

2025

M.Sc. 1st Semester Examination

COMPUTER SCIENCE

Paper : COSC403X8

(Research Methodology and Ethics Lab)

(Practical)

Full Marks : 15

Time : One Hour

The figures in the margin indicate full marks.

Answer any *one* question : 10×1=10

(Choose the question on the lottery basis)

1. Create a LaTeX document with the following specifications : document class : article, font size : 12pt. paper size : A4, margins : 1 inch on all sides. Include suitable packages for the document.
2. Create a comprehensive research proposal template with the following components : proposed title, name and affiliation, supervisor name, date, university logo placeholder, abstract, introduction with subsections, research methodology with subsections etc.

3. Design a sampling plan for a study on "Employee Job Satisfaction in IT Companies". Create a LaTeX document describing the following : population definition, sampling frame, sample size calculation, sampling technique justification. Create a stratified sampling plan table showing : job level, population size, proportion, sample size.

4. Create a comprehensive data codebook in LaTeX for a dataset containing : ID, Age, Gender, Education, Income. The codebook table must include columns for variable name, variable label, data type, valid range.

5. Write a Python script to import a CSV file, identify and handle missing values, detect and remove outliers, check for duplicate entries, and export cleaned data to a new CSV file.

6. Using the csvsimple package imports statistics from a file into a LaTeX document and create professional statistical tables using the booktabs package with clear column headers, proper alignment, table caption and label.

7. Create a Scatter Plot in LaTeX document to show with pgfplots with two variables like hours of coding practice (X-axis) vs. bug count (Y-axis) to see if more practice helps to reduce errors in the code.
8. Generate a sample scientific paper with LaTeX having proper sections and subsections. Manage the references in the paper using BibTeX. Create a BibTeX file (.bib) with at least 15 references including journals, books, book chapters and conference proceedings.
9. Write a LaTeX document to create a Bar chart using pgfplots package to show amount of rainfall over the years.
10. Design a slide using beamer package to explain 5 different types of sorting algorithms used in computer science.