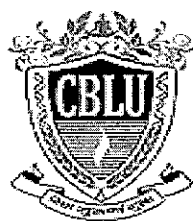


Syllabus and Evaluation Scheme

For

Ph.D. Course work



DEPARTMENT OF ZOOLOGY
CHAUDHARY BANSI LAL UNIVERSITY, BHIWANI

(A state University established by Govt. of Haryana Act No. 25 of 2014)

Session 2025-26 onwards

PGBOS&R on dated 20.05.2026

Faculty of Life Sciences on 03.06.2026



Scheme of Examination of ~~Pre~~ Ph.D (Course Work) ExaminationSummary

Programme : ~~Pre~~ Ph.D course work in Zoology
 Duration : One Semester
 Minimum Attendance Required: 75% in individual course
 Total Credits : 12
 Total Marks : 300
 Assessment/Evaluation of Theory examination
 Internal Evaluation:

Minor Test Marks	Attendance Marks	Assignment/ Quizzes Marks	Total Marks
15	5	10	30
7	4	4	15

Duration of Examination:

Minor Test	Major Test
1 hour	3 hours for 70 marks and 2 hours for 35 marks

Marks of class participation will be given as under for 05/04 marks:

Attendance criteria	Marks distribution (for 30 marks)	Marks distribution (for 15 marks)
85% and onwards	05	04
80% to less than 85%	04	03
75% to less than 80%	03	02
65% to less than 75%	02	01

Paper No.	Nomenclature	Credits	Internal Assessment marks	Final Semester Exam Marks	Total
25ZOOPh1001	Research Methodology	4	30	70	100
25ZOOPh1002	Bio Techniques	4	30	70	100
25ZOOPh1003	Review writing and presentation/ Seminar	2	15	35 + 15 2	50
25ZOOPh1004	Research and Publication Ethics	2	15	35	50
	Total	12	90	210	300

To qualify the course, a student is required to secure a minimum of 55% marks in aggregate including the internal evaluation and Major test (End semester Examination).

For details, please see the Ph.D. ordinance 2025-26 of the University

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The following courses are mandatory for a student to complete during the academic semester examinations held subsequent to the completion of the teaching of the following courses upon provisional registration of the research scholar:

- (a) One course on Research Methodology (4 Credits, 100 Marks (70 External + 30 Internal)).
- (b) One advance level course in the domain area preparing the student for the field of research (4 Credits, 100 Marks (70 External + 30 Internal)).
- (c) One course on Research and Publication Ethics (2 Credits, 50 Marks (35 External + 15 Internal)) (SOP-XXIII) Common for all departments.
- (d) Review of Literature in the area of research to be evaluated by the external examiner through a seminar/ presentation {2 Credits, 50 Marks (35 for Report + 15 for Presentation of Report)}.

Note: The research scholar can earn up to 40% credits through SWAYAM/MOOCs in consultation with concerned Chairperson of the Department and the examination of MOOCs course opted by the scholar can be conducted by this

University too on written request to concerned Chairperson of the Department.

Programme Outcomes

PO1: The Doctor of Philosophy program is designed to prepare each student to actively participate in research and teaching in the field of Zoology along with other fields of Life Sciences and in a university or a Research organization.

PO2: Several research areas of Zoology are interdisciplinary in nature and are funded by various funding agencies, giving students a flavor for both applied and basic research.

PO3: Students in this Programme acquire knowledge, critical thinking skills, and experience in conducting cutting-edge research. Students would gain proficiency in research methodology and assessment techniques in animal science.

PO4: Students with a PhD degree either pursue a post-doctoral position aiming for an academic career or find employment in industrial R&D laboratories.

PO5: The course work will equip the students to the highest level of research, integrity and train them to follow research and publication ethics while practicing science.

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CHAUDHARY BANSI LAL UNIVERSITY, BHIWANI
DEPARTMENT OF ZOOLOGY
Ph.D. (Course Work) ZOOLOGY
w.e.f. session 2025-26

Course code: 25ZOOPh1001

Course Title: Research Methodology

MM: 70

Time: 3Hr

Course Objectives:

1. The main objective of this course is to introduce the basic concepts in research methodology in Social science.
2. This course addresses the issues inherent in selecting a research problem and discuss the techniques and tools to be employed in completing a research project. This will also enable the students to prepare report writing and framing Research proposals.

Course Outcomes

- CO1:** Students should be able to identify the overall process of designing a research study from its inception to its report.
- CO2:** Students should know the primary characteristics of quantitative research and qualitative research.
- CO3:** Students should be able to identify a research problem stated in a study.
- CO4:** Students should be familiar with ethical issues in educational research, including those issues that arise in using quantitative and qualitative research.

Instructions for paper setter

There will be a total of nine questions. Question No. 1 will be compulsory and shall contain seven short answer type questions without any internal choice and it shall cover the entire syllabus. The remaining eight questions will include two questions from each unit. Candidates will be required to attempt one question from each of the four units. They will attempt five questions in all.

UNIT I

Identification and defining of the Research Problem

Meaning of research, objectives of research, types of research, significance of research, research methods vs methodology, Familiarization of research areas; Reading and interpretation of research papers, Critical analyses of research problems, literature survey/review of Literature (Data collection, data interpretation); Research design and related concept, Sampling, Patent search, related topics.

UNIT II

Experimental Approaches and Methodology

Definition, necessity and techniques of defining research problem, Formulation of research problem, Objectives of research problem, designing of hypothesis, features of good research design, Types of Research Designs, Research process and its components, Basic Principles of Experimental Designs, Design of experiments, Census and Sample surveys, Different types of sample designs, Characteristics of good sample design, Techniques of selecting a random sample/randomized control trial.

UNIT III

Ethics and Safety in Biological Research

Guidelines for Biosafety and Bioethics; Institutional Biosafety Committee – Handling of Genetically modified organisms, Ethical Committee - compliance, concerns and approval; Safety practices and disposal of Bio-waste in the laboratory; Radioactivity and safety precautions; Handling and disposal of flammable and hazardous chemicals. **Ethics in Science** -- Copyright, Royalty, Intellectual property rights and Patent laws, Reproduction of published material, Plagiarism, Citation and acknowledgements, Reproducibility and accountability, Conflict of Interest, related topics.

UNIT IV

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Presentation and Publication Skills

Skills for scientific writing and research presentation – Term paper, Research project, Research report, Thesis, Research article and Review; Use of electronic tools for bibliographic formatting and checking Plagiarism; Oral presentation skills;

Books Recommended:

- Research Methodology- C.R. Kothari
- Research Methodology- G.R. Basotia and K.K. Sharma.
- Research Methodology- C.H. Chaudhary, RBSA Publication

Teaching-Learning Process

- Lectures : Supported by power point presentations and related videos
- Assignments and exercises
- Test: Knowledge of the students is tested through classroom discussion, surprise tests, quiz & session tests.

Course mapping

	PO1	PO2	PO3	PO4	PO5
CO1	√	√	√	√	×
CO2	√	×	√	√	×
CO3	√	√	√	√	×
CO4	×	×	×	√	√

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CHAUDHARY BANSI LAL UNIVERSITY, BHIWANI
DEPARTMENT OF ZOOLOGY
Ph.D. (Course Work) ZOOLOGY
w.e.f. session 2025-26

Course code: 25ZOOPh1002

Course Title: Bio techniques

MM: 70

Time: 3Hr

Course objectives

1. This course will impart the advanced knowledge of fundamental research techniques which are essential for performing the research in zoology.
2. On completion of course, students will be able to understand the use of basic microbiological, molecular and analytical methods, which are extensively used in biological experiments.

Course Outcomes

- CO1:** Students would be able to develop basic appreciation of the underlying principles and practical strategy of the analytical and preparative techniques that are fundamental to study and understanding of life processes
- CO2:** Students would be able to develop basic concepts and practical aspects of various kinds of Microscopy, Spectroscopy and separation techniques.
- CO3:** Students would be able to understand the concept of radioisotope techniques, molecular biology techniques and their applications in research.
- CO4:** Students would be able to understand the concept DNA recombination and their applications in research.

Note: There shall be nine questions in all. Question no. I shall be compulsory, consisting of seven short answer type questions covering the entire syllabus. Two questions will be asked from each unit. Student will have to attempt one question from each unit. Each shall equal marks. The evaluation will be carried internally by the department.

Unit-I

Scope in genetic engineering techniques, Basic cloning method: Cloning vectors, steps involved in gene cloning, Restriction endonucleases: R-M system, nomenclature of RE, Types and recognition, cleavage sites and application of endonucleases. Nucleic Acid Purification, cDNA Synthesis, agarose gel electrophoresis, PCR (DNA Amplification, primer designing and its Applications),

Unit-II

Gene Cloning Vectors: Plasmids, lambda bacteriophage, yeast cloning vector, Artificial chromosome (YAC, BAC), Microscopy (SEM, TEM, confocal microscope, atomic force), spectrophotometry techniques.

Unit-III

Nucleic Acid Sequencing (Chain termination, chemical degradation, automated, pyrosequencing), Nucleic acid blotting and hybridization (Southern, Northern and dot blot hybridizations), Introduction to Microarray, molecular markers: RFLP, RAPD, AFLP, SNP

Unit-IV

Recombinant proteins: Purification of proteins and folding, characterization and stabilization, Protein analysis: SDS page and Western blotting, T-DNA and Transposon Tagging, Gene therapy, Gene knockout and gene silencing.

Suggest Readings:

1. Genetic Engineering: Rastogi and Pathak, Oxford University Press.
2. Metzenberg, Stan, Working with DNA, Oxford: Taylor and Francis,
3. Brown, T.A, Gene Cloning and DNA Analysis: An Introduction, United Kingdom: Wiley-Blackwell.
4. Sambrook J., MacCallum P, and David rusell, Molecular Cloning: A laboratory Manual (3rd edition, three-book set), New York, USS: CSHL, Press.
5. principals of gene manipulation & genomics: VIIth edition

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Teaching-Learning Process

- Lectures : Supported by power point presentations and related videos
- Assignments and exercises
- Test: Knowledge of the students is tested through classroom discussion, surprise tests, quiz & session tests.

Course mapping

	PO1	PO2	PO3	PO4	PO5
CO1	√	×	√	√	×
CO2	×	×	√	√	×
CO3	×	×	√	√	×
CO4	√	×	√	√	×

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CHAUDHARY BANSI LAL UNIVERSITY, BHIWANI
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Ph.D. (Course Work) ZOOLOGY
w.e.f. session 2025-2026

Course code: 25ZOOPh1003

Course Title: Review writing and Presentation/Seminar

MM: 35

Time: 2Hr

Course Outcomes

- CO1:** Students would be able to search the literature systematically
CO2: Students would be able to formulate a research question.
CO3: Students would be able to demonstrate a scientific attitude.
CO4: Students would be able to manage your own learning process.

Evaluation of the course:

Review of Literature in the area of research to be evaluated by the external examiner through a seminar/ presentation (2 Credits, 50 Marks (35 for Report + 15 for Presentation of Report).

Teaching-Learning Process

- Through seminar.

Course mapping

	PO1	PO2	PO3	PO4	PO5
CO1	√	√	√	√	×
CO2	×	×	√	×	×
CO3	√	×	√	√	√
CO4	×	×	√	√	×

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CHAUDHARY BANSI LAL UNIVERSITY, BHIWANI

DEPARTMENT OF ZOOLOGY
Ph.D. (Course Work) ZOOLOGY

w.e.f. session 2025-26

Course code: 25ZOOPh1004

Course Title: Research and Publication Ethics

MM: 50

Time: 2Hr

End Semester Examination -35

Internal Assessment-15

Course Objectives

This course is aimed to provide understanding of ethical issues related to Research and Publication, Patents and rights, IPR – Intellectual Property Rights. Also students will learn how to write research papers/thesis following publication ethics, related issues. Also students will know how to publish ethically and ways for avoiding plagiarism.

Course Outcomes

- CO1:** Students would be able to know the ethics and scientific conduct while publishing.
- CO2:** Students would be able to develop understanding of publication ethics and publications misconduct.
- CO3:** Students will know about various softwares used for plagiarism checking.
- CO4:** Students would be able to understand the citation databases and indexing.

Note: There shall be nine questions in all. Question no. 1 shall be compulsory, consisting of seven short answer type questions covering the entire syllabus. Two questions will be asked from each unit. Student will have to attempt one question from each unit. Each question shall carry equal marks.

Unit-I

Introduction to Philosophy: Definition, nature, and scope, concept, branches.

Ethics: definition, moral philosophy, nature of moral judgements and reactions.

Scientific Conduct: Ethics with respect to science and research, Intellectual honesty and research integrity, Scientific misconducts: Falsification, Fabrication, and Plagiarism (FFP), **Redundant publications:** duplicate and overlapping publications, salami slicing, Selective reporting and misrepresentation of data.

Unit-II

Publication Ethics: Definition, introduction, and importance.

Best practices/ standards setting initiatives and guidelines: COPE, WAME, etc.

Conflicts of interest

Publication misconduct: Definition, concept, problems that lead to unethical behavior and vice-versa, types. Violation of publication ethics, authorship and contributorship. Identification of publication misconduct, complaints and appeals. Predatory publishers and journals.

Open access publication and initiatives.

SHERPA/ ROMEO online resource to check publisher copyright & self-archiving policies.

Unit-III

Software tool to identify predatory publications developed by SPPU.

Journal finder/ journal suggestion tools viz. JANE, Elsevier Journal Finder, Springer Journal Suggested, etc.

Use of plagiarism software like Turnition, Urkund and other open software tools.

Unit-IV

Indexing databases

Citation databases: Web of Science, Scopus, etc.

Impact Factor of Journal as per Journal Citation Report, SNIP, SJR, IPP, Cite Score.

Metrics: h-index, g-index, i10 index, altimetry's.

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Books suggested:

1. Bird, A. (2006). Philosophy of Science. Routledge.
2. MacIntyre, Alasdair (1967) A Short History of Ethics. London.
3. P. Chaddah, (2018) Ethics in Competitive Research: Do not get scooped; do not get plagiarized, ISBN:978-9387480865
4. National Academy of Sciences, National Academy of Engineering and Institute of Medicine. (2009). On Being a Scientist: A Guide to Responsible Conduct in Research: Third Edition, National Academies Press.
5. Resnik, D.B. (2011). What is ethics in research & why is it important. National Institute of Environmental Health Sciences, 1-10.
6. Beall, J.(2012). Predatory publishers are corrupting open access. Nature, 489(7415), 176-179

Teaching-Learning Process

- Lectures : Supported by power point presentations and related videos
- Assignments and exercises
- Test: Knowledge of the students is tested through classroom discussion, surprise tests, quiz & session tests.

Course mapping

	PO1	PO2	PO3	PO4	PO5
CO1	√	×	√	√	√
CO2	√	×	√	√	√
CO3	×	×	×	×	√
CO4	√	√	√	√	√

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