

**NIRMA UNIVERSITY**  
**School of Engineering, Institute of Technology**  
**B.Tech. in Chemical Engineering**  
**Third Year /Semester VI**

<b>Institute:</b>	Institute of Technology
<b>Name of Programme:</b>	B. Tech. (All)
<b>Course Code:</b>	4FT901CC24
<b>Course Title:</b>	Research Methodology and Seminar
<b>Course Type:</b>	Core
<b>Year of introduction:</b>	2024-25

\*The course will be spread over two semesters (Semester VI and Semester VII). 4 credits will be awarded on successful completion of examination components at the end of semester 7.

	L	T	Practical component			
			LPW	PW	W	S
<b>Sem VI</b>	2	-	-	-	-	-
<b>Sem VII</b>	-	-	-	4	-	-

**Course Learning Outcomes (CLOs):**

At the end of the course, students will be able to –

1. formulate a research problem for a given engineering domain (BL4)
2. analyse the available literature for given research problem (BL4)
3. solve problems using scientific tools (BL3)
4. develop technical writing and presentation skills (BL3)
5. collaborate for research and articulate a document for possible publication (BL6)

**Semester VI:**

**Syllabus:**

**Total Teaching hours: 30**

Unit	Syllabus	Teaching hours
<b>Unit-I</b>	Introduction Introduction to research problem, sources of finding a research problem, characteristics of a research problem, pitfalls in selecting a research problem, scope and objectives of research problem, approaches of investigation of solutions for research problem.	<b>06</b>
<b>Unit-II</b>	Literature review Effective literature review approaches, literature analysis, ethics in research, data collection, analysis, interpretation, use of AI tools for literature review	<b>06</b>
<b>Unit-III</b>	Technology and computer applications Role of technology in research, Data organisation, Software selection and its applications, solving problems by using scientific software and tools, Sample programs for analysis of data	<b>06</b>

<b>Unit-IV</b>	Technical writing and presentation Effective technical writing, thesis writing, research proposal writing, research paper writing, presentation skills, tools for technical writing and presentation	<b>06</b>
<b>Unit-V</b>	Scholarly publishing IMRaD concept and design of research paper, citation and acknowledgment, plagiarism and measures to avoid it, reproducibility	<b>06</b>

### Semester VII:

#### Suggested Laboratory Project Work (not restricted to the following): (Semester VII)

<b>Sr NO</b>	<b>Title</b>	<b>Hrs.</b>
1.	Formulate a research problem for a given engineering domain.	10
2.	Perform literature survey for a given engineering domain.	12
3.	Apply a suitable computer application/software to solve/optimize a research problem for a given engineering domain.	12
4.	Perform data analysis using a suitable statistical tool(s) and data representation using appropriate software	08
5.	Writing a review/research paper and communicate the same for publication	18

#### Suggested Readings/ References:

1. Stuart Melville, Wayne Goddard, Research Methodology: An Introduction for Science and Engineering Students, Juta & Co Ltd.
2. Ranjit Kumar, Research Methodology: A Step-by-Step Guide for Beginners, Pearson.
3. C. R. Kothari, Research Methodology: Methods & Techniques, Wishwa Publication
4. D K Bhattacharyya, Research Methodology, Excel Books
5. Loraine Blaxter, Christina Hughes, Molcolm Tight, How to Research, Viva Books Pvt. Ltd.
6. Paul Oliver, Writing Your Thesis, Vistaar Publication
7. Pat Cryer, The Research Student's Guide to Success, Viva Books Pvt. Ltd.
8. R. Kumar, Research methodology a step-by-step guide for beginners, Sage Publications, London
9. C.G. Thomas, Research methodology and scientific writing, Ane books, Delhi
10. D C Montgomery, Design and Analysis of Experiments, Wiley.
11. Research papers / web articles in the field of research methodology

L = Lecture, T = Tutorial, P = Practical, C = Credit