



Hemchandracharya North Gujarat University, Patan

PH.D. COURSE WORK SYLLABUS

SUBJECT : ZOOLOGY

Scheme & Course

Sr.	Paper	Nomenclature	Credits	Marks
1.	Paper-I-ZOOLOGY-CW-101	Research Methodology	04	70+30
2.	Paper-II-ZOOLOGY-CW-102	Advance course in Zoology	04	70+30
3.	Paper-III-ZOOLOGY-CW-103	Computer Application in the subject	04	70+30
4.	Paper-IV-ZOOLOGY-CW-104	Review of published research in the relevant field	04	70+30
5.	Paper-V-ZOOLOGY-CW-105	Comprehensive Viva	04	100

Notes:

1. 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.
2. If candidate obtains 'F' or 'Ab.' grade in the 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.

Paper-I ZOOLOGY-CW-101 Research Methodology Credit-4 (70+30)

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.

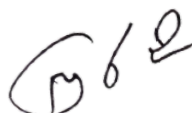
UNIT-3 Cell Biology

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.




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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 Progesterone
3. Kidney Function Test
4. Liver Function Test
5. Different surgical techniques.

Paper-II	ZOOLOGY-CW-102	Advance course in Zoology	Credit-4 (70+30)
UNIT-1	1. Restriction Endonucleases and DNA polymerases. 2. Cloning vectors : plasmids, bacteriophages, M13, PUC19, 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 metod.		
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, Mirco 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 DNA technology. 4. Component of innate and acquired immunity. 5. Kinds of environmental pollution and their control methods.		
Paper-III	ZOOLOGY-CW-103	Computer Application to the subject	Credit-4 (70+30)

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.

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- UNIT-2** **Memory:** Storage, Evaluation criteria, Main memory organization, main memory capacity, RAM, ROM, PROM, EPROM, Cache memory.
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 effect of some computer and 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 ZOOLOGY-CW-104 Review of published research in the relevant field Credit-4 (70+30)

For this paper candidates will have to review literature in an area of research, prepare a research proposal and submit a report to the University at the end of the course work. The selection of the problem and preparation of the proposal will be in consultation with research guide.

Paper-V ZOOLOGY-CW-105 Comprehensive viva voce Credit-4 (100)

Candidate will face a Comprehensive Viva-Voce of 4 credits on the subject of Research Methodology, Advance course in Zoology and literature review report submitted to the university. The Presentation will have to be made by the candidate and it will need to be prepared in consultation with research guide.

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