



University of Engineering & Management Jaipur

Third Semester Syllabus

TITLE OF COURSE: TEACHING AND RESEARCH METHODOLOGY

COURSE CODE: MVLSI301

L-T-P: 3-1-0

CREDITS: 4

Course Outcomes (CO):

At the end of this course, students will demonstrate the ability to

CO1: To develop understanding of the basic framework of research process.

CO2: To develop an understanding of various research designs and techniques.

CO3: To identify various sources of information for literature review and data collection.

CO4: To develop an understanding of the ethical dimensions of conducting applied research.

Mapping of Course Outcomes (CO) and Program Outcomes (PO):

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	✓	✓	✓		✓							✓
CO2	✓			✓								✓
CO3	✓	✓	✓								✓	✓
CO4	✓	✓	✓		✓							✓

Course Contents:

Unit –I: Instruction

Introduction to content, Elements of instruction, Learning objectives, Roles of the teacher and the learner in instruction

Unit –II: Teaching and Learning

Application of theories of learning to teaching and learning, Sequence of learning and Strategies of learning, Teaching methods, their merits and demerits, Use of ICT in teaching & learning, Classroom management, Individual differences.

Unit –III: Planning for teaching and learning

Understanding the syllabus, Preparation of a scheme of work, Lesson plan preparation, Micro teaching.

Unit –IV: Assessment and Evaluation

Define measurement, assessment, test, evaluation, Purpose of assessment and evaluation, Types of tests, Grading and reporting the results assessment. Evaluating teaching and learning

Unit –V: Definition and explanation of research

Types and Paradigms of Research, History and Philosophy of Research (esp. Philosophical evolution, pathways to major discoveries & inventions), Research Process decision, planning, conducting, Classification of Research Methods; Reflective Thinking, Scientific Thinking.



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Unit –VI: Research problem formulation:

Literature review- need, objective, principles, sources, functions & its documentation, Problem formulation esp. sources, considerations & steps, Criteria of a good research problem, Defining and evaluating the research problem, Variables esp. types & conversion of concepts to variables. Research design esp. Causality, algorithmic, quantitative and qualitative designs, and various types of designs. Characteristics of a good research design, problems and issues in research design; Hypotheses: Construction, testing, types, errors; Design of experiments especially classification of designs and types of errors.

Unit –VII: Problem solving:

Understanding the problem- unknowns, data & conditions, conditions - satisfiability, sufficiency, redundancy & contradiction, Separation of parts of the problem and conditions, notations; devising a plan- connection between data and unknown, similar/related problems, reuse of previous solutions, rephrasing/transforming the problem, solving partial or related problem, Transforming data and unknowns; carrying out the plan- esp. correctness of each step in multiple ways; Evaluation of solution and method- checking correctness of solution, different derivations, utility of the solution

Unit –VIII: Data & Reports:

Infrastructural setups for research; Methods of data collection esp. validity and reliability, Sampling; Data processing and Visualization especially Classification; Ethical issues especially. bias, Misuse of statistical methods, Common fallacies in reasoning. Research Funding & Intellectual Property; Research reports: Research Proposal & Report writing esp. Study objectives, study design, problems and limitations; Prototype micro- project report implementing a major part of all the above (compulsory assignment)

Text Book:

1. Kotahri C.R., Research Methodology: Methods and Trends.
2. Stuart Melville and Wayne Goddard - Research Methodology: An Introduction for Science & Engineering Students.

Reference Books:

1. Brian W. Kernighan and Rob Pike, The Practice of Programming, Addison-Wesley, 1999.
 2. Warland J., Varaiya P., “High-Performance Communication Networks”, Morgan Kaufmann, 1996.
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**M.Tech (Microelectronics & VLSI)
Second Year, Semester-III**

A. THEORY						
Sl. No.	Subject Code	Theory	Contact Hours/Week			Credit
			L	T/P	Total	
1	MVLSI 301	Teaching Research Methodologies	3	1	4	4
TOTAL OF THEORY						4
B. PRACTICAL						
2	MVLSI 381	Advanced Digital Signal Processing Lab	0	3	3	2
3	MVLSI 382	Dissertation I /Project Viva	0	0	18	12
TOTAL OF PRACTICAL						14
TOTAL OF SEMESTER						18

**M.Tech (Microelectronics & VLSI)
Second Year, Semester-IV**

Sl.No.	Subject Code	Theory	Contact Hours/Week			Credit
			L	T/P	Total	
1	MVLSI 481	Dissertation II /Project Viva	0	0	24	20
TOTAL OF SEMESTER						20