Syllabus for Ph.D. Course Work in Zoology (2016-17)

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.

Paper-I: Research Methodology, Advanced Tools & Techniques, Quantitative Data Analyses and Computer Fundamentals

		Lectures	Marks
A	**Research Methodology:**	**20**	**25**
	Introduction and Scope Research problem: Identification, Selection, Formulation of research objectives	2L	
	Research design: Components, Importance, Types	3L	
	Types of data, Data collection - Methods and Tools	2L	
	Research ethics, Institutional ethics committee	2L	
	Plagiarism - Pitfall	2L	
	Patents and IPR: Patent laws, process of patenting a research finding, Copy right, Cyber laws	3L	
	Bibliometrics: Measurement of academic output- Citation Index: Science Citation Index (SCI), h-index, i-10-index. Journal Impact Factor (JIF); Style of Bibliography, Project, research paper and review writing	6L	
B	**Advanced Tools & Techniques**	**20**	**25**
	Microscopic techniques –Electron microscopy and Confocal microscopy	5L	
	Principle, protocol and application of Chromatography – GLC & HPLC, Electrophoresis and its application	5L	
	PCR, Real time PCR, DNA microarray, DNA sequencing	5L	
	Protein microarray and Protein sequencing	5L	
C	**Quantitative Data Analyses**	**20**	**25**
	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	**Computer Fundamentals**	**20**	**25**
	Introduction to MS-Office software: MS-Word (Track change)	2L	
	MS-Excel	2L	
	MS-Power Point	2L	
	MS-Access	2L	

	Literature search technique using SCOPUS, Google Scholar, PUBMED, Web of Science	6L	
	Features for Statistical data analysis using computers and software, Microsoft Excel Data Analysis ToolPak, SPSS	6L	

Paper-II: Review of Literature & Seminar				
A	Review of Literature – Writing review of literature in the area of the proposed Ph.D. work			50.0
B	Seminar – Based on the review of literature			50.0

Recommended Books:

AI Vogel — Analytical chemistry
BK Sharma — Instrumental methods of analysis
Buranen L and Roy AM — Perspectives on Plagiarism and Intellectual Property in a Post-Modern World
Campbell RC — Statistics for biologists
Cassel P *et al.* — Inside Microsoft Office Professional
Chatwal and Chatwal — Instrumentation
Coleman P and Dyson P — Mastering Internets
CR Kothari — Research Methodology: Methods & techniques, 2008
Gilmore B — Plagiarism: Why it happens, How to prevent it?
Gralla P — How the Internet Works
Habraken J — Microsoft® Office 2003 All in One, Microsoft® Office 2010 In Depth
Kumar Anupa P — Cyber Law
R Panneerselvam — Research Methodology
Shelly GB, Vermaat ME, Cashman TJ — Microsoft® 2007: Introductory Concepts and Techniques
Snedecor GW & Cochran WG — Statistical Methods
Sokal RR & Rohlf FJ — Introduction to Biostatistics
Sood V — Cyber Law Simplified
Sumner M — Computers: Concepts & Uses
Upadhyaya and Upadhyaya — Instrumentation
Wardlaw AC — Practical Statistics for Experimental Biologists
White R — How Computers Work
Zar JH — Biostatistical Analysis