Subject: Introduction to Research (OE-9)								
Program: B. Tech. (Mechanical)				Subject Code: ME0729			Semester: VII	
Teaching Scheme				Examination Evaluation Scheme				
Lecture	Tutorial	Practical	Credits	University Theory Examination	University Practical Examination	Continuous Internal Evaluation (CIE) Theory	Continuous Internal Evaluation (CIE) Practical	Total Marks
3	0	0	3	16/40	***	24/60	***	100

Course Objectives:

- 1. To familiarize participants with basic of research and the research process.
- 2. To understand difference between discovery and research.
- 3. To select and define appropriate research problem and parameters.
- 4. To organize and conduct research (advanced project) in a more appropriate manner
- 5. To enable the participants in conducting research work and formulating research synopsis and report.

Course Outcomes:

- 1. After learning the course, the students should be able to:
- 2. Develop understanding of the basic framework of research process.
- 3. Develop understanding of various research designs and techniques.
- 4. Identify various sources of information for literature review and data collection.
- 5. Develop an understanding of the ethical dimensions of conducting applied research.
- 6. Appreciate the components of scholarly writing and evaluate its quality.
- 7. Be aware of the ethical principles of research, ethical challenges and approval processes
- 8. Describe quantitative, qualitative and mixed methods approaches to research.
- 9. Critically analyze published research.

COURSE CONTENT

UNIT-1

Research Methodology:

An Introduction: Meaning, Objectives, Motivation, Types of Research, Research Approaches, Significance of Research, Research Process, Criteria of Good Research

Strategy and Tools for Discovery

Strategic Planning Development Strategy and Process Assessment, Applying Search Strategies to Find Information, Discovery Procedures, types of discovery,

Method of discovery, Techniques of discovery, Different between discovery and research

UNIT-2

Research Problem Formulation:

Selecting the Problem, Necessity of Defining the Problem, Literature

Survey, Guidelines for literature review

Research Design:

Meaning of Research Design, Need for Research Design, Different Research Designs, and Basic Principles of Design.

UNIT-3

Probability, Sampling and its Distributions:

Probability laws, Probability distributions, Normal Distribution, Exponential distribution, Binomial distribution, Poisson distribution, Sampling, Sampling Design Process, Sampling Methods, Sampling distributions

Design of Experiments and Regression Analysis:

Planning of experiments, Taguchi Approach, Curve fitting, Types of regression analysis: Simple and Multiple regression analysis, Data analysis, Interpretation of results

UNIT-4 [14]

Structure of Thesis Report and thesis writing:

Preliminary Pages, Main body of Thesis, Summary, Appendices, References Stepsin writing the report, mechanics of writing, Presentation of figures and tables

Writing of papers and Synopsis:

Audience Analysis, Preparing papers for Journals, Preparation of Synopsis

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Text Books:

- 1. Research Methodology for Engineers R. Ganesan, MJP Publishers
- 2. Research Methodology: Methods and Techniques C. R. Kothari, Publisher New – AgeInternational
- 3. Research Methodology by Deepak Chawla & NeenaSodhi S. Chand Publication

References:

- 1. Business Research Methods- Naval Bajpai Pearson Publication
- 2. Uma Sekaran, Research Methods for Business, John Wiley and Sons Inc., New York, 2000.
- 3. Gupta, S.P. Statistical Methods, 30" Sultan Chand, New Delhi

Web Resources:

- 1. http://computationalengineering.mit.edu/research/methodology
- 2. http://www.asce.org/
- 3. http://www.asme.org/

MOOC:

- 1. https://nptel.ac.in/courses/121106007/
- 2. https://nptel.ac.in/courses/107108011/