



# ANDHRA UNIVERSITY TRANS-DISCIPLINARY RESEARCH HUB

## RESEARCH METHODOLOGY SYLLABUS FOR ENGINEERING

**Unit –I** Introduction of Research Methodology: Concept of research and its applications: characteristics features, objectives, scope, reliability and validity of research, Scientific process: Meaning and Definition, Steps involved in research process, a brief history of scientific process. Formulation of research problem: Objectives of research problem. Research Design-Meaning, Need and features of good research design, defining problem, preparing research design analysis and interpretation of data, Basic Principles of Experimental Techniques. Importance and relevance of ethics and values in science and technology

**Unit II** Scientific Methodology: Meaning, Scope, Primary sources of literature survey- journal, patents etc. Secondary sources of literature survey - books, reference books, text books. Paper Writing and preparation of Dissertation: Basic concepts of paper writing - Steps of paper writing, Methods of presentation, Precautions in preparing the research Dissertation – Concepts of bibliography and annexure, Discussion of results, Drawing conclusions, Giving suggestion and recommendation of concerned persons.

**UNIT III** Computer Applications: a. Spreadsheet tool: Introduction to spread-sheet applications, features & functions, using formulae & functions, data storing, features for statistical data analysis, generating charts/graphs & other features. [Tools: Microsoft Excel, Open office and similar or other advanced tools] b. Presentation tool: Introduction to presentation tool, features & functions, creating presentations, customising presentation. [Tools used: Microsoft Power point, Open Office or any other tool] c. Web Search: introduction to internet, Use of Internet & www, using search engines using advanced search tools. d. Thesis writing & Scientific editing tools.

**UNIT IV** Measurement Scales and Evaluation: Concepts of Measurement Scales; Primary Levels of Measurement; Classification of Measurement Scales; Validity and Reliability Analysis Scholarly Writing Characteristics of Scholarly Writing; Standard Guidelines; Critical Reviews; Research Proposals; Research Reports; Thesis/Dissertations; Research Papers; Impact Factor of Journals; Citation and Acknowledgement; Plagiarism and Self-Plagiarism; Reproducibility and Accountability Note: Following are to be practiced in Computer Lab.: Spreadsheet application, features and functions, using formulas and functions, data storing, features for statistical data analysis, use of SPSS generating chart's/graph and other features. Document and Presentation tool: features and functions,

Using Latex, Open-office and MS office, creating presentations, master page, adding animation, customizing animation, creating handouts. Web search: introduction to internet, using search engine, relevance of search terminology, Advanced search.

### **References:**

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3. Gash, S. Effective Literature Searching for Research. 2nd Revised ed., Gower, 1989
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5. Kumar, R. Research Methodology: A Step-by-step Guide for Beginners. 4 th ed., Sage Publications, 2014.
6. Lester, J. D. and Lester, J. D. Jr., Writing Research Papers: A Complete Guide. 15th ed., Longman, 2014.
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8. Mauch, James E. and Park, N. Guide to the Successful Thesis and Dissertation: A Handbook for Students and Faculty. 2 nd ed., Marcel Dekker, Inc., 1989.
9. Schloss, P. J. and Smith, M. A. Conducting Research. Prentice-Hall, 1999.
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## Model Question Paper

1. Discuss the importance and relevance of ethics and values in scientific research.
2. Explain the process of discussion of results in a research paper and its significance in the scientific method.
3. How can web search and advanced search tools contribute to the efficiency and effectiveness of research?
4. Define validity and reliability analysis in research and discuss their importance in ensuring the quality of research findings.