

Course Title: Research Methodology

Course Code: RM-898

Credit Hours: 2-0

Prerequisite: Nil

Course Objectives

- a. Understanding of the scope, principles, norms, accountabilities and bounds of contemporary scientific practices in specific disciplines.
- b. Application of systematic approaches to conduct and manage scientific projects.
- c. Ethical conduct and professional accountability.
- d. Effective oral and written communication in professional domain.
- e. Data security and professional use and management of information.
- f. Research analysis and drawing inferences from research data.

Course Outcomes

- a. Understanding the concept of research and circumstances under which formal research is required in the field of science & engineering.
- b. Approach scientific research problems in a structured and strategic manner.
- c. Formulate a research problem with Specific, Measureable, Achievable, Relevant and Time-bound (SMART) objectives.
- d. Undertake an effective literature review to learn the background material required for research projects and also to identify ongoing state of the art research in the specific area.
- e. Communicate findings of a literature review following accepted standards and traditions of scientific disciplines – especially with regard to referencing and citation.
- f. Prepare and communicate a formal research proposal including a plan, a convincing justification, and formal placement of time bound objectives within the context of the current state of research in a specific area.

- g. Understand and describe the ethical obligations associated with conducting research.
- h. Identify many different forms of plagiarism and ethical breaches.
- i. Understand and be able to implement best practices in data management and security.
- j. Demonstrate both written and oral communication skills to explain a scientific research exercise to specialist and non-specialist audiences with motivation, approach, justification, and key outcomes.

Course Contents

- 1 Introduction to Research Methodology Research Topic Discussion
- 2 Scientific Approach Research Topic Finalization
- 3 Literature Review Seminal Paper Search
- 4 Research Design EndNOTE®
- 5 Planning & Management Problem Solving: Literature Review
- 6 Intro to Software for Data Analysis & Visualization Excel®, MATLAB®, SPSS, etc.
- 7 Credibility of Research Findings & Threats to Reliability
- 8 Technical Writing Problem Solving: Literature Review
- 9 Documentation Guidelines Discussion: Review / Rebut Strategies
- 10 Ethics in Research Research Selling: a. Poster Development b. Press Release
- 11 Technical Speaking Review of Group Discussion Topic
- 12 Introduction to NUST PG Policies & MS TH-Forms
- 13 Research Proposal Documentation Problem Solving: Research Proposal Document

14 Guest Speaker Talk on Research Methodology from an expert

15 Research Proposal Presentations

16 Research Proposal Presentations