| Course Type | Course Code | Name of Course | L | T | P | Credit |
|---|---|---|---|---|---|---|
| RM | NPEC595 | Research Methodology | 3 | 0 | 0 | 3 |

**Course Objective**

- Understand some basic concepts of research and its methodologies
- Identify appropriate research topics, select and define appropriate research problem and parameters
- Prepare a project proposal (to undertake a project)
- Organize and conduct research (advanced project) in a more appropriate manner, write a research report and thesis, write a research proposal (grants)

**Learning Outcomes**

- Develop understanding on various kinds of research, objectives of doing research, research process, research designs and sampling
- Develop basic knowledge on qualitative research techniques
- Develop adequate knowledge on measurement & scaling techniques as well as the quantitative data analysis
- Develop basic awareness of data analysis-and hypothesis testing procedures

| Unit No. | Topics to be Covered | Lecture Hours | Learning Outcome |
|---|---|---|---|
| 1 | Foundations of Research: Meaning, Objectives, Motivation, Utility. Concept of theory, empiricism, deductive and inductive theory. Characteristics of scientific method – Understanding the language of research – Concept, Construct, Definition, Variable. Research Process. Problem Identification & Formulation – Research Question – Investigation Question – Measurement Issues – Hypothesis – Qualities of a good Hypothesis – Null Hypothesis & Alternative Hypothesis. Hypothesis Testing – Logic & Importance | 5 | This will help students to learn about basic foundation of research. Also students will learn about the concept of hypothesis. |
| 2 | Research Design: Concept and Importance in Research – Features of a good research design – Exploratory Research Design – concept, types and uses, Descriptive Research Designs – concept, types and uses. Experimental Design: Concept of Independent & Dependent variables | 5 | This unit will help students to learn the different type of research design. |
| 3 | Qualitative and Quantitative Research: Qualitative research – Quantitative research – Concept of measurement, causality, generalization, replication. Merging the two approaches. | 5 | This unit will help student to learn about qualitative and quantitative research. |
| 4 | Measurement: Concept of measurement–what is measured? Problems in measurement in research – Validity and Reliability. Levels of measurement – Nominal, Ordinal, Interval, Ratio | 5 | This unit will help students to learn about concept of measurement. |
| 5 | Sampling: Concepts of Statistical Population, Sample, Sampling Frame, Sampling Error, Sample Size, Non Response. Characteristics of a good sample. Probability Sample – Simple Random Sample, Systematic Sample, Stratified Random Sample & Multi-stage sampling. Determining size of the sample – Practical considerations in sampling and sample size | 6 | This unit will help students to learn about sampling. Students get the exposure of different type of sampling techniques. |
| 6 | Data Analysis: Data Preparation – Univariate analysis (frequency tables, bar charts, pie charts, percentages), Bivariate analysis – Cross tabulations and Chi-square test including testing hypothesis of association. | 5 | This unit will help students to get the idea of data analysis. They get the exposure of different data preparation techniques. |

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| 7 | Interpretation of Data and Paper Writing – Layout of a Research Paper, Journals in Computer Science, Impact factor of Journals, When and where to publish ? Ethical issues related to publishing, Plagiarism and Self-Plagiarism. | 5 | This unit will help students to get exposure of data interpretation and paper writing techniques. |
| 8 | Use of Encyclopedias, Research Guides, Handbook etc., Academic Databases for Computer Science Discipline.<br>Use of tools / techniques for Research: methods to search required information effectively, Reference Management Software like Zotero/Mendeley, Software for paper formatting like LaTeX/MS Office, Software for detection of Plagiarism | 6 | This unit will help students to know the importance of different sources like uses of encyclopedias, research guides, handbook, tools etc in research. |
| **Total** | | **42** | |

**Text Books:**


1. Research Methodology Methods and Techniques: C. R. Kothari
2. Basic Business Statistics: Concepts and Applications Mark Berenson, David M. Levine, Timothy C. Krehbiel
3. Research Methods- the Basics: Nicholas Walliman
4. Research Methodology: A Step-by-Step Guide for Beginners - Ranjit Kumar