MST1102 Guide 2019

| **Schedule** | | **Content** |
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| **Week** | **Session** |  |
| Week 1 | 1 | Definition & scope of statistics. Importance of statistics in the sciences. Characteristic of data. Variable: quantitative and qualitative variable. Measurement scales: Nominal, Ordinal, Interval and Ratio scales. Raw data, categorized data. Discrete & continuous variable, Accuracy and precision of data. |
|  | 2 | Definition and explanation of terms used in statistics: population, sample, replication and randomization, parameter, statistics, estimate, parametric vs. non-parametric statistics. |
| Week 2 | 1 | Data Presentation: Tabular, graphical, Frequency distribution, histogram & Frequency polygon, Cumulative frequency distributions, Relative frequency distribution, Stem and leaf display, box and whisker plot, bar chart, line graphs & pie chart. |
| 2 | Group data presentation: Class interval, class boundary and class width. Graphic presentation of frequency distribution: Computer aided presentations. |
| Week 3 | 1 | Statistics of location/ Central tendency. Measures of central tendency: mean, median and mode. Relationship between mean, median and mode. Computer aided calculations. |
| 2 | Measures of Dispersion: variance, standard deviation, Coefficient of Variation, methods for computing mean and standard deviations, standard errors. Computer aided calculations. |
| Week 4 | 1 | Probability distribution. Probability concepts: events, space, independent and dependent events. |
| 2 | Relative frequencies and subjective probabilities, complement and independent trials. Conditional Probability, disjointed and independent events, rules of addition and multiplication |
| Week 5 | 1 | Discrete Random variables: Expectation and variance; |
| 2 | Discrete Random variables: Binomial random variables; Mean, variance and probability of binomial random variable. |
| Week 6 | 1 | Continuous Random Variable: Normal distributions; probabilities of a normal distribution. Finding probabilities using a standard normal table. Finding the proportion under the curve. |
| 2 | Finding probabilities using a standard normal table. Finding the proportion under the curve. |
| Week 7 | 1 | **Test 1** |
| 2 | Sampling distribution of a sample mean; Sampling distribution for sample proportion. Assumptions of parametric statistics. |
| Week 8 | 1 | Hypothesis testing of a single mean. Type 1 and Type II errors. |
| 2 | Introduction to t distribution. Introduction to confidence intervals. Confidence intervals for population mean. |
| Week 9 | 1 | Finding sample size for estimating a population mean. One sample analysis: One tailed and two tailed hypothesis tests. |
| 2 | Comparing two groups. Hypothesis testing of two means. |
| Week 10 | 1 | Comparing two independents means; comparing paired means. |
| 2 | Constructing confidence Interval for the difference of two means.  Computer aided calculation and its interpretation using statistical software. |
| Week 11 | 1 | Comparing multiple means. Analysis of Variance - F-Ratio. |
| 2 | Comparing multiple means. Analysis of Variance - F-Ratio. |
| Week 12 | 1 | Introduction to regression. Regression equation, slope and intercept. Coefficient of determination. Simple linear regression using software. |
| 2 | Linear Regression. Transformation of data. Correlation and correlation coefficient. Computer aided calculation and its interpretation using statistical software. |
| Week 13 | 1 | Non-Parametric comparisons of two populations: Association tests and Goodness of fit. Chi - square distribution. |
| 2 | Chi - square distribution. Proportion and count data, Contingency tables. |
| Week 14 | 1 | Test 2. |
| 2 | Presentations of research data of group assignment. Computer aided calculation and its interpretation using statistical software. |
| Week 15 | 1 | Presentations of research data of group assignment. Computer aided calculation and its interpretation using statistical software. |
| 2 | Revision |

**Laboratory Content Guide**

| **Schedule** | **Content** |
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| Week 1 | ------ |
| Week 2 | Understanding the software system and how it is organized. Reading in and imputing data. Producing and saving and exporting results. Transferring results to a word document. Reviewing variables and metadata in the software system. Labelling variables and data values. Setting missing value codes. Recoding data. Transforming data. |
| Week 3 | *Data Tabulation:*  Frequency and relative frequency distributions, cross-tabulations (contingency tables)  Cumulative frequency distributions |
| Week 4 | *Data Tabulation:*  Frequency and relative frequency distributions, cross-tabulations (contingency tables)  Cumulative frequency distributions |
| Week 5 | *Diagrams:*  Stem and leaf display, bar charts, pie charts, box and whisker plots, histograms & frequency polygon, frequency and cumulative frequency curves, line graphs. |
| Week 6 | *Diagrams:*  Stem and leaf display, bar charts, pie charts, box and whisker plots, histograms & frequency polygon, frequency and cumulative frequency curves, line graphs. |
| Week 7 | *Measures of central tendency & Dispersion:*  Mean, median and mode, minimum, maximum, variance, standard deviation, standard errors |
| Week 8 | Estimating and comparing means and proportions. Generating test results and producing confidence intervals with different levels of confidence. |
| Week 9 | Estimating and comparing means and proportions. Generating test results and producing confidence intervals with different levels of confidence. |
| Week 10 | Paired t-test, independent samples t-test (also assuming that the variances are equal) |
| Week 11 | Generating results for Analysis of variance |
| Week 12 | Computing correlation coefficients  Computing regression equations and conducting hypothesis tests about regression equations and coefficients. |
| Week 13 | Producing cross-tabulations. Conducting tests of association and estimating odds ratios. |
| Week 14 | Presentations |
| Week 15 | Presentations |