



List of New Courses

Department : **Zoology**

Program Name: **Pre-Ph.D. course work**

Academic Year : **2018-19**

List of New Courses

Sr. No.	Course Code	Name of the Course
1	01	Research Methodology
2	02	Bio-techniques, Biochemistry and Toxicology
3	03	Endocrinology, Neuroscience and Fish Biology

Dr. V. K. Bhaskar

विभागमध्यक्ष
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जन्तु विज्ञान विभाग
Department of Zoology
गुरु घासीदास वि.वि., बिलासपुर
Guru Ghasidas Vishwavidyalaya, Bilaspur



Minutes of Meetings (MoM) of Board of Studies (BoS)

Academic Year : 2018-19

School : School of Studies of Life Sciences

Department : Zoology

Date and Time : July 06, 2018 - 4:00 PM

Venue : Department of Zoology

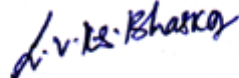
The scheduled meeting of member of Board of Studies (BoS) of Department of Zoology, School of Studies of Life Sciences, Guru Ghasidas Vishwavidyalaya, Bilaspur was held to design and discuss the Pre-Ph.D. course work, scheme and syllabi.

The following members were present in the meeting:

1. Prof. Sangeeta Shukla (External Expert Member BoS, Dept. of Zoology., Jiwaji University, Gwalior)
3. Dr. Monika Bhadauria (HOD, Associate Prof., Dept. of Zoology, GGV.-cum Chairman, BOS)
4. Dr. Rohit Seth (Member BoS, Associate Professor, Dept. of Zoology, GGV)
5. Dr. Santosh Singh (Member, Assistant Professor, Dept. of Zoolgy, GGV)

The committee discussed and approved the scheme and syllabi. All courses were newly introduced in the of Pre-Ph.D. course work, Zoology.

Course Code	Name of the Course
Paper I	Research Methodology
Paper II	Bio-techniques, Biochemistry and Toxicology
Paper III	Endocrinology, Neuroscience and Fish Biology


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Signature & Seal of HOD



Scheme and Syllabus

S No.	Paper	Credits	Marks
01	Research Methodology	04	100
02	Bio-techniques, Biochemistry and Toxicology	04	100
03	Endocrinology, Neuroscience and Fish Biology	04	100
04	Seminar	Mandatory	



SYLLABUS FOR PRE-Ph. D. COURSE WORK (ZOOLOGY)
Session: 2018-2019

Department of Zoology
Guru Ghasidas Vishwavidyalaya, Bilaspur, CG

PAPER 1: RESEARCH METHODOLOGY

Unit 1: Introduction to research

Meaning of research, objectives of research, research process, criteria of good research, defining the research problem, basic principles of research design, developing a research plan, sample design, characteristics of good sampling procedure, types of data.

Unit 2: Basics of scientific communication

Types of scientific communication, importance of publishing research papers, review, choosing journals, constituents of research paper: title, running title, authorships, abstracts, keywords, introduction, materials and methods, results, discussion, acknowledgements, referees, figures, table components, communication with the editors, handling referees comments, galley proofs. Plagiarism. Writing review articles, Preparing and delivering of oral and poster presentations. Intellectual Property Rights.

Unit 3: Statistical Analysis

Methods of data collection; Graphical representation of data; Measurement of central tendency: Definition, characteristics, types, merits and demerits. Measurement of dispersion: Range, Mean deviation, Standard deviation, Standard error, Variance, Correlation and Regression and their coefficients. Test of significance: Student's t test, Chi-square test and ANOVA.

Unit 4: Computer Application

Basics of computers; MS Word: typing the script, inserting tables, figures and graphs to prepare thesis and research papers; MS Excel: designing and application of formulae use of statistical tools, preparation of graphs, histograms and charts; MS power point: insertion of figures, graphs, charts in presentation; Preparation of posters for scientific presentations.

Unit 5: Microscopy

Basic principle, constituents and biological applications of Bright-field microscope, Dark-field microscope, Phase contrast microscope, Differential interference contrast microscope, Fluorescence microscope, Confocal microscope, Atomic force microscopy, Transmission and scanning electron microscope.

Unit 6: Spectroscopy

Electromagnetic spectrum, Lambert Beers's Law, Photometry, UV/VIS Spectrophotometry. Atomic absorption spectroscopy, ESR and NMR spectroscopy, Mass spectroscopy. (LC-MS, GC-MS), Fluorescent spectroscopy.



PAPER II: BIOTECHNIQUES, BIOCHEMISTRY AND TOXICOLOGY

Unit 1: Centrifugation and Electrophoresis

Principle, types and applications of Centrifugation; Electrophoresis: principle and applications, Types: PAGE (native and SDS), agarose gel electrophoresis, 2D electrophoresis, Blotting: Southern, western and northern blotting.

Unit 2: Chromatography

Chromatography: principle, types and applications of thin layer, gas, gel filtration, ion exchange, HPLC, FPLC and affinity chromatography.

Unit 3: Bio-molecules and their interaction

Structure and classification of biomolecules; Carbohydrate: Glycogenesis, glycogenolysis, pentose phosphate pathway; Lipids: biosynthesis and degradation, β -oxidation; Amino acids: Transamination, Deamination: transdeamination and oxidative deamination; Toxicity of ammonia: Ammonia detoxification; Urea cycle: Reactions and their regulation.

Unit 4: Apoptosis

Process of apoptosis: Induction and biochemical changes, Execution: cytochrome C release, caspase action, Phagocytosis of apoptotic bodies; intrinsic and extrinsic pathways. Introduction to autophagy

Unit 5: Free radical reaction in biological system and oxidative stress

Classification of toxic substances; Dose response relationships, LD_{50} , LC_{50} , TD_{50} and therapeutic index; Nature of free radicals; Initiation, propagation and termination radical reactions; electron transfer; Formation of free radicals in lipids and lipid membranes; Toxicological consequences of oxidative stress on protein and lipid.

Unit 6: Antioxidant defence mechanism

Enzymatic and Non enzymatic antioxidants; Role of glutathione, superoxide dismutases, catalases and peroxidases, Metallothionein and tocopherols as antioxidants; Metabolism (Phase-I and phase II reactions) and excretion of xenobiotics; Hepatic defence against toxicity, LFTs and KFTs: physiological, biochemical and pathological response.



PAPER III: ENDOCRINOLOGY, NEUROSCIENCE AND FISH BIOLOGY

Unit I: Hormone and Signaling Mechanism

Principles of Endocrinology; Functions of hormones and their regulation; Chemical Singaling: endocrine, paracrine, autocrine and intracrine mechanisms; Chemical classification of hormones and their synthesis; Hormone receptors and action mechanism; Hormones and immune system; Growth promotion and cancer; Gene mutation and endocrine function

Unit II: Molecular Endocrinology

Endocrine pancreas and diabetes; Thyroid gland and metabolism; Adrenal gland stress response; Hormones and calcium homeostasis; Gonadotropins, Gonads and sex steroids; Endocrine changes during puberty; Hormone replacement therapy; Hypothalamo-hypophysial system; Pineal gland and melatonin; Concept of chronobiology

Unit 3: Basics of Neuroscience

Introduction to the structure and function of Neurons; Generation, conduction and properties of the action potential and role of sodium and potassium pumps; Synaptic action, dendritic properties and functional operation of: Auditory system; Visual system and Olfactory system.

Unit 4: Neuroendocrinology

The hypothalamo - hypophysial gonadal axis - interface of hormones and the nervous system. Sex differences in the brain, hormone action in the brain, and the control of energy balance; An introduction to biological clock and its significance and hypothalamic regulation of biological rhythm.

Unit 5: Fish Culture

Fish culture systems: Integrated fish farming, Composite fish farming, Criteria of selection of cultivable fishes, Age and growth: Growth rate and aging, Length weight relationship, gonadosomatic index, Functional morphology of gonads, Role of hypothalamo-hypophysial hormones in reproduction; Induced breeding in fishes.

Unit 6: Fish Anatomy and Physiology

General organization of epidermis and dermis; Gill structure and physiology of gill respiration; modifications of alimentary canal in relation to food and feeding habits; fish kidney; water and ion balance; General organization of circulatory system; Fish Brain, Structure and function of thyroid, ultimobranchial gland, pancreas, adrenal, corpuscles of Stannius, urophysis and Pineal.