VIKRAM UNIVERSITY, UJJAIN (M.P.)

Ordinance-11: PhD COURSE WORK *in ZOOLOGY* wef SESSION 2018

(MP Universities Common Ordinance-11 as suggested by UGC regulation, 2016)

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S.S. in Zoology & Biotechnology

Vikram University, Ujjain. India

Dean

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Faculty of Life Sciences
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03/5/19
Chairman BOS

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VIKRAM UNIVERSITY, UJJAIN (M.P.)

EXAMINATION IN THE FACULTY OF SCIENCE

Ph.D. (Zoology) Course Work

Ordinance-11 Session -2018-19

Scheme and course

(As per common ordinance No. 11, Item No. 11(e) and (f))

Paper	Nomenclature	Credits	Marks
Paper-I: Zool-01	Research Methodology	4	100 (60+40 CCE)
Paper-II: Zool-02	Review of Research in the relevant field	3	100 (60 written report+ 40 oral presentation)
Paper-III: Zool-03	Computer Applications	3	100 (60+40 CCE)
Paper-IV: Zool-04	Advance Course in Zoology	3	100 (60+40 CCE)
Paper-V: Zool-05	Comprehensive *Viva Voce*	3	100
Total		**16**	**500**

21.9.19

Notes:-

- The candidate has to obtain a minimum of 55% of marks or its equivalent grade points in aggregate in the course work in order to be eligible to continue in the Ph.D. Programme.
- If a student obtains F or Ab Grade in a Course/subject, he/she will be treated to have failed in that course. He/she has to reappear in the examination in the next semester.
- If candidates further fails in the course, he/she shall not be given another chance and shall be out of the Ph.D. programme.

Paper I ZOL- 01 Research Methodology

Unit: 1 Microbial and tissue culture

1. Techniques of tissue and cell culture
2. Preparation and sterilization of solid and liquid culture media.
3. Preparation and maintenance of microbial cultures.
4. Design of a typical laboratory fermenter
5. Techniques of preservation of animal.

Unit:-2 Limnology

1. Method of fish culture in India.
2. Management of fish culture techniques.
3. Waste water treatment technology.
4. Environmental pollution.
5. Integrated fish culture.

Unit: - 3 Cell Biology

1. *Allium cepa*: Fiskesjo's model and Rank-Nielson model.
2. Bone marrow chromosomes Rat/ Mice.
3. The Ames Test.
4. Micronuclei test
5. Preparation of sub cellular fractions.
6. Use of *C. elegans, D. melanogaster* & Vertebrate cells.

Unit: - 4 Biochemistry

1. Isolation and extraction of nucleic acids.
2. DNA electrophoresis, southern blotting and autoradiography.
3. Restriction fragment length polymorphism and DNA fingerprinting.
4. Polymerase chain reaction and DNA amplifications.
5. Biological data base: Nucleotide and protein data bases.
6. Bioinformatics tools: BLAST, Clustal, Fasta

Unit:-5 Methods in Endocrinology and reproductive Physiology.

1. Bioassay of gonadotropin.
2. Bioassay of Progesteron
3. Kidney Function Test
4. Liver Function Test
5. Different surgical techniques.

Paper II ZOL 02 Review of Research in the relevant field

PAPER III ZOL 03 COMPUTER APPLICATIONS

Unit:-1

Computer and its components: Basic concepts of computer, its components, block diagram of computer, characteristics of computer, classification of computer and types of computer (Digital mainframe, micro, mini and super computer)

Input devices: Keyboard, joystick, Mouse, Light pen. Scanner, Bar code reader, Optical magnetic reader.

Output devices : Cathode Ray tube, Monitor, Printer.
Application of computer in the field of research.

Unit:- 2

Memory : Storage, Evaluation criteria, Main memory organization, main memory capacity, RAM, ROM, PROM, EPROM, Cache memory.

Secondary storage devices: Magnetic taps, magnetic disk, optical disk, pen drive, CD – ROM
Operating System: DOS (internal and external commands), M.S. Window, M.S. Window NT, UNIX, Linux

Unit:-3

Computer virus: Definition, name, types and effects of some computer viruses.

Computer Antivirus: Definition, name, types and effects of some computer ant viruses.

Internet: Concept of World Wide Web, WWW browsers, Client server architecture, Protocols, Emails, Browsing on internet, applications of internet in the field of research.

Unit: - 4

Computer Software: Concept of hardware and software, Relationship between hardware and software, types of software (System and application software)

Common software packages: Important features of M.S. Word, M.S. Excel and M.S. Power point. common software package used in research.

Unit:- 5

Basics of Programming: Machine, Assembly and High level language.
Characteristics of a good programming language, selecting language of application coding.

Concepts of high level languages: FORTRAN, COBOL, BASIC, PASCAL.

Basics programming in C and C++: Basic concepts, branching statements (if, if –else, switch etc), concepts of OOPs , class, function overload

Paper-IV ZOL 04 Advance Course in Zoology

Unit – 1

1. Restriction Endonucleases and DNA polymerases.
2. Cloning vectors : plasmids, bacteriophases, M13, PUC 19, Cosmids and artificial chromosomal vectors:
3. Gene cloning strategies: C DNA and genomic cloning; C DNA and genomic libraries
4. Method of gene transfer in Prokaryotic and Eukaryotic cells.
5. DNA sequencing: Maxam and Gilbert method; using bacteriophage M13 method.

UNIT-2

1. Site directed Mutagenesis: oligonucleotide- directed mutagenesis, PCR- amplified; oligonucleotide- - directed mutagenesis, Random mutagenesis
2. Gene knockouts and creation of knockout mice: disease model.
3. Gene Expression Analysis.
4. Concept of Oxidative Stress and Role of Antioxidants
5. Molecular Diagnosis of Genetic Diseases, and Gene Therapy

UNIT-3

1. Gene Silencing: Si RNA technology, Micro RNA, Principles and applications of gene silencing.
2. PCR and DNA Amplification
3. Gene regulation in Eukaryotes: Different levels of gene regulation of gene expression
4. Modes of Cell Signaling, Second messengers & Signal Transduction up to gene
5. Cell Adhesion Molecules

UNIT-4

1. Prenatal diagnosis & genetic screening
2. Genetic counseling
3. Human gene therapy
4. Transgenic animals & their applications
5. Human Genome Project

UNIT-5

1. Chemical nature of hormones
2. Purification and characterization of hormones
3. Production of hormone by r DNA technology.
4. Component of innate and acquired immunity
5. Kinds of environmental pollution and their control methods.

Paper V ZOL 05 Comprehensive *Viva Voce*

LBL 31.5.19