

Syllabus for Ph.D. Course Work in Microbiology (2025-26)
Program code Ph. D. MB 0410

One Semester

There are two papers: each with maximum marks 100. The candidate must independently obtain 50% or more marks in each paper to qualify in the course work. The answer papers will be assessed independently by two examiners.

No.	Name of paper	Lectures	Marks
Paper I	Research Methodology, Tools & Techniques in Microbiology, Data Analyses and Computer application.		100
A	Research Methodology:	25	25
	Introduction and Scope, Research problem: Identification, Selection, and Formulation of research objectives	3L	
	Research design: Components, Importance, Types	3L	
	Types of data, Data Collection - Methods and Tools	2L	
	Research ethics, Institutional ethics committee	2L	
	Plagiarism – Pitfall, Regulation	2L	
	Patents and IPR: Patent laws, process of patenting research findings, Copyright, Cyber laws	3L	
	Bibliometrics: Measurement of academic output- Citation Index: Science Citation Index (SCI), h-index, i-10-index. Journal Impact Factor (JIF); AI in research	5L	
	Style of Bibliography, Reference Management Tools, Project, Research Paper, and Review Writing Literature search technique using SCOPUS, Google Scholar, PUBMED, Web of Science	5L	
B	Tools & Techniques: Principle, protocol and application	25	25
	Histological, Histochemical, Cytochemical, and Immunohistochemical techniques	5L	
	Chromatography – GLC & HPLC, Electrophoresis	7L	
	PCR, Real-time PCR, DNA Microarray, DNA Sequencing, Protein Sequencing	8L	
	Biosensors: DNA Biosensors, Immunosensors, Biosensors Techniques, Biosensor Applications	5L	
C	Data Analyses	20	25
	Hypothesis testing	2L	
	Normal and Binomial distributions and their property	3L	
	Tests of significance: Student <i>t</i> -test, <i>F</i> -test, <i>Chi-square</i> test	5L	
	Correlation and Regression	4L	
	ANOVA – One-way and Two-way, Multiple-range test	6L	
D	Computer application	10	25
	Introduction to MS Office software: MS Word (Track change)	2L	
	MS Excel, PowerPoint	4L	
	Features for Statistical data analysis using computers and software, Microsoft Excel Data Analysis ToolPak, SPSS	4L	

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Paper II	Review of Literature & Seminar		100
	A	Review of Literature – Writing a review of literature in the area of the proposed Ph.D. work	50
	B	Seminar – Based on the review of the literature	50

Note: Research and Publication Ethics (2 credit course) – As per guidelines of Pt. Ravishankar Shukla University, Raipur (C.G.)

Recommended Books:

Buranen L and Roy AM

Campbell RC

Cassel P et al.

Chatwal and Chatwal

Coleman P and Dyson P

CR Kothari

Gilmore B

Gralla P

Habraken J

Kumar Anupa P

R Panneerselvam

Shelly GB, Vermaat ME,

Cashman TJ

Snedecor GW & Cochran WG

Sokal RR & Rohlf FJ

Sood V

Sumner M

Upadhyaya and Upadhyaya

Wardlaw AC

White R

Zar JH

Perspectives on Plagiarism and Intellectual Property in a Post-Modern World

Statistics for biologists

Inside Microsoft Office Professional

Instrumentation

Mastering Internets

Research Methodology: Methods & techniques, 2008

Plagiarism: Why it happens, How to prevent it?

How the Internet Works

Microsoft Office 2003 All in One, Microsoft Office 2010

In Depth

Cyber Law

Research Methodology

Microsoft 2007: Introductory Concepts and Techniques

Statistical Methods

Introduction to Biostatistics

Cyber Law Simplified

Computers: Concepts & Uses

Instrumentation

Practical Statistics for Experimental Biologists

How Computers Work

Biostatistical Analysis

Sadhane