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PH. D. COURSE WORK

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Course Code & Title	24CSAR0101 RESEARCH METHODOLOGY	Credits: 4

Course Objectives

- To introduce the basic concepts and methods of Scientific and Computer Science Research.
- To inculcate writing skills and make them write good scientific documents like articles, reviews and thesis
- To make the students aware of the various research tools Intellectual property rights

UNIT	CONTENTS
I	**Introduction**
	Introduction to Scientific Research: Objectives-significance- Motivation of research, Types and approaches, Quantitative research methods, Research methods versus methodology, Research process, Criteria of good research.
	Introduction to Computer Science Research: Significance & Status of Research in Computer Science. Steps in Research: Having grounding in Computer Science, Major Research areas of Computer Science, Identification, selection & Formulation of research problem, Hypothesis formulation, Developing a research proposal, Planning the research, The wider community, The role of empirical studies.
II	**Defining**
	Defining the Research Problems: Meaning, Selection, Needs and Techniques. Research Design: Meaning of Research Design, Need for a Research Design, Features ofa good design, Important Concepts Relating to Research Design, Different research designs, Basic principles of experimental designs, Important Experimental Designs.
III	**Research Methods**
	Research Methods: Exploratory Research, Constructive Research, Empirical Research, Quantitative Research, Qualitative Research, Mixed research. Computer Science **Research Methodology:** Formal, Experimental, Build, Process, Model
	Research Tools: Research Management Tools, Survey Tools, Data Collection Tools and Sites, Web Scraping Tools
IV	**Research Data**
	Research Data: Mathematical statistics and computer science views on data analysis, Methods for finding associations: regression and pattern recognition, Method for aggregation and visualization.
	Literature Survey: Finding out about your research area, Literature search strategy, Writing critical reviews, Identifying venues for publishing your research.

	Writing Papers and the Review Process - Thesis Writing
V	**Writing Papers and the Review Process:** Preparing and presenting your paper. The conference view process, Making use of the referees' reports, The journal review process, Group exercise in reviewing research papers. **Thesis Writing:** Planning the thesis, Writing the thesis, Thesis structure, Writing up schedule, The Oral examination and Viva Voce. **Intellectual Property:** Intellectual Property Rights, Legislations covering Intellectual Property Rights in India

LEARNING OUTCOMES

- Understand the basic concepts and methods of scientific and computer research
- Abilie to analyze a research problem and make a design
- Acquire skills to write scientific documents
- Exposed to various research tools and intellectual property rights

Reference:

1. Research Methodology Methods and Techniques, C.R Kothari and Gaurav Garg, 3rd Edition, New Age International Publishers, 2014.
2. Research Methods By Francis C. Dane, Brooks/ Cole Publishing Company, California.
3. Basic of Qualitative Research (3rdEdition) By Juliet Corbin &Anselm Strauss, Sage Publications (2008)
4. The Nature of Research: Inquiry in Academic Context By Angela Brew, Routledge Falmer (2001)
5. The Computer Science and Engineering Handbook by (Editor-in-Chief) By AllenB. Tucker, jr. CRC Press
6. Research Ethics Cases and Materials, Edited By Robin Levin Penslar, Indiana University Press (1995)