PONDICHERRY UNIVERSITY
SCHOOL OF LIFE SCIENCES

DEPARTMENT OF BIOCHEMISTRY &
MOLECULAR BIOLOGY

COURSE OF STUDIES FOR Ph.D.
PROGRAMME
In
Biochemistry & Molecular Biology

2019-20 onwards
Pre-PhD Curriculum:

The Pre-PhD Curriculum has three components/papers, each bearing Four Credits.

Of these the papers, BCMB-601 – Research Methodology and BCMB - 602 – Biochemical and Molecular Techniques, are compulsory for all students registering for PhD in Biochemistry and Molecular Biology.


**Paper –II – BCMB – 602 – Biochemical and Molecular Techniques** - The syllabus will be recommended by the departmental members of the Board of Studies and will cover the basic and advanced techniques essential for conducting research in Biochemistry and Molecular Biology.

**Paper –III – Guide Paper** – A distinct theory paper specific for each student based on their respective PhD research problem that will address the necessary theoretical background and methodologies as essential for comprehensive assessment of knowledge of the research scholar in their respective research domain.
BCMB 601 - RESEARCH METHODOLOGY

4 Credits

COURSE OBJECTIVES:
To understand the fundamentals of designing a scientific problem and experiments to answer the same.
To demonstrate the ability to analyze, present and interpret scientific data to draw accurate and appropriate conclusions and identify implications and future directions of the research.
To know good laboratory practices, ethical issues in research, intellectual property rights, patents and patentability.

UNIT I: Foundations of Research: 11h

UNIT II: Experimental Design: 10h

UNIT III: Concepts of Statistical Methods: 12h
Population, Sample, Sampling Frame, Sampling Error, Sample Size, Non Response - Characteristics of a good sample - Probability Sample – Simple Random Sample, Systematic Sample, Stratified Random Sample & Multi-stage sampling. Determining size of the sample – Practical considerations in sampling and sample size- Data Preparation – Univariate analysis (frequency tables, bar charts, pie charts, percentages), Bivariate analysis – Cross tabulations and Chi-square test including testing hypothesis of association - p-value, ANOVA (analysis of variance), cluster analysis – SPSS.

UNIT IV: Interpretation of Data and Presentation skills: 10h

UNIT V: Good Laboratory Practices, Ethical Issues & IPR: 12h
Good Laboratory Practices – Data management in laboratory – Regulations for recombinant DNA and toxic compounds research - safety and bio- and radio- hazards, disposal of biological and chemical waste, Accuracy of liquid transfer, Preparation of reagents, chemicals and buffers, Handling of sophisticated instruments- Animal handling and ethics, Maintenance of animals, Various routes of injections and sample collection, CPCSEA guidelines; Institutional ethics and safety committees,
Ethical consideration in research on human beings, Regulation of clinical trials and transfer of biological samples - Copyright, Royalty, Intellectual property rights and Patent laws, Reproduction of published material, Ethical issues related to publishing, Plagiarism and Self-Plagiarism, Citation and acknowledgements, Reproducibility and accountability, Conflict of Interest - IPR-related issues, trademarks, copy rights, patents, geographical indicators.

References:

Suggested reading:
1. Ministry of Environment, Forest and Climate Change, Govt. of India (2018) Compendium of CPCSEA.

COURSE OUTCOME:
Demonstrate intellectual independence, knowledge about good research practice and ability to make scientific judgments based on such principles.
Have better understanding of the nature of science and values at stake in the practice of science.