

## **CS 703 Doctoral Research Methodology**

L-T-P : 4-0-0

Credit : 4

### **What is a Thesis?**

#### **Developing the Proposal**

Choosing a Research Project – consideration of possible topics, feasibility and practicability of a topic, personal criteria of the researcher.

Research Formulation-Literature review- primary and secondary sources – reviews, treatise, monographs-patents, web. Critical literature review- identifying gap areas from the literature review, development of working hypothesis.

#### **Research Design and Methods**

Basic principles of research design. Features of a good design.

Observation and facts, laws and Theories, prediction and explanation, Induction, Deduction, Development of models. Developing a Research Plan.

Data analysis- Sampling methods, data processing and analysis strategies, hypothesis testing, generalization and interpretation.

#### **Standard Pitfalls for Postgraduate Students**

Solving the world, Manna from heaven, Computer bum, Yet another language, Micawberism, Ivory tower, Misunderstood genius, Lost in abstraction, Ambition paralysis, Methodology, discovery route.

#### **Psychological Hurdles**

Mental attitude, Research impotence, Dealing with criticism, Early morning -- Cold start, Theorem envy, Fear of exposure.

#### **Writing Technical Papers**

Quantitative methods, theoretical proofs, analysis of experimental results, comparison with competing methods/systems/techniques; Departmental research papers, departmental technical papers, departmental working papers, personal notes, publishing papers in conference proceedings and journals.

#### **Learning Latex**

Writing single and multi-column survey article with tables, figures, equations, various styles of references. Creation of index.

#### **Ethics of Research**

Ethical issues, copy right, intellectual property rights and patent laws, reproduction of published material – citation, acknowledgement and plagiarism.

Use of plagiarism detection tool (e.g., Turnitin), ways to avoid plagiarism while using and referring earlier work.

#### **Seminar presentations**

Various approaches for research outcome presentation

## **Textbooks / References**

1. **The Researchers' Bible** by Alan Bundy, Ben du Boulay, Jim Howe and Gordon Plotkin, University of Edinburgh, 1999
2. **The LaTeX Companion 2<sup>nd</sup> Ed.** by Frank Mittelbach and Michel Goossens, Addison-Wesley, 2004
3. **Guide to Successful Thesis and Dissertation- A Handbook for Students and Faculty, 5e.** by James E Mauch and Namgi Park. Marcel Dekker, Inc. New York, 2003.