

# **Tribhuvan University**



## **Institute of Science and Technology SCHOOL OF MATHEMATICAL SCIENCES Syllabus**

### **Master's in Data Sciences (MDS)- THIRD SEMESTER**

#### **Compulsory Courses**

<b>Course Code</b>	<b>Course Titles</b>	<b>Credits</b>	<b>Nature</b>
MDS 601	Research Methodology	3	Th.
MDS 602	Advanced Data Mining	3	Th.+ Pr.
MDS 603	Techniques for Big Data	3	Th.+ Pr.

#### **Elective Courses (Any Two Available on School)**

<b>Course Code</b>	<b>Course Titles</b>	<b>Credits</b>	<b>Nature</b>
MDS 604	Cloud Computing	3	Th.+ Pr.
MDS 605	Regression Analysis	3	Th.+ Pr.
MDS 606	Decision Analysis	3	Th.+ Pr.
MDS 607	Monte Carlo Methods	3	Th.

**Code No. : MDS 601**

**Course Title: Research Methodology**

**Nature: Theory (Compulsory)**

**Full Marks: 75**

**Credit: 3**

### ***Course Description***

The paper deals with different essential components of research methodology mostly focusing on quantitative research work. It explains the fundamental notions of research methodology, formulation of research problems and hypothesis, different aspects of review of literature and study designs. It also deals with the practical aspects of sampling, choice of appropriate data analysis technique(s) and interpretations of statistical findings with reference to the data problem. Finally, how a research report, journal article is prepared, tools and techniques used in preparing journal articles, ethical issues and the issues of plagiarism are included. The tutor should involve the students practically in preparing the project proposals and thesis proposals, which they will be going to conduct in the next semester.

### ***Learning Objectives***

After completion of the course, students will be able to

- Understand the need and importance of research methodology
- Formulate research problem, research hypothesis
- Know the skills of reviewing literature, citation and referencing
- Understand the different types of research design
- Perform online searching and prepare research/ project proposal
- Choose appropriate statistical tools and interpret the results
- Know how to prepare research reports and journal articles

### ***Course Contents:***

#### **Unit 1: Introduction to Research Methodology**

**[5 Hrs.]**

Meaning, objectives, need, utility, research methods and methodology, Deductive and inductive theory, Characteristic of scientific method, Research language, concept, constructs, research process

#### **Unit 2: Research Problem Identification and Formulation**

**[5 Hrs.]**

Understanding research problem and its formulation, Statement of research problem, Research question, Research hypothesis, Statistical hypothesis, Linkage between research hypothesis and statistical hypothesis

#### **Unit 3: Review of Literature and Research Design**

**[12 Hrs.]**

Importance of review of literature in research work, Review of research journals, Use of encyclopedia, reference books, research guides, handbooks, academia database in the relevant field, Citations and referencing, American Psychological Association(APA), IEEE style, Bibliography; Need and importance of research design, Exploratory, descriptive, analytical, and experimental research design; Online searching: Different database, SCIFinder, Scopus, Science direct, Searching research articles, Citation index, Impact factor, H-index; Preparation of project proposals and research proposals

#### **Unit 4: Data Analysis and Interpretations**

**[15 Hrs.]**

Concept of measurement and scaling, Validity and reliability, Levels of measurement- nominal, ordinal, interval and ratio scales; Sampling: Concepts of statistical population, sample survey, sampling frame, target population, sampling and non-sampling errors, Issues of choosing appropriate sampling technique(s) while selecting samples in the study, sample size, issues of practical considerations in sampling and sample size; Use of appropriate statistical tests and models, interpretations of statistical findings in terms of problem specific sense

#### **Unit 5: Preparation of Research Report**

**[11 Hrs.]**

Preparation of academic and other reports, Formats of research reports (both academic and others), Research paper writing, layout of research paper, Journals in relevant field, Impact factor journals, Communications in the journals for publishing research article, Plagiarism, ethical issues in research and publishing the articles, Techniques and tools used for research: Effective way of searching research materials, Handling reference management software such as Mendeley, research paper formatting software such as LaTeX, MS Office.

#### **References:**

1. Kothari C. R. (2014). *Research Methodology, Methods and Techniques*, 3<sup>rd</sup> Edition, New Age international Publishers, New Delhi, India.
2. Kumar Ranjit(2011). *Research Methodology: A Step by Step Guide for Beginners*, SAGE Publications Pvt. Ltd, India.
3. Creswell J.W.(2014). *Research Design: Qualitative, Quantitative and Mixed Methods Approaches*, 4<sup>th</sup> Edition, SAGE Publications, India.
4. Day Robert A. (1996). *How to Write and Publish Scientific paper*, Cambridge University Press
5. Relevant updated References from the internet

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