

**B.Sc. Degree Program**

Faculty of Applied Sciences

University of Sri Jayewardenepura

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| **Course Title** | Descriptive Statistics |
| **Course Code** | STA 113 2.0 |
| **Credit Value** | 02 |
| **Status** | Core |
| **Year / Level** | Year 1 |
| **Semester** | 1 |
| **Theory: Practical: Independent Learning** | 30: 00:70 |
| **Other: Pre-requisite Course/s** | None |

**Aim of the Course:**

The aim of this course unit is to introduce basic concepts and techniques used in descriptive statistics.

**Intended Learning Outcomes (ILOs):**

**Aim of the Course:**

*On the successful completion of this course, the student should be able to:*

1 Explain the concepts and techniques related to descriptive statistics

2 Apply the concepts and techniques related to descriptive statistics in solving real life problems.

3 Demonstrate clear and coherent communication skills using summary measures, tables, graphs, and charts

4 Demonstrate ability of active team work to produce simple statistical reports

5 Critically analyze data and statistical reports and interpret results

**Course Content:**

1. **I**ntroduction to Statistics

* Definition of statistics
* Role of statistics in society
* History of statistics, Branches of statistics
* Scope and limitations of statistics
* Terminology used in statistics

1. Data Collection

* Steps of data collection
* Observational and experimental studies
* Primary and secondary data
* Population and sample
* Sampling
* Methods of collecting data

1. Exploring, Summarization and Presentation of Data

* Types of data
* Scales of measurements
* Exploring data (one way and two-way frequency tables, box plots, stem and leaf plots, histograms, scatter plots, time series plots)
* Classification of data
* Desirable properties of a summary measure
* Measures of central tendency (mean, median, mean, weighted mean, harmonic mean, geometric mean, Quadratic mean)
* Measures of dispersion (range, Inter quartile range, quartile deviation, variance, standard deviation)
* Skewness and its measures of skewness (Pearson’s and Bowley’s)
* Kurtosis
* Association between two variables (cross tabulation, Pearson’s product moment correlation coefficient, Spearman’s rank correlation coefficient)
* Tables (one way and two-way frequency tables, tables of summary measures)
* Charts (simple and multiple, component, percentage component bar charts, pie charts, pictograms)
* Graphs (line graphs, area graphs)
* Misuse of statistics

**Session Breakdown and Learning Activities:**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Topic  No. | Topic / Sub Topic | No. of Hrs. | | | Teaching Method | Assessment Criteria | ILO  Alignment |
| Teaching | Practical | Independent Learning |
| 1.1 | Definition of statistics, Role of statistics in society, History of statistics | 2 | 0 | 5 | Lecture / Handout/ Individual assignment |  | 1 |
| 1.2 | Branches of statistics, Scope and limitations of statistics, Terminology used in statistics | 2 | 0 | 5 | Lecture / Handout/Group discussion |  | 1 |
| 2.1 | Steps of data collection, Observational and experimental studies, | 2 | 0 | 5 | Lecture/ Handout |  | 1, 2 |
| 2.2 | Population and sample, Sampling | 2 | 0 | 5 | Lecture / Handout |  | 1, 2 |
| 2.3 | Methods of collecting datada data | 2 | 0 | 6 | Group assignment/Lecture/ Handout |  | 1, 2 |
| 2.3 | Methods of collecting data | 2 | 0 | 6 | Mid semester examination/Lecture / Handout/Group assignment | 20% Final Marks | 1, 2, 3, 4 |
| 3.1 | Types of data, Scales of measurements,  Exploring data (one way and two way frequency tables), Charts (simple and multiple, component, percentage component bar charts, pie charts, pictograms) | 2 | 0 | 5 | Lecture/ Handout/Group assignment |  | 1, 2, 3, 4 |
| 3.2 | Exploring data (box plots, stem and leaf plots, histograms, scatter plots, time series plots), Graphs (line graphs, area graphs), Classification of data | 2 | 0 | 5 | Lecture / Handout/Group assignment |  | 1, 2, 4 |
| 3.3 | Desirable properties of a summary measure, Measures of central tendency (mean, median, mean, weighted mean, harmonic mean, geometric mean, Quadratic mean) | 3 | 0 | 8 | Lecture / Handout/Group assignment |  | 1, 2, 4 |
| 3.4 | Measures of dispersion (range, Inter quartile range, quartile deviation, variance, standard deviation) | 3 | 0 | 6 | Lecture / Handout/Group assignment |  | 1, 2, 4 |
| 3.5 | Skewness and its measures (Pearson’s and Bowley’s), Kurtosis | 3 | 0 | 4 | Lecture / Handout/Group assignment |  | 1, 2, 4 |
| 3.6 | Association between two variables (cross tabulation, Pearson’s product moment correlation coefficient, Spearman’s rank correlation coefficient) | 3 | 0 | 6 | Lecture / Handout /Group assignment | 10% Final Marks | 1, 2, 3, 4 |
| 3.7 | Misuse of statistics  Revision/problem solving | 2 | 0 | 4 | Lecture / Handout |  | 1,2, 3, 5 |
|  | *Total* | 30 | 00 | 70 |  |  |  |

**Program Learning Outcomes:**

Upon successful completion of the B.Sc. degree programme, a graduate will be able to,

1. Demonstrate competency in theoretical knowledge and practical and/or technical skills in respective subject areas
2. Communicate efficiently and effectively in the respective field of study using written, oral, visual and/or electronic forms.
3. Facilitate and participate as an empathetic and emotionally intelligent team player with leadership qualities, in a group, diverse team or organization.
4. Apply subject knowledge and skills creatively in making appropriate judgments in changing situations.
5. Integrate creativity and innovation to achieve entrepreneurial competencies.
6. Implement solutions in keeping with ethical, societal and environmental norms and need for sustainable development.
7. Secure lifegoals through lifelong learning with the aim of strengthening professional skills, and ensuring the betterment of the community.

**Linking Program Learning Outcomes with ILOs:**

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| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **PLO 1** | **PLO 2** | **PLO 3** | **PLO 4** | **PLO 5** | **PLO 6** | **PLO 7** |
| **ILO 1** | **\*\*\*** | **\*** |  | **\*\*** |  | **\*** | **\*** |
| **ILO 2** | **\*\*\*** | **\*** | **\*** | **\*\*\*** | **\*** | **\*** | **\*** |
| **ILO 3** | **\*\*\*** | **\*\*\*** | **\*\*\*** | **\*\*** | **\*** | **\*** | **\*** |
| **ILO 4** | **\*\*\*** | **\*\*\*** | **\*\*\*** | **\*\*\*** | **\*\*** | **\*\*** | **\*\*** |
| **ILO 5** | **\*\*\*** | **\*\*** | **\*\*** | **\*\*\*** | **\*\*\*** | **\*\*\*** | **\*\*** |

*\*\*\* - Strongly Linked; \*\* - Medium linked; \* Weakly linked*

**Mode of Assessment:**

**Formative Assessment (FA):** Groupassignment: 10% of the total marks

Mid semester examination: 20% of the total marks

**Summative Assessment (SA):** End of Semester Examination: 2-hour paper covering Structured

Essay type questions - 70% of the total marks

**References:**

1. Black, Ken, John Asafu-Adjaye, P. Black, Nazim Khan, Gerard King, Nelson Perera, Carl Sherwood, Reeta Verma, and Saleh Wasimi. *Australasian business statistics*. CQ University, 2013.
2. Gupta, S. C., and V. K. Kapoor. *Fundamentals of mathematical statistics*. Sultan Chand & Sons, 2020.
3. Talagala, T. S. (2024). Course website: STA 113 2.0 Descriptive Statistics, <https://thiyangt.github.io/descriptivestatisticsweb/>