NIRMA UNIVERSITY

Institute:	Institute of Technology, School of Technology
Name of Programme:	B. Tech. (All)
Semester:	VI and VII
Course Code:	4FT901CC24
Course Title:	Research Methodology and Seminar*
Course Type:	Core
Year of Introduction:	2024-25

Teaching and Examination Scheme:

Course Code	Semester	Course Title	Teaching Scheme				Examination Scheme (Weightage)		
			L	T	P	C	CE	LPW	SEE
4FT901CC24	VI	Research Methodology and Seminar*	2	-	-	-	0.5	0.5	-
	VII		0	0	4	4			-

*The course will be spread over two semesters (semester 6 and semester 7). 4 credits will be awarded on successful completion of examination components at the end of semester 7.

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	(BL6)
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:

Unit	Contents	Teaching hours (Total 30)
Unit-I	**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.	06
Unit-II	**Literature review:** Effective literature review approaches, literature analysis, ethics in research, data collection, analysis, interpretation, use of AI tools for literature review	06

Unit-III	**Technology and computer applications:** Role of technology in research, Data organization, Software selection and its applications, solving problems by using scientific software and tools, Sample programs for analysis of data	06
Unit-IV	**Technical writing and presentation:** Effective technical writing, thesis writing, research proposal writing, research paper writing, presentation skills, tools for technical writing and seminar presentation	06
Unit-V	**Scholarly publishing:** IMRaD concept and design of research paper, citation and acknowledgment, plagiarism and measures to avoid it, reproducibility	06

Semester VII:

Suggested Work (not restricted to the following):

Sr. No.	Title	Hours
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 and / or making seminar presentation.	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