University: Cairo **Faculty:** Engineering **Department:** Aerospace Engineering

Course Specifications

Programme on which the course is given: Aerospace Engineering
Major or Minor element of programmes: Major
Department offering the programme : Aerospace Engineering Department
Department offering the course : Engineering Mathematics and Physics
Academic year/level : Third Year
Date of specification approval : March 2015.

A- Basic Information

Title : Probability and Statistics
Code : MTH 316B
Specification is not based on credit hour system.
However, an equivalent computation is based on:
1 credit hour = 1 contact hour for lecture,
1 credit hour = 2 contact hours for tutorial or practical:
Lecture: 3 Hrs./week Tutorial: 1 Hr./week Practical: 0 Total: 4 Hrs./week
(contact hours per week: Lecture 3, Tutorial 1, Total 4 hours)

B- Professional information

1.Overall Aims of Course

At the end of this course, the student should

- have some statistical awareness with an ability to present and analyze data as well as to understand and interpret presented data.
- understand the ideas of randomness and uncertainty and their grounding in probability theory
- be able to make effective decisions based on sampling and statistical inference.

2.Intended Learning Outcomes of Course (ILOs)

a- Knowledge and understanding:

I. Probability Theory:

a1. Basic Notations and Definitions.
a2. Axioms of Probability and Basic Theorems.
a3. Conditional Probability and Independence.
a4. Random Variables and Probability Distribution Functions, Expectations and Moments.
a5. Special Univariate Distributions; Discrete and Continuous.
a6. Joint and Conditional Distributions, Independence and Correlation.

II. An Introduction to Statistics:

- Sampling and Sampling Distributions.
- Estimation of Parameters, Point Estimators, and Confidence Intervals.

- Hypothesis Testing.
- Correlation and Simple Linear Regression.
- Goodness of Fit and Contingency Tables.

b- Intellectual Skills:

b1- Apply the probability theory to solve applied engineering problems.
b2- Estimation of basic population parameters.
b3- Make effective decisions based on sampling and hypothesis testing.
b3- Discover how random variables are related (Independence and Correlation).

3.Contents

Topic	No. of hours	Lecture	Tutorial
Basic Notations and Definitions. Axioms of Probability and Basic Theorems	6	4	2
Conditional Probability and Independence	5	4	1
Random Variables and Probability Distributions Moment Generating Functions. Measures of location and Dispersion.	9	7	2
Some Special Discrete Distributions.	4	3	1
Some Special Continuous Distributions. The Normal Distribution.	6	5	1
Joint Distributions. Covariance and Correlation.	7	5	2
Statistical Awareness and an idea about Sampling. The Central Limit Theorem.	5	3	2
Estimation of Parameters.	5	4	1
Concepts of Hypothesis Testing	**5**	**4**	**1**
Goodness-of-Fit Testing and the Chi-squared Distribution Contingency Table Analysis.	5	4	**1**
Linear Regression and Correlation.	3	**2**	**1**
TOTAL	**60**	**45**	**15**

4.Teaching and Learning Methods

4.1- Lectures.
4.2- Tutorial sessions to discuss solutions of pre-distributed sets of problems.

5.Assessment Schedule

Assessment 1 Midterm 9^{th} Week
Assessment 2 : Quiz 14^{th} Week
Assessment 3 : Final 16^{th} Week

Weighting of Assessments

Quiz	7%
Midterm	14%
Final	70%
Attendance and contribution	9%
Total	100%

6.List of References

6.1 - Course Notes:

Lecturer notes (in English).

6.2- Essential Books (Text Books)

Applied Statistics and Probability for Engineers. Fourth Edition 2006 by Douglas C. Montgomery and George C. Runger.

6.3- Recommended Books

Probability and Statistics for Engineers and Scientists. Third Edition by Sheldon Ross.

7. Facilities Required for Teaching and Learning

White board, projector.

Course Coordinator:- Dr. Nabila Philip Attalla Seif

Head of Department: Prof. Ayman H. Kassem

Date: March, 2015.