

## Swarnnim Startup and Innovation University (Doctorate Program)

### Title: Research methodology

#### 1. Course Outcomes (COs)

CO1: Explain the significance, role, aims, objectives, and phases of research.

CO2: Understand the purpose and methodology of literature reviews, and locate, synthesize, and present relevant information.

CO3: Identify research gaps and formulate clear research problems and objectives.

CO4: Design research using qualitative and quantitative methods, including hypothesis formulation, statistical testing, and evaluation.

CO5: Organize and format theses, research papers, and technical reports, and deliver effective oral presentations.

CO6: Recognize and apply ethical standards in research, understand issues related to plagiarism, and comply with intellectual property laws.

#### 2. Total Credits: 06

Credit hours: 90

#### 3. Syllabus:

##### Unit-I: General Introduction to Research

[Credit hours: 08]

History of Science & Technology: Importance of research, role of research, aims & objectives, research process, phases of research.

Swarnnim Startup & Innovation University

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### Unit-II: Research Problem Formulation

[Credit hours: 23]

Review of Research Literature: Purpose and use of literature review, locating relevant information, use of library & electronic databases, preparation & presentation of literature review, research article reviews, theoretical models and frame work. Identification of research gaps, formulation of research problem, definition of research objectives.

### Unit-III: Research Design

[Credit hours: 20]

Qualitative Methods: Types of hypothesis and characterization. Quantitative Methods: Statistical methods for testing and evaluation. Characterization of experiments: Accuracy, reliability, reproducibility, sensitivity, Documentation of ongoing research.

### Unit-IV: Research Publication & Presentation

[Credit hours: 20]

Thesis, Research paper, Review Article & Technical Reports: Organization of thesis and reports, formatting issues, citation methods, references, effective oral presentation of research. Quality indices of research publication: impact factor, immediacy factor, H- index and other citation indices.

### Unit-V: Research Ethics and Morals

[Credit hours: 19]

Issues related to plagiarism, collaborative models and ethics, acknowledgements. Intellectual Property Rights: copyrights, copy left: Patents, Industrial designs, Trademarks.

## 4. Reference Books:

- What is this thing called Science, Chalmers, A. F., Queens's I and University Press, 1999.
- Methods & Techniques of Social Research, Bhandarkar & Wilkinson, Himalaya Publications, 2009.
- Doing your Research project, BellJ., Open University Press, Berkshire, 4<sup>th</sup> Edition, 2005
- A Hand book of Academic Writing, Murray, R. and Moore, S., Tata McGraw HInternational, 2006.





1. Research Methodology, Methods & Techniques, C.R. Kothari, Viswa Prakashan, 2<sup>nd</sup> Edition, 2009.
2. Research Methods- A Process of Inquiry, Graziano, A.M., Raulin, M.L, Pearson Publications, 7<sup>th</sup> Edition, 2009.
3. How to Write a Thesis, Murray, R. Tata McGrawHill, 2nd Edition, 2010.
4. Writing For Academic Journals, Murray, R., McGraw Hill International, 2009.
5. Writing for Publication, Henson, K.T., Allyn & Bacon, 2005.

The students will be able to describe the laboratory techniques, safety while using dangerous chemicals, use of internet and databases, online tools, designing a research problem and handling data using statistical tools.

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UNIVERSITY  
WHERE IDEAS COME ALIVE.

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