



Course Specification

Course Name: [Probability and Statistics - 1]

Course Code: [ST121]

I. Basic Course Information

Major or minor element of program: General

Department offering the course: Faculty

Academic level: 100 Level

Semester in which course is offered: Second (spring) Semester

Course pre-requisite(s): Mathematics - 1

Credit Hours: 3

Contact Hours Through:

| Lecture | Tutorial * | Practical * | Total |
|---------|------------|-------------|-------|
| 2.5 | 1.5 | 0.0 | 4.0 |

* 1.5 hours for **either** Tutorial or Practical

Approval date of course specification: January 2015

II. Overall Aims of Course

The aim of the course is to provide students with an introduction to statistics and probabilities so that they can apply these rules to real-life decision making problems. This includes furnishing students with basic definitions pertaining to the field including data and the collection of data. Then given data, a discussion of data analysis is presented, where the important descriptive statistical techniques are introduced. Since knowledge of probability is a prerequisite to an understanding of statistics, the course then proceeds to a discussion of probability and probability distributions.

III. Program ILOs covered by course

| Program Intended Learning Outcomes (By Code) | | | |
|--|---------------------|---------------------|----------------|
| Knowledge & Understanding | Intellectual Skills | Professional Skills | General Skills |
| K13,K14 | I5 | P8 | G2,G5,G9 |



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IV. Intended Learning Outcomes of Course (ILOs)

a. Knowledge and Understanding

- K.1 Distinguish between key definitions: population vs. sample, primary vs. secondary data types, qualitative vs. quantitative data, and time series vs. cross-sectional data.
- K.2 Explain the difference between descriptive and inferential statistics.
- K.3 Describe the differences and similarities between different sampling methods.
- K.4 Discuss how to categorize data by type and level of measurement.
- K.5 Distinguish between different techniques for describing and displaying data numerically and graphically.
- K.6 Distinguish between different statistical measures: central tendency, dispersion, location, and others.
- K.7 Explain different approaches to assessing probabilities.
- K.8 Distinguish between discrete and continuous probability distributions.
- K.9 Recognize when to apply different types of distributions.

b. Intellectual/Cognitive Skills

- I.1 Interpret data presented in frequency distributions or graphically.
- I.2 Compute and interpret different central tendency measures, dispersion measures, measures of location, and other measures such as the coefficient of variation, skewness, kurtosis, and z scores.
- I.3 Use numerical measures along with graphs, charts, and tables to describe data.
- I.4 Apply common rules of probability, including Bayes' Theorem for conditional probabilities.
- I.5 Calculate and interpret the expected value of a discrete random variable.
- I.6 Compute probabilities for different discrete probability distributions: binomial, Poisson, and hypergeometric distributions.
- I.7 Determine probabilities associated with a continuous probability distribution: normal, uniform, or exponential.

c. Practical/Professional Skills

- P.1 Construct and interpret tabular and graphical data representations: frequency distribution, histogram, bar charts, pie charts, line charts, scatter diagrams, and stem-and-leaf diagrams.
- P.2 Apply different statistical measures to real-life problems.
- P.3 Construct and interpret a box and whisker graph.
- P.4 Apply the discrete and continuous probability distributions to business decision-making situations.
- P.5 Determine probabilities using distribution tables.

d. General and Transferable Skills

- G.1 Demonstrate ability in time management, organization skills.
- G.2 Show the ability to identify, understand, and present the quantitative dimensions of a problem.
- G.3 Demonstrate problem solving skills.



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V. Course Matrix Contents

| | Main Topics / Chapters | Duration (Weeks) | Course ILOs Covered by Topic (By ILO Code) | | | |
|----|---|------------------|--|--------|--------|------------|
| | | | K & U | I.S. | P.S. | G.S. |
| 1- | Introduction - Basic Definitions | 1 | K1, K2, K3, K4 | | | |
| 2- | Describing Data: Graphs, Charts, and Tables | 2 | K5 | I1, I3 | P1 | G1, G2, G3 |
| 3- | Describing Data Using Numerical Measures - Statistics | 3 | K6 | I2, I3 | P2, P3 | G1, G2, G3 |
| 4- | Using Probability and Probability Distributions | 3 | K7 | I4, I5 | | G1, G2, G3 |
| 5- | Discrete Probability Distributions | 2 | K8, K9 | I6 | P4, P5 | G1, G2, G3 |
| 6- | Continuous Probability Distributions | 2 | K8, K9 | I7 | P4, P5 | G1, G2, G3 |
| | | | | | | |
| | Net Teaching Weeks | 13 | | | | |

VI. Course Weekly Detailed Topics / hours / ILOs

| Week No. | Sub-Topics | Total Hours | Contact Hours | |
|----------|---|-------------|-------------------|-------------------|
| | | | Theoretical Hours | Practical Hours * |
| 1 | What is statistics? Tools for collecting data/ Populations, samples, and sampling Data types & measurement level | 2.5 | 2.5 | |
| 2 | Describing Data (Graphically & Tables) Frequency distributions & histograms | 4 | 2.5 | 1.5 |
| 3 | Describing Data (Graphically & Tables) Bar charts, pie charts, & stem leaf Line charts & scatter diagrams | 4 | 2.5 | 1.5 |
| 4 | Describing Data (Numerically) Central Tendency Measures (Mean, Mode, Median, Weighted Mean) | 4 | 2.5 | 1.5 |
| 5 | Describing Data (Numerically) Dispersion Measures (Range, Mean Deviation, Variance, and Standard Deviation) | 4 | 2.5 | 1.5 |
| 6 | Describing Data (Numerically) Location Measures (Percentiles, Quartiles), Interquartile range, Box and whisker plot Other Measures (Kurtosis, Skewness, coefficient of variation) | 4 | 2.5 | 1.5 |
| 7 | Midterm Exam | | | |



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|-----------------------------|---|-----------|-----------|-----------|
| 8 | Probability Basics of Probabilities (Events & sample space, tree diagrams, mutually exclusive) Methods of Assigning Probability | 4 | 2.5 | 1.5 |
| 9 | Probability Probability Rules (Addition rule, Complement rule) Conditional Probability | 4 | 2.5 | 1.5 |
| 10 | Probability Multiplication Rule Bayes' Theorem | 4 | 2.5 | 1.5 |
| 11 | Discrete Probability Distributions Introduction The Binomial probability distribution | 4 | 2.5 | 1.5 |
| 12 | Discrete Probability Distributions The Poisson distribution The Hypergeometric distribution | 4 | 2.5 | 1.5 |
| 13 | Continuous Probability Distribution The Normal probability distribution | 4 | 2.5 | 1.5 |
| 14 | Continuous Probability Distribution Uniform probability distribution The Exponential probability distribution | 4 | 2.5 | 1.5 |
| 15 | Final Exam | | | |
| Total Teaching Hours | | 51 | 33 | 18 |

* No Practical/Tutorial during the first week of the semester

VII. Teaching and Learning Methods

| Teaching/Learning Method | Selected Method | Course ILOs Covered by Method (By ILO Code) | | | |
|---|-----------------|---|---------------------|---------------------|----------------|
| | | K & U | Intellectual Skills | Professional Skills | General Skills |
| Lectures & Seminars | ✓ | All | All | All | G2,G3 |
| Tutorials | ✓ | All | All | All | G1,G2,G3 |
| Computer lab Sessions | | | | | |
| Practical lab Work | | | | | |
| Reading Materials | | | | | |
| Web-site Searches | | | | | |
| Research & Reporting | | | | | |
| Problem Solving / Problem-based Learning | | | | | |
| Projects | | | | | |
| Independent Work | | | | | |
| Group Work | | | | | |
| Case Studies | | | | | |
| Presentations | | | | | |
| Simulation Analysis | | | | | |
| Others (Specify): | | | | | |



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VIII. Assessment Methods, Schedule and Grade Distribution

| Assessment Method | Selected Method | Course ILOs Covered by Method (By ILO Code) | | | | Assessment Weight / Percentage | Week No. |
|---------------------|-----------------|---|---------|---------|------|--------------------------------|----------|
| | | K & U | I.S. | P.S. | G.S. | | |
| Midterm Exam | ✓ | K1 – K6 | I1 – I3 | P1 – P3 | All | 20% | 7 |
| Final Exam | ✓ | All | All | All | All | 60% | 15 |
| Quizzes | ✓ | K1 – K7 | I1 – I6 | P1 – P4 | All | 10% | 5,11 |
| Course Work | ✓ | All | All | All | All | 10% | All Term |
| Report Writing | | | | | | | |
| Case Study Analysis | | | | | | | |
| Oral Presentations | | | | | | | |
| Practical | | | | | | | |
| Group Project | | | | | | | |
| Individual Project | | | | | | | |
| Others (Specify): | | | | | | | |

IX. List of References

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|--|---|
| Essential Text Books | <ul style="list-style-type: none"> Title: Probability and Mathematical Statistics Author: Sheldon M.Ross Edition: First Edition (Academic Press) |
| Course notes | <ul style="list-style-type: none"> None |
| Recommended books | <ul style="list-style-type: none"> Title: STATISTICS for Business and Economics Author: Mc Clave, Benson, and Sincich Edition: Eighth Edition Title: Statistical Thinking for Managers Author: Hildebrand/Ott Edition: Fourth Edition |
| Periodicals, Web sites, etc ... | <ul style="list-style-type: none"> None |

X. Facilities required for teaching and learning

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| List the facilities required <ul style="list-style-type: none"> Teaching aids Computer aided data show White boards |
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Course coordinator: Ass. Prof. El-Sayed Elsherpieny

Head of Department: Prof. Reda Abd el-Wahab

Vice Dean for Education and Student affairs

Date: January 2015