

Branch Name:	Bachelor of Technology (Computer Engineering / Information Technology)
Program Code:	ET103/ET105
Course Title:	Research Methodology
Course Code:	2ET1030703T
Pre-requisite Course:	Basic understanding of the relevant discipline and fundamental statistics

Course Objectives: To develop research orientation among undergraduate engineering students by introducing the fundamentals of engineering research, technical writing, and effective research communication, including report writing, presentations, and dissertation preparation.

Teaching and Examination Scheme:

Credit	Teaching Scheme Hours per week				Evaluation Scheme (Marks)								Total (Marks)
					Theory (Marks)				Practical (Marks)				
	L	T	P	Total	SEE		CCA		SEE		CCA		
					Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
2	2	-	-	2	-	-	10	25	-	-	-	-	25

Course Contents:

Unit No	Topics	Total Hours	Weightage (%)
1	Introduction to Research Methodology: Meaning and objectives of research, Types of research fundamental research, Applied research, Experimental research, Qualitative and quantitative research, Research process and workflow, Concepts – Variables, Constructs, Hypothesis, Research problem, Characteristics of good research	4	20%
2	Research Problem Formulation and Literature Review: Identification and selection of research problems, Problem statement formulation, Research objectives and scope, Hypothesis formulation, Literature survey techniques, Sources of literature, Advance Search techniques, citation search, Use of digital libraries and indexing databases	3	15%
3	Research Design and Data Collection: Research design concepts, Experimental and non-experimental research design, Survey and case study methods, Sampling techniques, Data collection, Questionnaire design, interviews, and observation methods, Reliability and validity	5	25%
4	Technical Writing and Documentation: Components of research paper – Title, Abstract, Introduction, Literature review, Methodology, Results and discussion, Conclusion, References & citation styles, Referencing and bibliography tools, Presentation and poster preparation	5	20%
5	Research Ethics and Intellectual Property Rights: Ethics in research, Plagiarism and academic integrity, Citation ethics, Data fabrication and falsification, Copyright, Intellectual Property Rights, and patents	3	10%
6	Modern Trends in Research and Scholarly Publishing: Collaborative & AI-assisted research tools, Open access publishing, Impact factor, h-index, citation metrics, Researcher profile ids, Research funding	2	10%

Reference Books:

1. C. R. Kothari, "Research Methodology: Methods and Techniques," New Age International Publishers
2. John W. Creswell, "Research Design: Qualitative, Quantitative, and Mixed Methods Approaches," SAGE Publications
3. Raman, Meenakshi, and Sangeeta Sharma, "Technical Communication: Principle and Practice," Oxford University Press.

List of Open-Source Software/learning website:

1. <http://dl.acm.org>
2. <https://www.springer.com>
3. <https://www.sciencedirect.com>
4. <https://www.elsevier.com>
5. <https://ieeexplore.ieee.org>
6. <https://www.zotero.org>
7. <https://www.scopus.com>

Course Outcomes (CO):

Course Outcomes	Description	Bloom's Taxonomy Level
CO1	Understand research processes and methodologies	Remembering (1) Understanding (2)
CO2	Conduct literature surveys using scholarly databases & formulate research problems	Understanding (2) Applying (3)
CO3	Apply data collection and analysis techniques	Applying (3) Analyze (4)
CO4	Prepare technical reports and research papers with ethical practices	Understanding (2) Applying (3)
CO5	Use modern research and citation management tools	Applying (3)

Mapping of CO with PO and PSO:

Course Outcomes	Program Outcomes (POs)												Program Specific Outcomes (PSOs)			
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3	PSO 4
CO1	M	H	-	M	-	-	-	-	-	-	-	L	M	-	-	-
CO2	-	H	M	H	H	-	-	-	-	-	-	M	H	H	-	-
CO3	M	H	M	H	H	-	-	-	-	-	-	M	H	H	-	-
CO4	-	-	-	M	-	H	M	H	M	H	-	L	-	M	M	-
CO5	-	M	-	M	H	-	-	-	-	-	-	H	M	H	-	M

H: High, M: Medium, L: Low