



The University of Burdwan,

Ph. D. Course Work Syllabus in Microbiology, 2020

Department of Microbiology, The University of Burdwan

Course code	Course title	Credit value	Marks Distribution
			Total Marks
PHDCW 101	Research Methodology	4	50
PHDCW 102	Research and Publication Ethics (RPE)	2	25
PHDCW 103	Advance Microbiology	4	50
PHDCW 104	Term Paper(s) and related seminar presentation(s)	4	50 (25+25)
	Total	= 14	=175 marks

Modified Microbiology Ph.D. Course Syllabus of The University of Burdwan

Paper PHDCW 101 : Research Methodology: 4 credits 50 Marks

1. Research:

- a) Types, Research process and steps in it, Hypothesis, Research proposals and aspects.
- b) Research Design: Definition, Need, Problem, variables, research design concepts; Literature survey and review; Research design process; Errors in research.
- c) Research Modeling: Types of Models, Model building and stages, Data consideration and testing, Heuristic and Simulation modeling.
- d) Scientific writing: Pre writing considerations, Thesis writing, Report writing, Publications in Research journals.
- e) Research institutes, research schemes (minor and major), preparation of research scheme proposals, formats, funding agencies.

2. Design of Experiments and Basic Bio-statistics:

- a) Objectives, strategies, Factorial experimental design, Designing engineering experiments, basic principles, replication, randomization, blocking, Guidelines for design of experiments.

3. Computer Applications:

- a. Spreadsheet Tool: Introduction to spreadsheet application, features and functions, Using formulas and functions, Data storing, Features for Statistical data analysis, Generating charts/ graph and other features. Tools used may be Microsoft Excel, Open office or similar tool.
- b. Presentation Tool: Introduction to presentation tool, features and functions, Creating presentation, Customizing presentation, showing presentation. Tools used may be Microsoft Power Point, Open Office or similar tool.
- c. Web Search: Introduction to Internet, Use of Internet and WWW, Using search engine like Google, Yahoo etc. using advanced search techniques.

4. Instrumentation:

Basic laboratory Instruments, Chromatographic techniques, Electrophoretic techniques, Spectroscopy, Radioisotopic techniques, Immunological techniques.

Paper PHDCW 102: UGC RESEARCH AND PUBLICATION ETHICS (RPE): 2 Credits

25 Marks

THEORY

- RPE 01: PHILOSOPHY OF ETHICS (3 hr)
 - 1. Introduction of philosophy: Definition, Nature and scope, concept, branches
 - 2. Ethics: Definition, moral philosophy, nature of moral judgements and reactions
- RPE 02: SCIENTIFIC CONDUCT (5 hr)
 - 1. Ethics with respect to science and research
 - 2. Intellectual honesty and research integrity
 - 3. Scientific misconducts: Falsification and, Fabrication, and Plagiarism (FFP)
 - 4. Redundant publications: Duplicate and overlapping publications, SalamiSlicing
 - 5. Selective reporting and mis presentation of data
- RPE 03: PUBLICATION ETHICS (7 hr)
 - 1. Publication ethics: Definition, introduction and importance
 - 2. Best practices/standards setting initiatives and guidelines: COPE, WAME, etc.
 - 3. Conflicts of interest
 - 4. Publication misconduct: Definition, concept, problems that lead to unethical behavior and vice-versa, types.
 - 5. Violation of publication ethics, authorship and contributorship.
 - 6. Identification of publication misconduct, complaints and appeals
 - 7. Predatory publishers and journals

PRACTICE

- RPE 04; OPEN ACCESS PUBLISHING (4 hr)
 - 1. Open access publications and initiatives
 - 2. SHERPA/RoMEO online resource to check publisher copyright & self-achieving policies
 - 3. Software tool to identify predatory publications developed by SPPU
 - 4. Journal finder/journal suggestion tool viz., ZAME, Elsevier journal Finder, Springer journal suggester, etc.
 - RPE 05: PUBLICATION MISCONDUCT (4 hr)
 - A. Group discussion (2 hr) ALL Faculty Members
 - 1. Subject specific ethical issues, FFP, authorship
 - 2. Conflicts of interest
 - 3. Complaints and appeals: Examples and fraud from India and abroad
 - B. Software tools (2 hr)
 - Use of plagiarism software like Turnitin, Urkund and other open source software tools
- RPE 06: DATABASES AND RESEARCH METRICS**
- A. Databases (4 hr)
 - 1. Indexing databases
 - 2. Citation databases: Web of science, Scopus, etc.
 - B. research Metrics (3 hr)
 - 1. Impact Factor of journal as per journal Citation report, SNIP, SJR, IPP, Cite Score
 - 2. Metrics: h-index, g index, i10 index, altmetrics

Paper PHDCW 103: Advance Microbiology:

4 Credits 50 Marks

1. Advance Microbiology: Microbial diversity & taxonomy, Microbiology of Extremophiles, Environmental microbiology, Xenobiotic degradation. Extraterrestrial Microbiology
2. Gene Amplification, Cloning & Expression.
3. Genomics, metagenomics, and metabolomics; Transcriptomics & Proteomics
4. The major epigenetic mechanisms: classifications of HDAC, HAT, DNA methyl transferases and scaffold attached regions
5. Microbial Interaction- Microbe-microbe, plant-microbe, animal-microbe interactions with special emphasis to plant and human microbiomes.
6. Drug discovery, designing and development.
7. IPR & its significance in Microbiology

Reference Books:

Paper PHDCW 104: Term Paper(s) and related seminar presentation(s) :4 credits 50 marks

The candidate has to undertake a term paper in partial fulfillment of course work, under a faculty. Its documentation must be made as follows:

Term paper:

Origin of the problem, review of literature (International & national status), possible methodology/proposed methodology to execute the work (must include experiments that candidate is planning with proper hints of possible outcome), time frame for work, Expected outcome, list of references. 25 Marks

Seminar Presentation (related to submitted term paper).- 25 marks

Chandra Singh

B. Das

Subhra Kanti Mukhopadhyay

Pradipta Saha

Somasree Sam

Ushara Das