

Recent techniques in Aquaculture. Cryopreservation techniques for live feeds – Bio-enrichment technique. Applied genetics of cultivated fishes – Regulation of vitellogenesis in shell and fin fishes.

M. Tubes

SK

Dr. Kumar

PAPER-III: NEUROSCIENCE**CELLULAR NEUROBIOLOGY AND NEUROCHEMISTRY****UNIT-I**

An overview of the nervous system

Neurons: Introduction to neurons, The neuron doctrine, The Nissl and Golgi stains, Components of neurons, Classification and types of neurons, cytology of neurons, Dendrites structure and function, Axons structure and functional aspects, ultra structure, myelination and synapses.

UNIT-II

Glial cells, Structure and function of glial cells, Different types of glial cells: astrocytes, oligodendrocytes & Schwann cells, Types of astrocytes – Type I and II astrocytes, fibrous and protoplasmic astrocytes, Importance of astrocytes in glutamate metabolism and blood brain barrier, Functions of other glial cells: Oligodendrocyte and microglial cells, Microglial phenotypes, Overview of glial and neuronal relationship in the CNS, Glial- neuronal interplay in the CNS.

UNIT-III

Acetylcholine: Chemistry, synthesis, storage and release; Nicotinic and muscarinic receptors; Catecholamine; biosynthesis, storage and release; Dopamine, adrenergic receptors.

UNIT-IV

Serotonin; synthesis, action and distribution; role of serotonin receptors in behavior; Excitatory amino acid transmitters; synthesis, metabolism, distribution and receptor subtypes; histamine; Dynamics, molecular sites and action in the CNS, GABA, glycine; Synthesis, uptake and release; Receptors of GABA and glycine.

UNIT-V

Neuropeptides neurotransmitters; biosynthesis, function regulation and receptors; Opioid peptide and opioid receptors; Synthesis, metabolism, distribution and receptor subtypes; CSF; Micro circulation and blood brain and CSF barriers.

Suggested books:

1. Siegel, Basic Neurochemistry (7th Edition) Academic press, 2006
2. Alberts, Molecular Biology of the Cell (5th Edition) Garland Science, 2008
3. Kendel, Principles of Neural science (4th Edition), McGrawhill, 2000
4. Vekhratsky, Glial Neurobiology, A Text Book, Wiley, 2007