1.1.2.

Ph.D. Course work in Environmental Studies
Department of Environmental Studies
University of Delhi

Revised Syllabus

Paper 1. Research Methodology
Paper 2. Review of Literature
Paper 3. Advancements in the chosen area of Research

Paper 1. Research Methodology

1. What is Scientific Research: Nature and types of Research, Formulation of Objectives, Experimental design and Research plan, Research methods (Descriptive/observation, Experimental, case studies, historical and comparative methods)
2. Instrumentation. Use of routinely used laboratory equipment such as Spectrophotometry (UV-Vis), Atomic Absorption Spectrophotometer, SEM/TEM, Confocal microscopy, Autoclave and weighing balances, Solution preparation and titrations.
3. Analytical techniques: Analyses and interpretation of data, Statistical methods
4. Literature Survey: Referencing, Keeping up to date with current literature, Use of Scientific databases like Web of Science, Scopus, Science Direct, Pubmed etc., Footnotes and Bibliography (Endnote)
5. Scientific Writing: Writing Research Papers, Review Articles, Research Projects
6. Good Laboratory Practices: Setting up Experiments, Safety measures to followed, disposal of Hazardous/Poisonous chemical/biological agents, Dealing with Electrical and Fire hazards

Paper 2. Specialization Course

The Supervisor/Co-Supervisor(s) shall assign suitable topics for the Ph.D. candidate to undertake Review or empirical work in the area of Research which the candidate has opted to work in. Supervisor may also assign a topic other than the Ph.D. topic. The Empirical or Review work as the case may be, will be submitted to experts for evaluation. A Seminar Presentation will have to be made by the Ph.D. candidate at the end of the Experimental/Review work. A written Satisfactory completion report will be submitted by the Supervisor(s) and Advisory Committee members based on the presentation made by the candidate.

Paper 3. Advancements in the chosen area of Research

The Supervisor/Co-Supervisor(s) shall impart theory and practical training on advances including recent techniques in the area of Research adopted by the Ph.D. candidate or the Supervisors may include courses in theoretical or mathematical ecology (basic elements of theoretical ecology/biology, basic population biology; discrete and continuous population models; stochastic and spatial models; interspecific interactions); Key concepts in Evolutionary biology (Variation and heritability, natural and sexual selection, genetic drift, biogeographic patterns across space and time; species dispersal and diversification; island biogeography); Computer programs/applications such as C; Matlab or R.

At the end of the Course, the Supervisor/ Co-Supervisor(s) shall evaluate the student through an examination comprising theory and practical papers.

Paper 1 will be common to all students. An attendance of 66% is mandatory in each Paper, failing which the candidate will not be allowed to take the examination

Scheme of Evaluation:

Paper	Theory/Project Document	Internal Assessment/Practical/Seminar	Total Marks
1. Research Methodology	70	30	100
2. Review of literature	50	50	100
3. Advancements in the chosen area of Research	70	30	100

Suggested Readings

Bock P (2001) *Getting It Right: R&D Methods for Science and Engineering*. Academic Press. ISBN-10: 0121088529, ISBN-13: 978-0121088521

Hofmann AH (2009) *Scientific Writing and Communication: Papers, Proposals, and Presentations*. Oxford University Press, USA ISBN-10: 0195390059, ISBN-13: 978-0195390056

Sokal RR, Rohlf FJ (1995) *Biometry, The Principles and Practices of Statistics in Biological Research*. 3rd Edition. W.H. Freeman and Company, ISBN 0-71672411-1

Further Readings/Text will be recommended by concerned instructor on the topic.