

Third Semester Syllabus

Teaching Research Methodologies

SCE301

L-T-P: 4-0-0

Credits: 4

Pre-requisite: Basic understanding of statistics.

Introduction:

Research Methodology is a hands-on course designed to impart education in the foundational methods and techniques of academic research. It involves problem definition, research design, data collection, ethical issues in research, report writing, and presentation.

Course Outcomes (CO): Upon successful completion of this course, students should be able to:

CO1: Understand research and explain and apply research terms; describe the research process, principal activities, skills and ethics associated with the research process.

CO2: Explain the relationship between theory and research.

CO3: Describe and compare the major quantitative and qualitative research methods

CO4: Propose a research study and justify the theory as well as the methodological decisions.

CO5: Understand the importance of research ethics and integrate research ethics into the research process.

CO6: Be able to assess and critique a published journal article that uses one of the primary research methods in the field.

CO7: Be able to construct an effective questionnaire that employs several types of survey questions.

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

<u>CO</u>	<u>PO1</u>	<u>PO2</u>	<u>PO3</u>	<u>PO4</u>	<u>PO5</u>	<u>PO6</u>
CO1			✓			
CO2			✓			
CO3			✓			
CO4			✓			
CO5			✓			
CO6			✓			
CO7			✓			

Course Contents:

Module 1: Instruction: Introduction to content, Elements of instruction, Learning objectives, Roles of the teacher and the learner in instruction.

Module 2: 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.

Module 3: Planning for teaching and learning: Understanding the syllabus, Preparation of a scheme of work, Lesson plan preparation, Micro teaching.

Module 4: 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.

Module 5: Definition and explanation of research: Types and Paradigms of Research, History and Philosophy of Research, Research Process decision, planning, conducting, Classification of Research Methods; Reflective Thinking, Scientific Thinking.

Module 6: Research problem formulation: Literature review, Problem formulation, considerations & steps, Criteria of a good research problem, Defining and evaluating the research problem, Variables types & conversion of concepts to variables, Research design, Hypotheses, Design of experiments.

Module 7: Problem solving: Understanding the problem, data & conditions, redundancy & contradiction, Separation of parts of the problem and conditions, notations; devising a plan, rephrasing/transforming the problem, transforming data and unknowns, Evaluation of solution and method- checking correctness of solution, different derivations, utility of the solution.

Module 8: Data & Reports: Infrastructural setups for research; Methods of data collection, Sampling; Data processing and Visualization, Ethical issues, Misuse of statistical methods, Common fallacies in reasoning, Research Funding & Intellectual Property; Research reports: Research Proposal & Report writing. Prototype micro- project report implementing a major part of all the above (compulsory assignment)

Text Books

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

