# Syllabus for Ph.D. Course Work in Biochemistry (2017-18)

**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<br>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** | | **100** |
|---|---|---|
| **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:

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|---|---|
| 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 |