

RESEARCH METHODOLOGY FOR ENGINEERING

(Applicable to all the Engineering Departments)

Sub Code: 20RMEN01

UNIT I:

Objectives of Engineering Research - Motivation in Engineering Research - Types of Engineering Research - Finding and Solving a Worthwhile Problem - Problem definition, Objectives of Research, Research Questions, Research design, Approaches to Research, Quantitative vs. Qualitative Approach, Understanding Theory, Building and Validating Theoretical Models, Exploratory vs. Confirmatory Research, Experimental vs Theoretical Research, Importance of reasoning in research.

UNIT II:

Problem Formulation, Understanding Modelling& Simulation, Conducting Literature Review, Referencing, Information Sources, Information Retrieval, Role of libraries in Information Retrieval, Tools for identifying literatures, Indexing and abstracting services, Citation indexes.

UNIT III:

Research Design: Meaning of Research Design, Need of Research Design, Feature of a Good Design, Important Concepts Related to Research Design, Different Research Designs, Basic Principles of Experimental Design, Developing a Research Plan, Design of Experimental Set-up, Use of Standards and Codes.

UNIT IV:

Experimental Research: Cause effect relationship, Development of Hypothesis, Measurement Systems Analysis, Error Propagation, Validity of experiments, Statistical Design of Experiments, Field Experiments, Data/Variable Types & Classification, Data collection, Numerical and Graphical Data Analysis: Sampling, Observation, Surveys, Inferential Statistics, and Interpretation of Results

UNIT V:

Preparation of Dissertation and Research Papers, Tables and illustrations, Guidelines for writing the abstract, introduction, methodology, results and discussion, conclusion sections of a manuscript. References, Citation and listing system of documents

REFERENCES

- Bordens, K. S. and Abbott, B. B., “Research Design and Methods – A Process Approach”, 8th Edition, McGraw-Hill, 2011
- C. R. Kothari, “Research Methodology – Methods and Techniques”, 2nd Edition, New Age International Publishers
- Dipankar Deb, Rajeeb Dey, Valentina E. Balas, “ Engineering Research Methodology A Practical Insight for Researchers” Springer
- Davis, M., Davis K., and Dunagan M., “Scientific Papers and Presentations”, 3rd Edition, Elsevier Inc.
- Michael P. Marder, “ Research Methods for Science”, Cambridge University Press, 2011
- T. Ramappa, “Intellectual Property Rights Under WTO”, S. Chand, 2008
- Robert P. Merges, Peter S. Menell, Mark A. Lemley, “Intellectual Property in New Technological Age”. Aspen Law & Business; 6 edition July 2012