2023

PhD Course Work (Revised Curriculum)

DEPARTMENT OF COMPUTER SCIENCE
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APPROVED IN THE BOS MEETING HELD ON XX.XX.2023

PhD Course Work (Revised curriculum)			
Course Code	**Course Title**	**L-T-P**	**Credits**
PCS1.1	Scientific Research Methodology	3-1-0	04
PCS1.2	Research Skills, Ethics and Publications	3-0-2	04
PCS1.3	Literature Review and Term Paper	0-1-6	04
PCS1.4	Elective: … … …	3-1-0	04

- *PCS1.3 requires reviewing at least 15 research papers and writing a term paper with the supervisor.*
- *PCS1.4 requires doing a PG-level course recommended by the supervisor to strengthen the area of study.*

SYLLABUS

PCS1.1	Scientific Research Methodology	3-1-0	04 Credits

1. **Research Fundamentals:** Research Overview, Terminology, Prominent Definitions, Characteristics, Purpose, Goals and Objectives, Beneficiaries and Values, Methodology, Method and Skills; Quantitative and Qualitative Research, Contribution, Findings and Gains; Typical Core and Specific research Skills..
2. **Scientific Research and Methods:** Scientific Research and Knowledge, Knowledge Acquisition, Typical Sciences, Pseudoscience, Characteristics and Values, Generic Process; Scientific Methods - Overview, Principles of Scientific Method, Scientific Attitude and Temper, Elements of Scientific Methods, Scientific Process, Scientific Objectivity, Scientific Misconceptions.
3. **Research Paradigms and Models:** Philosophy and Paradigms; Research Paradigms- Overview, Generic Elements, Positivist, Post-Positivist, Interpretivist, Critical, Pragmatic; Research Models: Overview, Generic Research Process, Sequential, Generalized, Circulatory, Evolutionary, and Mixed-Methods.
4. **Research Design** and **Instruments:** Typical Classifications and Designs, Nature, Application, Mode, Objective, Experiment and Other Classifications; Theoretical, Fundamental, Applied, Qualitative, empirical, Experimental, Technological, Action, Evaluative and Other Designs; Research Instruments – Observations, Theory, Modelling, Experiments, CBR, Simulations, and e-Science.
5. **Research Context of Computer Science:** Dialectic of research, Models of argument; Traditions – Theoretical, Empirical and Engineering; Research Methods: Formal, Experimental, Build, Process and Models; Dominant Paradigms – Scientific, Rationalist and Technocratic; Models of Argument – Observational-Empiricism, Verificational-Demonstration, Mathematical-Proof and Interpretational-Hermeneutics; Grand Research Challenges, Characteristics and Identified Problems.

Dawson (2005). Projects in Computing and Information Systems. AWL
Walliman (2010). Your Research Project, Vistar publications
Mustafa (2021): Scientific Research Primer, Ane Books; and Relevant Research Papers

PCS1.2	Research Skills, Ethics and Publications	3-1-0	04 Credits

1. **Literature Review and Synopsis:** Review Terminology and Types; Literature – Meaning, Formats, and Credible Sources; Literature Review – Characteristics, Purpose, Generic Procedure etc. Systematic Literature Review - Generic Protocol & Kitchenham Guidelines, Process, Analyses, Documentation, bias, Inadequacies; Synopsis: Elements, Structure, Preparation and writing.
2. **Data Collection and Analyses:** Types of Data; Data Collection – Typical Methods and Tools; Web data Collection; Qualitative Analysis – Content, Narrative, Discourse, Thematic, Grounded Theory, Interpretive Phenomenological Analysis; Quantitative Analyses – Typical Descriptive and Inferential Statistics; Hypothesis Testing – Level of significance, Selection of the Test statistic and Decision Rule.

3. **Reasoning, Argument and Proofs**: Reasoning and Arguments - Overview, Terminology, Logic, Reasoning, Arguments, Common Fallacies; Methods of Proofs - Mathematical and Good Proof, Informal, Formal & Supplementary Proof; Classical Proof Fallacies.
4. **Research Ethics and Metrics:** Research Ethics, Scientific Conduct and Professionalism; Professional Conduct, Rights and Responsibilities, Research Misconduct, Plagiarism, and Intellectual Property Rights; Research Databases and Typical Metrics – JCR, IF, SJR, SNIP, Indexes, and Altimetric.
5. **Research Dissemination and Publications:** Overview, Typical Forms of Dissemination Methods and Platforms; Typical Publications and Writing; Journal Selection and Finders; Publication Ethics – Best Practices and Standards, COPE, WMAE, etc; Conflict of Interest, Publication Misconduct, Violations, Open Access Publishing, Predatory Publishing and Journals.

Walliman (2010). Your Research Project, Vistar publications
Yadav (2020): Research Publications and Ethics, Ane Books
Zubel (2014): Writing for Computer Science, Springer