

**CREDIT DISTRIBUTION, ELIGIBILITY
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Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/Practice		
Research Methodology (BCH-DSE-8)	04	02	00	02	Class XII with Science and Biology	NIL

Learning Objectives

The main objective of this paper is to provide students with a general introduction to the methodological foundations and tools used in research for an understanding of the ways to identify problems, develop hypotheses and research questions and design research projects. The course will expose students to the range of designs used in research in laboratory, field experiments, surveys and content analysis. It will also provide an introduction to the concept of controls, statistical tools and computer applications used in research. In addition, the course will impart knowledge of scientific writing, oral presentation and the various associated ethical issues.

Learning outcomes

On successful completion of the course students will be able to:

1. Describe the importance of research in knowledge generation.
2. Explain the research process
3. Evaluate the importance of the major quantitative and qualitative research methods
4. Construct an effective research proposal
5. Examine the importance of research ethics
6. Record and analyse data using computer software
7. Prepare a Scientific presentation and article.

SYLLABUS OF DSE-8

BCH-DSE-8 : RESEARCH METHODOLOGY

Semester – VI

2.2 Course Contents

Theory (Credits – 2)

Total Hours: 30

Unit I: Introduction to Research Hours (4)

Objectives and characteristics of research; significance of research, types of research methods- qualitative and quantitative; basic and applied; descriptive and analytical; various phases of research-problem identification, generation of hypothesis, experimental design, results and discussion. Writing a research proposal-schematic presentation.

Unit II: Basic principles of research design Hours (8)

Review of literature using appropriate sources – reviews, patents, research papers, books and e-resources; Significance of controls in research, Types of research designs – exploratory, descriptive, experimental, survey and case study.

Unit III: Statistical tools and Report writing Hours (12)

Data collection, analysis and graphical presentation; Sample – types and characteristics; Basic Statistical Tools - Measures of central tendency, Arithmetic mean, Median, Mode, Standard deviation, Co-efficient of variation (Discrete series and continuous series), Correlation, Regression, Multiple Regression, hypothesis testing, P-value, data analysis and interpretation; Report writing, format of publications and presentations-oral and poster.

Unit IV: Scientific conduct and ethics in Research (6 Hours)

Biosafety and Ethics - compliance and concerns; Plagiarism-Software tools and Creative Commons; Introduction to Intellectual Property Rights; Citation and acknowledgement, Impact factor, h-index, Indian and international funding agencies.

2.3 Practical:

Credits: 2	Total Hours:
60	

1. Citation formats and citation generator
2. Plagiarism tools
3. Design of a research survey on a specific problem
4. Writing a concept note / research proposal
5. Writing of a mini-review paper
6. Systematic review, meta data analysis and presentation
7. Poster/oral presentations

2.4 Essential readings:

1. Cresswell, J. (2009) *Research Design: Qualitative and quantitative Approaches* Thousand Oaks CA, (3rd ed.), Sage Publications
2. Kothari, C.R. (2004) *Research Methodology: Methods and Techniques* (2nd ed.), New Age International Publishers.
3. Kumar, R. (2011) *Research Methodology: A Step-by-Step Guide for Beginners* (5th ed.), SAGE publisher
4. Walliman, N. (2017) *Research Methods: The Basics*, (2nd ed.), London; New York: Routledge
5. WHO (2001) *Health Research Methodology – A Guide for Training in Research Methods*.

3. Keywords

Research methodology; Patents; Plagiarism; Ethics; Biosafety; Report writing

Note: Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.