

**RAMAKRISHNA MISSION VIVEKANANDA CENTENARY COLLEGE**

**RAHARA, KOLKATA-700118**



**DEPARTMENT OF ZOOLOGY**

**SESSION 2020-21**

**Syllabus of Coursework for Ph. D. in Zoology**

The course of Ph.D. Zoology is modified under CBCS syllabus, 2020-2021  
vide BOS resolution dated 29<sup>th</sup> November, 2020

Total Change= 100%

*Pradyot Kumar Medda*

ASSOCIATE PROFESSOR  
AND HEAD  
Dept. of Zoology  
R. K. Mission V.C. College  
Rahara, Kol-700118

## PROGRAM OUTCOMES

After completion of the Ph.D. Degree program, the students will be able to

PO No.	Program Outcomes	Cognitive Level
PO 1	Understands and apply theories, methodologies, and knowledge to address fundamental questions in their primary area of study.	U, Ap
PO 2	Demonstrate the gained knowledge and skills in oral and written and hence communicate them to publish and present work in their field.	E, C
PO 3	Develop a mastery of analysing skills and knowledge at a level required for college and university undergraduate teaching in their discipline and assessment of student learning.	An
PO 4	Develop the intellectual independence that epitomizes true scholarship and Pursue research of significance in the discipline under the guidance of an advisor.	C

R= remembering, U = understanding, Ap = applying, An = analysing, E = evaluating, and C = creating

## PROGRAMME SPECIFIC OUTCOMES

After the successful completion of this course, the student will be able to:

PSO No.	Program Specific Outcomes	Cognitive Level
PSO1	Participate in research in the field of Zoology along with other fields of Life Sciences.	Ap
PSO2	Understand, apply and evaluate advanced experimental and theoretical techniques in animal science.	U, Ap, E
PSO3	Develop proficiency in research methodology, critical thinking skills and conduct cutting-edge research.	An, C
PSO4	Ability to conduct independent research to get post-doctoral position aiming for an academic career or find employment in industrial R&D laboratories.	C

R= remembering, U = understanding, Ap = applying, An = analysing, E = evaluating, and C = creating

*Pradyot Kumar Medda* Page  
ASSOCIATE PROFESSOR  
AND HEAD  
Dept. of Zoology  
R. K. Mission V.C. College  
Rahara, Kol-700118

Credit Distribution across the Course			
Course Type	Total Papers	Credit	Total Credit
Common	3	3×4	12
Special	1	1×4	4
Total			16
List of Common Courses			
Code	Course	Credit	
PHDZOO 01	Research Methodology	4	
PHDZOO 02	Computer Applications	4	
PHDZOO 03	Literature review	4	
Special			
PHDZOO 04	Tools and techniques in molecular biology and biochemistry	4	
PHDZOO 05	Pharmacology and Toxicology	4	
PHDZOO 06	Anti-Microbial Defence	4	
PHDZOO 07	Ecology, Environment and animal behaviour	4	
PHDZOO 08	Bioinformatics and computational Biology	4	

Pradyot Kumar Medda 21 Page  
 ASSOCIATE PROFESSOR  
 AND HEAD  
 Dept. of Zoology  
 R. K. Mission V.C. College  
 Rahara, Kol-700118



SEMESTER – I	
Course name	Research Methodology
Course code	PHDZOO 01
Number of lectures	60
Credits	4
Marks	100

**Course Objectives:**

After completion of this course the student will be able to

Sl. No.	Course Objectives:
1:	Develop the ability to choose methods appropriate to research aims and objectives.
2:	Understand the advantages and disadvantages of particular research method.
3:	Develop skill of critical thinking and the skill of qualitative and quantitative data analysis and presentation.
4:	Prepare students for organizing and conducting research in a more appropriate manner

**Course Content: Research Methodology**

**Unit 1: Research Formulation:** Objectives and motivation of Research –Research Methodology vs methods. Types of research– Descriptive, Analytical, Applied, Fundamental, Quantitative, Qualitative, Conceptual, Empirical etc.; Approaches to Research: Preparation of Schedule, Case study approach, Comparison approach, Definition approach, Descriptive approach, Evaluative approach, Exploratory approach, Interpretive approach, Narrative approach, Persuasive approach, Policy memorandum approach. Definition and formulation of the research problem – Selection of the problem - Necessity of defining the problem - Importance of literature review in defining a problem–Literature review–Primary and secondary sources–reviews, treatise, monographs–patents–webasource–searching the web–Critical literature review–Development of working hypothesis. [12 hours]

**Unit- II: Data Collection and analysis:** Execution of the research–Observation and Collection of data - Methods of data collection –Sampling Methods- Data Processing and Analysis strategies – Data Analysis with Statistical Packages–Hypothesis-testing–Generalization and Interpretation. [12 hours]

3 | Page  
*Pradyot Kumar Medda*  
 ASSOCIATE PROFESSOR  
 AND HEAD  
 Dept. of Zoology  
 R. K. Mission V.C. College  
 Rahara, Kol-700118

**Unit III: Reporting and thesis writing:** Structure and components of scientific reports - Types of report – Technical reports and thesis –Significance – Different steps in the preparation – Layout, structure and Language of typical reports–Illustrations and tables– Bibliography, referencing and footnotes. **12 hours**

**Unit IV: Application of results and ethics:**

Environmental impacts – Ethical issues - ethical committees: Guidelines for Bio-safety, functioning of Institutional Bio-safety committee, Institutional Animal ethics committee, and Institutional ethical committee , CPCSEA guidelines for animal experimentation, ICMR guidelines for experiments involving humans, DBT guidelines for Biosafety practices to be followed **5 hours**

Intellectual property rights (IPR): kinds of property, nature of IP, basic principle, major IP, moral rights & economic rights; Copy right, patent, industrial design, trade mark, geographical indication, farmers' right, IPR licensing & technology transfer; Reproduction of published material- plagiarism, citation and acknowledgement. Reproducibility of IP and accountability. **7 hours**

**Unit V: Presentation of Results:** Poster presentation, Oral presentation, Software related to presentation, layout and structure. Oral presentation–Planning–Preparation–Practice–Making presentation–Use of visual aids–Importance of effective Communication. Writing an Abstract: Importance, Types: Critical Abstract; Descriptive Abstract; Informative Abstract; Highlight Abstract; Writing Style. Writing Introduction: Background Information, Research Questions, Theoretical Framework. Writing a Case Study: Identifying a Case, Structure and writing style, Limitations. Writing a Field Report: Objects to observe, Obtaining consent, Field Notes, Techniques to Record Observation. Writing an Executive Summary; Policy Memo Writing a Book Review: Descriptive; Critical. Proof Reading: Strategies to identify errors; use of computer checking, common grammatical errors. Group Projects: Goals, Planning, Preparation and Implementation. **12 hours**

**Course Outcomes**

On successful completion of the course students will be able to:

CO. No.	Course Outcome	Cognitive Level	POs Addressed	PSOs Addressed
CO1	Understand the objectives, motivation and types of research	U	PO1	PSO2
CO2	Define and formulate a research problem	R, C	PO4	PSO1

*Pradyot Kumar Medda*<sup>4</sup> | Page  
 ASSOCIATE PROFESSOR  
 AND HEAD  
 Dept. of Zoology  
 R. K. Mission V.C. College  
 Rahara, Kol-700118

CO3	Collect data (primary or secondary) based on the formulated problem and analyse the data.	An	PO2	PSO3
CO4	Analyse the data with hypothesis testing, generalization and interpretation.	An, C	PO3	PSO4
CO5	Discuss the application of results and write the thesis.	Ap, E	PO3	PSO4

R= remembering, U = understanding, Ap = applying, An = analysing, E = evaluating, and C = creating

Pradyot Kumar Medda<sup>51 page</sup>  
 ASSOCIATE PROFESSOR  
 AND HEAD  
 Dept. of Zoology  
 R. K. Mission V.C. College  
 Rahara, Kol-700118



SEMESTER – I	
Course name	Computer Applications
Course code	PHDZOO 02
Number of lectures	60
Credits	4
Marks	100

### Course Objectives:

After completion of this course the student will be able

Sl. No.	Course Objectives:
1:	To develop competency in technical writing.
2:	To master the fundamentals of writing LaTeX and Python scripts.
3:	To acquire Object Oriented Skills in Python.
4:	To develop the skill of designing Graphical user Interfaces in Python and LaTeX.
5:	To develop the ability to write database applications in Python.

### Course Content

**Unit-I: LaTeX:** Introduction to LaTeX, Installation of LaTeX, Layout Design, LaTeX input files, Input file structure, document classes, packages, environments, page styles, Type setting texts, Fancy Header, tables. In line math formulas and displayed equations, Math symbol sand fonts, Delimiters, matrices, arrays, Typesetting Mathematical formulae: fractions, Integrals, sums, products, etc. Producing Mathematical Graphics. Document classes for paper writing, thesis, books, etc. Table of contents, index, bibliography management, hypertext, pdf pages, geometry, fancy header and footer, Verbatim, itemize, enumerate, boxes, equation number. Beamer class, beamer theme, frames, slides, pause, overlay, transparent, hand outsand presentation mode. **30 hours**

**Unit-II: Python:** Introduction to Python, Installation of Python, Basic elements of the language, Looping and Branching: If, select, for, break, continue, Functions, return, Contour plots, tiles, axes, legends. Matrices: Creating matrices, sum, product of matrices, inverse, rank determinant, comparing matrices, system of equations, High level linear algebra features, working with polynomials, plotting 2D and 3D graphs, defining a function and output arguments. Python Demonstrations: Polynomials, discrete and continuous Random variables, Tcl/tk, spreadsheet, GUI: unicontrols, with latex. Basic functions, animation,

6 | Page  
*Pradyot Kumar Medda*  
 ASSOCIATE PROFESSOR  
 AND HEAD  
 Dept. of Zoology  
 R. K. Mission V.C. College  
 Rahara, Kol-700118

finite elements, Bezier curve and surfaces, matplotlib, complex elementary functions. Python help browser for mathematics. Parametricplots, Polarplots, Matrix Operations, Matrix inversions, Solving system of equations. Evaluation of definite integrals, Generating prime numbers, Illustration of Rolle's and Mean value theorems. **30 hours**

### Course Outcomes (PHDMATH02)

On successful completion of the course students will be able to:

CO. No.	Course Outcome	Cognitive Level	POs Addressed	PSOs Addressed
CO1	Explain and use TeX and LaTeX.	An	PO2	PSO1
CO2	Understand the advantages of LaTeX over other more traditional software's.	U	PO1	PSO2
CO3	Prepare handouts and presentations using LaTeX.	C	PO4	PSO3
CO4	Understand the core Python scripting elements such as variables and flow control structures.	U, Ap	PO1	PSO3
CO5	Use Python to read, write, demonstrations files.	E, C	PO3	PSO4

R= remembering, U = understanding, Ap = applying, An = analysing, E = evaluating, and C = creating

7 | Page  
*Pradyot Kumar Medda*  
 ASSOCIATE PROFESSOR  
 AND HEAD  
 Dept. of Zoology  
 R. K. Mission V.C. College  
 Rahara, Kol-700118



SEMESTER – I	
Course name	Literature review
Course code	PHDZOO 03
Number of lectures	60
Credits	4
Marks	100

### Course Objectives:

After completion of this course the student will be able

Sl. No.	Course Objectives:
1:	To learn to review and assess scientific literature critically.
2:	To write and present an overview of the relevant literature for a specific research topic.
3:	To develop knowledge, insight, and academic skills.
4:	To develop transferable skills & interpersonal skills.

### Course Content

#### Unit 1: Searching of Literature

5 hours

- Formulation of key questions for a literature review.
- Identification of literature through generating a definite search string using relevant keywords.
- How to use Publication Databases: Web of Science, Scopus, PubMed, Google Scholar

#### Unit 2: Quantitative Evaluation of Literature

5 hours

- Quantification of the research performance and research trends analysis.
- Identification of important bibliometric parameters namely Countries, Organizations, Authors, Research areas, funding agencies.
- Identification of important Journals for designing and communicating the research.

#### Unit3: Qualitative Evaluation of Literature

5 hours

- Citation analysis: Average citation, h-index, G-index, i-10 index, self-citation, citation half-life.
- Mapping of science: Collaboration, Co-citation, co-occurrence network map analysis.
- Journal's impact: Impact factor, 5-year impact factor, Ranking, JCR and SNIP.

8 | Page

*Pradyot Kumar Medda*  
 ASSOCIATE PROFESSOR  
 AND HEAD  
 Dept. of Zoology  
 R. K. Mission V.C. College  
 Rahara, Kol-700118

- Patent citation analysis.

**Unit 4: Content Analysis**

**7 hours**

- Identification of “Trending Issues” of a particular research topic.
- Analysis of thematic evolving trends of a particular research field to identify “Emerging themes”.
- Applications of various bibliometric software: Sci2, SciMat, Bibliometrix, VOSviewer.
- Basic introduction about meta data analysis.

**Unit 5: How to Write a Review Literature**

**8 hours**

- Types of literature review: Critical Review, Systematic Review and Computational Review.
- Identification of the most important works, trends and debates within a certain field.
- Evaluation and presentation of the important research findings in a systematic way.

**Unit 6: Assignments**

**30 hours**

- Independently defining, designing and writing of a literature review.

**Course Outcomes**

On successful completion of the course students will be able to:

CO. No.	Course Outcome	Cognitive Level	POs Addressed	PSOs Addressed
CO1	Identify and retrieve relevant publications within a field of research and write a literature review by searching the literature systematically.	An, E	PO2	PSO1
CO2	Select representative scientific sources from several perspectives relevant to the assignment.	E	PO2	PSO2
CO3	Write a research proposal for obtaining Financial assistance from national funding agencies.	C	PO4	PSO4
CO4	Draw conclusions related to the research problem and give recommendations towards new research opportunities.	C	PO4	PSO3
CO 5	Represent and systematically structure a discussion on the theories and experimental results and define, design and write a literature review independently	An, C	PO3	PSO3

R= remembering, U = understanding, Ap = applying, An = analysing, E = evaluating, and C = creating

SEMESTER – I	
Course name	Tools and techniques in molecular biology and biochemistry
Course code	PHDZOO 04
Number of lectures	60
Credits	4
Marks	100

**Course Objectives:**

After completion of this course the student will be able

Sl. No.	Course Objectives:
1:	To develop competency in molecular biology techniques
2:	To apply techniques in biomolecules purification and characterisation
3:	To acquire knowledge in microscopic and histochemistry techniques
4:	To develop the ability in designing and conducting molecular biology and genetic engineering experiments.

**Course Content: Tools and techniques in molecular biology and biochemistry**

**Unit I: Tools and techniques:** Biochemical and Biophysical techniques, Microscopic techniques, Histology and histochemistry, Cell biology, molecular biology, Genetic engineering techniques 10 lectures

**Unit II: Techniques used for purification and characterization of biomolecules:** Centrifugation, Ultrafiltration, Chromatography, electrophoresis, spectrophotometry, GC-MS, LCMS, NMR, MALDITOF, X-ray crystallography, CD 10 lectures

**Unit III: Microscopic techniques:** Fluorescence microscopy, Confocal microscopy, atomic force microscopy and live cell imaging FACS analysis. 10 lectures

**Unit IV: Histology and histochemistry:** Fixation and sectioning of tissue, embryos and cells. Immunohistochemistry, immunofluorescence, histochemical staining for characterization of cell type. 10 lectures

**Unit V: Molecular biology techniques:** Real time PCR, DNA microarray, cloning and sequencing, Next generation DNA sequencing, Protein Microarray, protein sequencing, FRET analysis, Comparative Genomics, Global expression profiling - whole genome analysis of mRNA, 10 lectures

**Unit VI: Advances in Molecular Biology and Genetic Engineering:**



Gene therapy: Introduction, vectors in gene therapy, advances in gene therapy, safety assurances, DNA analysis and diagnostics: Methods of DNA analysis, Diagnosing infectious diseases, Identifying genetic disease Transgenic animals: custom made animals, Animal bioreactors, Medical forensics: DNA fingerprinting, - genetic identification, Use of technology in anthropological studies, Pharmaceutical products of DNA technology: Human protein replacements, Human therapies, Vaccines- traditional vaccines and DNA vaccines

10 lectures

**Course Outcomes(PHDZOO 04)**

On successful completion of the course students will be able to:

CO. No.	Course Outcome	Cognitive Level	POs Addressed	PSOs Addressed
CO1	Develop competency in molecular biology techniques	Ap	PO1	PSO1, 3
CO2	Demonstrate and apply techniques in biomolecules purification and characterisation	U	PO2	PSO2
CO3	Apply and analyse microscopic and histochemistry techniques	Ap, E	PO3	PSO3
CO4	Design research experiments in molecular biology and genetic engineering.	C	PO4	PSO3
CO5	Conducting molecular biology and genetic engineering experiments.	C	PO4	PSO4

SEMESTER – I	
Course name	Pharmacology and Toxicology
Course code	PHDZOO 05
Number of lectures	60
Credits	4
Marks	100

### Course Objectives:

After completion of this course the student will be able

Sl. No.	Course Objectives:
1:	To understand the scopes and techniques in Pharmacology and Toxicology.
2:	To demonstrate and evaluate the mechanism of Drug actions.
3:	To acquire knowledge on Pharmacogenomics.
4:	To develop the skill of designing experiments in Pharmacology and Toxicology.
5:	To develop the ability to conduct experiments in Pharmacology and Toxicology.

### Pharmacology and Toxicology

1. Scopes of Pharmacology – branches of pharmacology, sources of drugs, classification of drugs
2. Routes of Drug Administration – types of routes, their advantages and disadvantages
3. Absorption, Distribution, Metabolism and Elimination of Drugs – process of absorption. Factors influencing absorption, fates of absorbed drug.
4. Mechanism of Drug actions and factors modifying Drug action – types and mechanism of drug action, factors influencing drug action
5. Principles of Drug interactions – importance, advantages and disadvantages
6. Pharmacogenomics – genetic polymorphism, roles of genes in diseases and drug response
7. Scopes of Toxicology – importance, classes of toxicants
8. Toxicant processing – absorption, distribution, kinetics and dynamics
9. Toxicant metabolism – Phase I and Phase II reactions
10. Toxicity studies – symptoms and diagnosis of toxicity, effects of drug toxicity

### Course Outcomes(PHDZOO 05)

On successful completion of the course students will be able to:

CO. No.	Course Outcome	Cognitive Level	POs Addressed	PSOs Addressed
CO1	Demonstrate and apply the scopes and techniques in Pharmacology and Toxicology.	U, Ap	PO1	PSO1, 2
CO2	Evaluate the mechanism of Drug actions.	E	PO2	PSO2
CO3	Demonstrate and analyse the pharmacogenomics.	U, An	PO3	PSO3
CO 4	Develop the skill of designing experiments in Pharmacology and Toxicology.	C	PO4	PSO4
CO 5	conduct experiments in Pharmacology and Toxicology.	C	PO4	PSO4



SEMESTER – I	
Course name	Anti-Microbial Defence
Course code	PHDZOO 06
Number of lectures	60
Credits	4
Marks	100

**Course Objectives:**

After completion of this course the student will be able

Sl. No.	Course Objectives:
1:	To understand about the microbial pathogens and Anti-microbial defence.
2:	To demonstrate and evaluate the role of natural compounds against microbes.
3:	To acquire knowledge about the Chemotherapeutic agents.
4:	To develop the skill of designing experiments to evaluate the impact of antimicrobial compounds.
5:	To develop the ability to conduct experiments to evaluate the impact of antimicrobial compounds.

**Anti-Microbial Defence (PHDZOO 06)**

1. Microbial pathogens – common and important types,
2. Evolution of Anti-microbial defense – tolerance, resistance
3. Natural compounds against microbes
4. Anti-microbials by microbes – role of alpha selection
5. Anti-microbial peptides – classes and mechanism of actions
6. Chemotherapeutic agents against virus – types and mode of actions
7. Chemotherapeutic agents against bacteria – types and mode of actions
8. Chemotherapeutic agents against fungi – types and mode of actions
9. Chemotherapeutic agents against protozoa – types and mode of actions
10. Chemotherapeutic agents against helminths – types and mode of actions

**Course Outcomes(PHDMATH04)**

On successful completion of the course students will be able to:

CO. No.	Course Outcome	Cognitive Level	POs Addressed	PSOs Addressed
CO1	Demonstrate the microbial pathogens and Anti-microbial defence.	U	PO1	PSO2
CO2	Analyse and evaluate the role of natural compounds against microbes.	An, E	PO3, 2	PSO3, 2
CO3	Demonstrate and apply the acquire knowledge about the Chemotherapeutic agents.	U, Ap	PO1	PSO1, 2
CO 4	Develop the skill of designing experiments to evaluate the impact of antimicrobial compounds.	C	PO4	PSO4
CO 5	Ddevelop the ability to conduct experiments to evaluate the impact of antimicrobial compounds.	C	PO4	PSO4

15 | Page  
*Pradyot Kumar Medda*  
 ASSOCIATE PROFESSOR  
 AND HEAD  
 Dept. of Zoology  
 R. K. Mission V.C. College  
 Rahara, Kol-700118

SEMESTER – I	
Course name	Ecology, Environment and animal behaviour
Course code	PHDZOO 07
Number of lectures	60
Credits	4
Marks	100

**Course Objectives:**

After completion of this course the student will be able

Sl. No.	Course Objectives:
1:	To understand about the biodiversity and genetic diversity.
2:	To demonstrate and evaluate the biodiversity through molecular and computational approach.
3:	To acquire knowledge about the field studies and to apply various tools and techniques in biodiversity study.
4:	To develop the skill of designing field-based experiments to evaluate the environmental impact on biodiversity.
5:	To develop the ability to conduct experiments to evaluate the ecological and environmental impact on biodiversity.

**Ecology, Environment and animal behavior**

**Unit 1:** Biodiversity, genetic diversity, molecular diversity and taxonomy, DNA bar-coding, population genetics, conservation of diversity and endangered species. Evolution, Modern tools of Taxonomy (alpha, beta and gamma level taxonomy), Application of molecular and computational tools for phylogeny, Effects of man-made alteration on biosphere (20 L)

**Unit 2:** Field studies: Assessment of biodiversity in different types of ecosystems, sampling techniques and quantitative methods for biodiversity assessment, Study on Biodiversity by Shannon-Weiner Index and Simpson's Index study, Wetland vegetation sampling and mapping, Meteorological tools in environmental and agricultural science, Methods to study soil and aquatic fauna, Counting of forest animals and conservation techniques. (10 L)

**Unit 3:** Animal behavior: Questions and patterns of behavior, genetic and neural basis of behavior, biological rhythms, Exploitation of resources, communication, social behavior,



mate selection and parent caring

(10 L)

**Unit 4:** Methods of sampling animals, Methods of determining population characteristics, Methods of determining biological function of animals, Methods of determining ecological function of animals.

(10 L)

**Course Outcomes (PHDZOO 07)**

On successful completion of the course students will be able to:

CO. No.	Course Outcome	Cognitive Level	POs Addressed	PSOs Addressed
CO1	Demonstrate the biodiversity and genetic diversity.	U	PO1	PSO2
CO2	Demonstrate and analyse the biodiversity through molecular and computational approach.	U, E	PO2, 3	PSO2, 3
CO3	Apply the acquired knowledge about the field studies and evaluate various tools and techniques in biodiversity study.	Ap, E	PO1, 2	PSO1
CO 4	Develop the skill of designing field-based experiments to evaluate the environmental impact on biodiversity.	C	PO4	PSO4
CO 5	Develop the ability to conduct experiments to evaluate the ecological and environmental impact on biodiversity.	C	PO4	PSO4

SEMESTER – I	
Course name	Bioinformatics and computational Biology
Course code	PHDZOO 08
Number of lectures	60
Credits	4
Marks	100

#### Course Objectives:

After completion of this course the student will be able

Sl. No.	Course Objectives:
1:	To understand about the bioinformatics and its applications.
2:	To demonstrate and evaluate various tools in bioinformatics.
3:	To acquire knowledge about the genome analysis, gene mapping, gene identification, prediction and protein structure prediction.
4:	To develop the skill of designing computational-based experiments.
5:	To develop the ability to conduct computational-based experiments.

#### Bioinformatics (PHDZOO 08)

1. Bioinformatics – application, major database, data operations along with the bioinformatics tools, molecules participating in information flow and the functional sites.
2. Information search and data retrieval – tools for web search, Entrez database and their description, data mining of biological databases.
3. Genome analysis and gene mapping – sequence assembly problem, restriction fragment length polymorphism, variable number tandem repeats, sequence tagged sites.
4. Tools for similarity search and sequence alignment – role of FASTA and BLAST.
5. Profiles and Hidden Markov models – using profiles.
6. Gene identification and prediction – methods and tools, clustering gene expression profiles.
7. Protein structure visualization – database and tools, domain architecture databases,
8. Computational methods for pathways and system biology.
9. Computer aided drug design – approaches, methods, ADME-Tox, property prediction.

#### Course Outcomes

On successful completion of the course students will be able to:

CO. No.	Course Outcome	Cognitive Level	POs Addressed	PSOs Addressed
CO1	Demonstrate the bioinformatics and its applications.	U	PO1	PSO2
CO2	Demonstrate and evaluate various tools in bioinformatics.	U, E	PO1, 2	PSO2
CO3	Apply and analyse the genome sequence, gene mapping, gene identification, prediction and protein structure prediction.	Ap, An	PO1, 3	PSO1, 3
CO 4	To develop the skill of designing computational-based experiments.	C	PO4	PSO4
CO 5	To develop the ability to conduct computational-based experiments.	C	PO4	PSO4

19 | Page  
*Pradyot Kumar Medda*  
 ASSOCIATE PROFESSOR  
 AND HEAD  
 Dept. of Zoology  
 R. K. Mission V.C. College  
 Rahara, Kol-700118