Syllabus for Ph. D. Course Work in Biochemistry (2025-2027)				
Program code- Ph. D. BC (0410)				
One Semester				
There are Two papers; each with 100 maximum marks. The candidate must obtain 50% or more marks in each paper independently to qualify in the course work. The answer papers will be assessed independently by two examiners.				
No.		**Name of paper**	**Lectures**	**Marks**
Paper-I Course code- Ph.D.BS (0410A)		**Research Methodology, Techniques in Biochemistry, Quantitative Data Analyses and The art of Presentation**	--	**100**
	A	**Research Methodology:**	**24**	
		Introduction and Scope Research problem : Identification, Selection, Formulation of research objectives	2L	
		Defining the Research Problem - Identification of broad area of research; Review of literature using appropriate sources – reviews, patents, research papers, books; Utilization of tools for literature source – web and libraries; Defining a research problem	3L	
		Types of data, Data collection-Methods and Tools	2L	
		Ethics and Animal Ethics compliance and concerns; Genetically modified organisms;	2L	
		Guidelines for Ph.D. thesis. Patents and Intellectual property rights; Patent laws, process of patenting a research finding, Copy right, Cyber laws. Regulation [UGC, ICMR, ICAR, DBT]	5L	
		Bibliometrics: Measurement of academic output- Citation Index: Science Citation Index (SCI), h-index, i-10-index.Journal Impact Factor (JIF); Style of Bibliography, reference management tools, Project, research paper and review writing Literature search technique using SCOPUS, Google Scholar, PUBMED, Web of Science	10L	
	B	**Techniques in Biochemistry:** Principle, protocol and application	**28**	
		Enzyme assay, enzyme activity and specific activity determination. Cell disintegration and extraction techniques, separation of proteins by fractionation (ammonium sulphate, organic solvents).	8L	
		Chromatography–GLC & HPLC, Electrophoresis	5L	
		Spectroscopy and Spectrometry	2L	
		Concepts of vaccine development	3L	
		PCR, Real time PCR, DNA microarray, DNA sequencing, Protein sequencing	5L	
		Bioinformatics tools - Investigation of hypothesis through **in-silico** (software emulations) method.	5L	

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		Dry Lab- testing and analyses is performed using data, coding and computer systems. Modeling and analysis of experiments using software.		
	C	**Quantitative Data Analyses**	**20**	
		Hypothesis testing	2L	
		Normal and Binomial distributions and their property	3L	
		Tests of significance: Student *t*-test ,*F*-test ,*Chi-square* test	5L	
		Correlation and Regression	4L	
		ANOVA–One-way and Two-way, Multiple-range test	6L	
	D	**The art of Presentation**	**08**	
		Development of writing skills – Plan of research, Research project, Research report, Research article and review, Term paper; Bibliography, referencing and footnotes; Creation of reference libraries; Plagiarism check; Development of Oral presentation skills – Planning, Preparation, Practice, Oration; Use of visual aids and software like MS Word, MS PowerPoint, MS Excel, End Note.	5L	
		Analytical software SPSS and Prism.	3L	

Paper-II Course code- Ph.D.BS (0410B)		**Review of Literature & Seminar**	--	**100**
	A	Review of Literature–Writing review of literature in the area of the proposed Ph.D. work		50
	B	Seminar–Based on the review of literature		50

Note: Research and Publication Ethics (2creditcourse)-As per guidelines of Pt. Ravi Shankar Shukla University, Raipur (C.G)

Recommended Books:

1. AI Vogel Analytical chemistry
2. Buranen Land Roy AM Perspectives on Plagiarism and Intellectual Property in a Post- Modern World
3. Campbell RC Statistics for biologists
4. Casse l P *et al.* Inside Microsoft Office Professional
5. Chatwal and Chatwal Instrumentation
6. C R Kothari Research Methodology:Methods&techniques,2008
7. Gilmore B Plagiarism: Why it happens, How to prevent it?
8. Gralla PHow the Internet Works
9. Kumar Anup a P Cyber Law
10. R Panneer selvam Research Methodology
11. Shelly G B, Verma at ME, Microsoft 2007: Introductory Concepts and Techniques

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