



Course Title: Research Methodologies

Course Level: PG

Course Code: CSIT724

Credit Units:

| L | T | P/S | SW/F W | TOTAL CREDIT UNITS |
|---|---|-----|-----------|--------------------------|
| 3 | - | - | - | 3 |

Course Objectives:

The objectives of the course are:

- The students are able to recognize the steps involved in doing research work.
- The students will be able to collect data using various media and using the best possible sample available.
- The students would learn to propose their Hypothesis and build models for the problem.
- The students would be able to correctly document their findings in the form of a report.

Pre-requisites: None

Course Contents/Syllabus:

| | Weightage (%) |
|---|---------------|
| Module I : Introduction | 15 |
| Research - Types, Research process and steps, Hypothesis, Research Proposal and aspects. Research Design- Need, Problem Definition, Variables, Research Design concepts, Literature survey and review, Research design process, Errors in research. Research Modeling- Types of models, model building and stages, Data consideration and testing, Heuristic and simulation modeling. | |
| Module II: Sampling | 20 |
| Sampling and data collection- Techniques of sampling, Random, Stratified, Systematic, Multistage-sampling, Primary and secondary sources of data. Design of questionnaire. | |
| Module III : Data Collection and Experiments | 20 |
| Design of Experiments- Objectives, strategies, Factorial experimental design, designing engineering experiments, basic principles-replication, randomization, blocking, guidelines for design of experiments. | |
| Module IV : Models and Hypothesis | 25 |

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|---|-----------|
| Single factor experiment- Hypothesis testing, analysis of Variance component (ANOVA) for fixed effect model; Total, treatment and error of squares, Degrees of freedom, Confidence interval; ANOVA for random effect model, estimation of variance components, Model adequacy checking. | |
| Module V: Report Writing | 20 |
| Structure and components of Scientific Reports, Types of Report, Technical Reports and Thesis; Different steps in the preparation – Layout, structure and Language of typical reports; Illustrations and tables, Bibliography, Referencing and foot notes. Oral presentation- Planning, Preparation and practice, Making presentation, Use of visual aids, Importance of Effective Communication. Conventions and strategies of Authentication, Citation Preparing Research papers for journals, Seminars and Conferences, Design of paper using TEMPLATE, Calculations of Impact factor of a journal, citation Index, ISBN & ISSN. Preparation of Project Proposal - Title, Abstract, Introduction – Rationale, Objectives, Methodology, Time frame and work plan, Budget and Justification, References | |

Student Learning Outcomes:

After completion of this course, the student will be able to:

- Recognize the various steps involved in research.
- Collect data from samples, Examine and Analyze the data.
- Develop models for problems.
- Explain the entire process in the form of a report.

Pedagogy for Course Delivery:

The subject will be taught with the help of

- (i) Class room teaching in form of Lectures,
- (ii) Tutorial sessions including Question – Answer sessions, Assignments and Group Discussions.

| Theory L/T (%) | Lab/Practical/Studio (%) | Total (%) |
|----------------|--------------------------|------------|
| 100 | - | 100 |

Theory Assessment (L&T):

| Continuous Assessment/Internal Assessment | | | | | End Term Examination |
|--|-------------------|-------------------|-------------------|-------------------|-----------------------------|
| Components (Drop down) | Attendance | Class Test | Assignment | Case Study | |
| Weightage (%) | 5% | 10% | 5% | 10% | 70% |

Text & References:

- Design and Analysis of Experiments – Douglas C. Montgomery, Wiley India, 8th Edition, 2012.
- Research Methodology – Methods and Techniques – C.R. Kothari, New Age International, New Delhi, 2004.
- Practical Research: Planning Design – Paul D. Leddy, London, 1980.