**Menoufiya University**

**Faculty of Computers and Information**

**Department of  Computer Science**

جامعة المنوفية

كلية الحاسبات والمعلومات

قسم علوم الحاسب

# COURSE SPECIFICATIONS

## (STATISTICS AND PROBABILITY)

**Programme(s) on which the course is given**    CS, IT, IS and OR

**Major or Minor element of programs**    Major

**Department offering the program**    Computer Science

**Department offering the course**    Information Technology

**Academic year / Level**    1st Year / 2nd Semester

## A- Basic Information

| Title | Statistics and Probability | | Code | | ST111 |
|-------|---------|--------|------|------|------|
| Credit Hours | Lecture | 3 | Tutorial | 3 | Practical | - |
| | Total | | | | 6 |

## B- Professional Information

### 1- Overall aims of course

- Understand the principles and theories  probability theories and basics of statistics
- Understand methods of processing statistical data
- Understand and application of statistical data.

### 2- Intended learning outcomes of course (ILOs)

**a- Knowledge and understanding**

**a1**    Know and understand the essential mathematics relevant to computer science.

**a4**    Know and understand the fundamental concepts, principles and theories of computing and computer science covering topics such as algorithms, operating system, programming languages and artificial intelligence.

**b- Intellectual skills**

**b1**    Solve a wide range of problems related to the analysis, design and construction of computer systems

**c- Professional and practical skills**

**d- General and transferable skills**

**d6**    Employ discrete mathematical skills as appropriate.

### 3- Contents

| | Topic | No. of Hours | Lecture | Tutorial / Practical |
|---|---|---|---|---|
| **1** | **Elementary probability and the binomial distribution** | **9** | **9** | **18** |
| | • Introduction<br>• Probabilities of Simple Events<br>• Probabilities of Two Events<br>• Probabilities for Combinations of Three or More Events<br>• Permutations and Combinations<br>• More Probability<br>• The Binomial Distribution<br>• The Theoretical Mean of the Binomial Distribution<br>• The Theoretical Variance of the Binomial Distribution<br>• Exercises | | | |
| **2** | **The normal distribution** | **6** | **6** | **12** |
| | • Introduction<br>• The Normal Distribution<br>• Use of Standard Normal Tables<br>• More Normal Probabilities<br>• The Normal Approximation to the Binomial Theorem<br>• Exercises | | | |
| **3** | **Statistics** | **6** | **6** | **12** |
| | • The Present Importance of Statistics<br>• Two Kinds of Statistics<br>• Description of data.<br>• Selecting a Random Sample<br>• Classification of Data<br>• Frequency Distributions and Cumulative Frequency Distributions<br>• Graphical Representation of Data<br>• Exercises | | | |
| **4** | **Measures of location** | **6** | **6** | **12** |
| | • Introduction<br>• The Mid-range<br>• The Mode<br>• The Median<br>• The Arithmetic Mean<br>• The Median of Classified Data<br>• Summation Notation<br>• The Mean of Classified Data<br>• Exercises | | | |
| **5** | **Measures of variation** | **3** | **3** | **6** |
| | • Introduction<br>• The Range<br>• The Mean Absolute Deviation<br>• The Variance and the Standard | | | |

| | | | | |
|---|---|---|---|---|
| | Deviation<br>• The Variance and Standard Deviation of Classified Data<br>• Exercises | | | |
| 6 | **Some tests of statistical hypotheses**<br><br>• Introduction<br>• The Nature of a Statistical Hypothesis—Two Types Error<br>• Test of H0: $\pi = \pi_0$ versus a Specified Alternative<br>• Tests about the Mean of a Normal Distribution<br>• Exercises | 6 | 6 | 12 |
| 7 | **Confidence LIMITS**<br><br>• Introduction<br>• A Note on Inequalities<br>• Confidence Intervals for $\mu$<br>• Confidence Interval for $\pi$<br>• Exercises | 6 | 6 | 12 |
| 8 | **Appendix: tables**<br><br>• Area of the Standard Normal Distribution<br>• $\chi$ -Distribution,<br>• t-Distribution, and<br>• F-Distribution | - | - | - |
| | **Total number of Hours for the course** | 42 | 9   42 | 84 |

## 4- Teaching and learning methods

**4.1** Reports, assignments, exercises, and final written exam to assess knowledge and understanding.

**4.2** Regular oral, practical and written quizzes to assess intellectual skills.

**4.3** Reports, assignments, and discussions to assess general and transferable skills

**4.4** Reports, assignments, exercises, and final written exam to assess knowledge and understanding.

## 5- Student assessment methods

### 5-a Methods

**5.a.1** Class test (1) ……. *to assess* …Understanding...
**5.a.2** Class test (2) ……. *to assess* …Understanding...
**5.a.3** Reports ……… …. *to assess*   Problem Solving
**5.a.4** Mid term exam … *to assess*   gains of completed topics….

## 5-b Assessment schedule

| Assessment 1 | 5$^{th}$ week. |
|---|---|
| Assessment 2 | 8$^{th}$ week. |
| Assessment 3 | 10$^{th}$ week. |
| Assessment 4 | 17$^{th}$ -18$^{th}$ weeks *(final written exam* |

## 5-c Weighting of assessments

| Final-term examination | 70% |
|---|---|
| Mid-term examination | 20% |
| Semester practical  work | 10% |
| Other types of assessment | - |
| Total | 100% |

## 6- List of references

### 6-a Course notes

There are lectures notes prepared in the form of a book authorized by the department

### 6-b Essential books (text books)

None

### 6-c Recommended books

[1] Advanced Engineering Mathematics, 8$^{th}$ edition, Erwin kreyszig, © 1999 by John wiley & sons, Inc., 0-471-33328-x
[2] Engineering Statistics, Second edition, Douglas C. Montgomery, George C. Runger, Norma F. Hubele, © 2001 by John wiley & sons, Inc., 0-471-38879-3
[3] Elementary Probability, David Stirzaker, © Cambridge Universty Press, 1994, 0-521-56694-0

### 6-d Periodicals, Web sites, … etc

None

## 7- Facilities required for teaching and learning

Computer Lab
Datashow, screen, and laptop computer.
White board and colored pens

**Course coordinator:**

**Prof. Mohiy M. Hadhoud**

**Head of Department:**

**Prof. Mohiy M. Hadhoud**

**Date:**  /  /