**STATISTICS - I**

1. **Course Description**

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| **Course Code** |  |
| **Course Title** | **Statistics I** |
| **Credit Hours** | 3 |
| **Prerequisites by Course(s) and Topics** | Basic knowledge of combinatorics is desirable. |
| **Subject related CS courses.** | Some of the related courses are: Probability and statistics, Biostatistics, Basic Maths |
| **Assessment Instruments with Weights** | Assignment (10%), Quiz (15%), Class participation (10%), Mid Term (20%), Final Term (45%) |
| **Semester** | Spring 2022 |
| **Course Instructor** | Ms. Huma Rehman, Ms. Aurooj Butt, Ms Sehar Malik, Mr Suhail Ahmad, Zainab Manzoor, Umama Tahir, Madiha Fatima, Rubina Naz |
| **Course Instructor Email** | [humarehman@ucp.edu.pk](mailto:humarehman@ucp.edu.pk)  [aurooj.butt@ucp.edu.pk](mailto:aurooj.butt@ucp.edu.pk) |
| **Course Coordinator** | Ms Huma Rehman |
| **Help Material** | * Introductory Statistics by Barbara Illowsky, De Anza College, Susan Dean, De Anza * Probability and Statistics for Engineers and Scientists by Walpole * Advanced Level STATISTICS 1 by Steve Dobbs and Jane Miller * Discrete Mathematics and its applications, Kenneth H. Rosen. * Mathematics for Computer Science, Eric Lehman. (MIT) |
| **Course Introduction** | This course introduces Statistics with emphasis on Probability with application. Topics include variables and their types, pattern of variations, randomness of variables, Combinatorics, probability distributions, Bayesian inference, and linear regression. |
| **Course Objectives** | The students should achieve a good command of analytical methods and decision-making tools. |
| **Course Goals** | * Learn the language of probability with core concepts of theory. * Become an informed consumer of statistical information. * Be able to handle further queries/ courses in future involving concepts studied in this course. |

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| **Week #** | **Lecture #** | **Contents** | **Instrument** |
| 1 | 1 | **Sampling and Data**  Definitions of Statistics, Probability, and Key Terms  Data, Sampling, and Variation in Data and Sampling  Frequency, Frequency Tables, and Levels of Measurement |  |
| 1 | 2 | Experimental Design and Ethics  Data Collection Experiment  Sampling Experiment |  |
| 2 | 3 | **Descriptive Statistics**  Stem-and-Leaf diagrams  Histograms |  |
| 2 | 4 | Measures of the Location of the Data | Assignment 1 |
| 3 | 5 | Cumulative frequency graphs.  Box Plots | Quiz 1 |
| 3 | 6 | Measures of the Center of the Data |  |
| 4 | 7 | Skewness and the Mean, Median, and Mode |  |
| 4 | 8 | Measures of the Spread of the Data  Descriptive Statistics |  |
| 5 | 9 | **Probability**  Terminology  Independent and Mutually Exclusive Events | Assignment 2 |
| 5 | 10 | Two Basic Rules of Probability  Contingency Tables |  |
| 6 | 11 | Tree and Venn Diagrams  Probability Topics |  |
| 6 | 12 | **Discrete Random Variables** |  |
| 7 | 13 | Probability Distribution Function (PDF) for a Discrete Random Variable | Quiz 2 |
| 7 | 14 | Mean or Expected Value and Standard Deviation |  |
| 8 | 15 | Revision |  |
| 8 | 16 | Revision |  |
| 9 |  | **Mid Term** |  |
| 10 | 17 | Binomial Distribution |  |
| 10 | 18 | Binomial Distribution with practice questions |  |
| 11 | 19 | Geometric Distribution with practice questions | Assignment 3 |
| 11 | 20 | **The Normal Distribution** |  |
| 12 | 21 | The Standard Normal Distribution | Quiz 3 |
| 12 | 22 | Using the Normal Distribution |  |
| 13 | 23 | Confidence interval using z-distribution |  |
| 13 | 24 | Confidence interval using t-distribution | Assignment 4 |
| 14 | 25 | Hypothesis testing (t and Z Test ) |  |
| 14 | 26 | Practice Questions |  |
| 15 | 27 | Linear Regression and Correlation;   * Linear Equations * Scatter plots   The Regression Equation | Quiz 4 |
| 15 | 28 | Predictions  Outliers  Covariance And Correlation |  |
| 16 | 29 | Revision |  |
| 16 | 30 | Revision |  |
|  |  | **FINAL TERM** |  |

Book Link: <https://openstax.org/details/books/introductory-statistics>