SEMESTER III
RESEARCH SPECIFIC ELECTIVE (RSE) COURSES

Name of the Programme : M.Sc. in Data Science
Course Code : CSD-600
Title of the Course : Research Methodology
Number of Credits : 4 (4L-0T-0P)
Contact Hours : 60 hours (60L-0T-0P)
Effective from AY : 2023-24

Pre-requisites for the Course	None	
Course Objectives:	The objective of the course is to introduce the theoretical as well as practical aspects of Research	
Content:	Foundations of Research: Meaning, Objectives, Motivation, Utility. Concept of theory, empiricism, deductive and inductive theory. Characteristics of scientific method – Understanding the language of research – Concept, Construct, Definition, Variable. Research Process Problem Identification & Formulation – Research Question – Investigation Question – Measurement Issues – Hypothesis – Qualities of a good Hypothesis –Null Hypothesis & Alternative Hypothesis. Hypothesis Testing – Logic & Importance Research Design: Concept and Importance in Research – Features of a good research design – Exploratory Research Design – concept, types and uses, Descriptive Research Designs – concept, types and uses. Experimental Design: Concept of Independent & Dependent variables.	**15 hours**
	Qualitative and Quantitative Research: Qualitative research – Quantitative research – Concept of measurement, causality, generalization, replication. Merging the two approaches. Measurement: Concept of measurement– what is measured? Problems in measurement in research – Validity and Reliability. Levels of measurement – Nominal, Ordinal, Interval, Ratio. Sampling: Concepts of Statistical Population, Sample, Sampling Frame, Sampling Error, Sample Size, Non-Response. Characteristics of a good sample. Probability Sample – Simple Random Sample, Systematic Sample, Stratified Random Sample & Multi-stage sampling. Determining size of the sample – Practical considerations in sampling and sample size.	**15 hours**
	Data Analysis: Data Preparation – Univariate analysis (frequency tables, bar charts, pie charts, percentages), Bivariate analysis – Cross tabulations and Chi-square test including testing hypothesis of association. Interpretation of Data and results	**15 hours**

	Paper Writing – Layout of a Research Paper, Software for paper formatting like LaTeX/MS Office. Journals in Computer Science, Impact factor of Journals, When and where to publish? Ethical issues related to publishing, Plagiarism and Self-Plagiarism. Software for detection of Plagiarism . Use of Encyclopedias, Research Guides, Handbook etc., Academic Databases for Computer Science Discipline. Use of tools / techniques for Research: methods to search required information effectively, Reference Management Software like Zotero/Mendeley	**15 hours**
Pedagogy:	Lecture/Presentations/Assignments/Case Study/	
References/ Readings	1. Business Research Methods – Donald Cooper & Pamela Schindler, TMGH, 9th edition 2. Business Research Methods – Alan Bryman & Emma Bell, Sixth Edition, Oxford University Press. 3. Research Methodology: Methods and Techniques, C.R.Kothari, Second Revised Edition, New Age International Publishers	
Course Outcomes	After completion of this course, students will – 1. Understand how to formulate a research problem 2. Understand data collection and analysis techniques 3. Understand all aspects related to publishing research papers	

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