



## Course Specifications: Engineering Mathematics 6

### Benha University

### Faculty of Engineering at Shoubra

**Department offering the program:** Electrical Engineering and Control

**Department offering the course:** Electrical Engineering and Control

### 1- Course Data

Course Code: EEC 325

Course Title: Engineering Mathematics 6

Course Type : Compulsory

Level : 2

Teaching Hours : 4

Lecture : 2

Tutorial : 2

Practical : 0

### 2- Course Aims

- 2.1 Provide the students the concepts of probability and statistics and their applications in engineering.
- 2.2 Teach the students methods for solving partial differential equations.
- 2.3 Teach the students numerical methods for solving differential equations and linear systems.
- 2.4 Teach the students data collection and data analysis.
- 2.5 Teach the students the methods of interpolation.

### 3- Intended Learning Outcomes of Course (ILO's)

On completing this course, students will be able to:

#### a- Knowledge and Understanding

- a.1 Define the probability density function and statistical measures.
- a.2 State the probability distributions.
- a.3 Explain the numerical methods for solving linear systems and differential equations.
- a.4 Recognize the solutions of linear systems and differential equations.
- a.5 Describe the interpolation.

#### b- Intellectual Skills

- b.1 Deduce the probability function.
- b.2 Determine the random variable.
- b.3 Satisfy the conditions of convergence of numerical methods.
- b.4 Verify the conditions of the probability density function and the probability function.

**c- Professional and Practical Skills**

- c.1 Apply the statistical measures for treating real problems in the light of available data.
- c.2 Solve the wave equation and the heat equation.
- c.3 Compute the probability of random variables.
- c.4 Find the solution of linear systems and differential equations.
- c.5 Find the interpolating polynomials of discrete data.

**d- General and Transferable Skills**

- d.1 Communicate effectively.
- d.2 Use information technology for obtaining information.
- d.3 Work in a group and lead a team.
- d.4 Manage time effectively and conduct self learning.

**4- Course contribution in the program ILO's**

Course ILO's	Program ILO's
Knowledge and understanding	A1, A5
Intellectual skills	B1
Professional and practical skills	C5
General and transferable skills	D1, D8

**5- Contents**

Week	Topic	No. of Hours	
		Lecture	Tutorials
1	<b>Introduction</b> Interpolation : Finite differences.	2	2
2	Divided differences and Lagrange's method.	2	2
3	Solving equations of one variable by inverse interpolation, Newton's method.	2	2
4	Iterative method for solving systems of linear equations.	2	2
5	Numerical methods for solving differential equations: Picard's method, Euler's method.	2	2
6	First order partial differential equations.	2	2
7	Mid-Term Exam 1	1	
8	Second order equations, Wave equation, Heat equation.	2	2
9	Probability theory, Independent and dependent events, Conditional probability, Bayes theorem.	2	2



10	Random variable, Probability function of one variable, Moments, Expectation, Variance.	2	2
11	Mid-Term Exam 2	1	
12	Probability function of two variables, Covariance, Correlation Coefficient.	2	2
13	Discrete probability distributions: Binomial, Poisson.	2	2
14	Continuous probability distributions: Normal, Gamma.	2	2
15	Final Exam	2	

## 6- Teaching and Learning Methods

- 5.1 Lectures
- 5.2 Tutorials

## 7- Student Assessment

### a- Student Assessment Methods

- Assignments to assess knowledge and general skills.
- Midterm exams to assess knowledge, intellectual and professional skills.
- Final exam to assess knowledge, intellectual and professional skills.

### b- Assessment Schedule

Methods of Assessment	Grading / Marks	Weighting %	Outline Details	
Assignments	10	10 %	Week: All	
Mid-Term Exam 1	30	30 %	Week: 7	1 hour
Mid-Term Exam 2	20	20 %	Week: 11	1 hour
Final Exam	40	40 %	Week : 15	2 hours

## 8- List of References

Course Notes	Lectures Notes (PDF)
Required Books	“Numerical Methods For Engineers and Scientists”, Calculus, 2 <sup>th</sup> Edition, J.D. Hoffman, Mc Graw Hill, Inc. New York, 1992.
Recommended Books	“Advanced Engineering Mathematics”, E. Kreyszig, John Wiley and Sons, New York, 1999.
Periodicals, web sites	www.intmath.com www.academicpress.com

**Course Coordinator :** Dr. Mohamed Eid

**Head of Department :**

**Matrix of The Course Contents and ILO's**

Course Code: EEC 325

Course Title: Engineering Mathematics 6

Course Type : Compulsory

Level : 2

Teaching Hours : 4

Lecture : 2

Tutorial : 2

Practical : 0

No	Topics	Weeks	Knowledge and Understanding	Intellectual Skills	Practical and Professional Skills	General and Transferable Skills
1	Interpolation.	2	a.5		c.5	
2	Methods for solving differential equations and methods for solving equations of one variable	2	a.3, a.4	b.3	c.4, c.5	d.1, d.2 d.3, d.4
3	Partial differential equations.	2	a.3		c.2, c.4	
4	Statistical measures	1	a.1	b.1	c.1	d.2, d.3
5	Random variable and probability function.	1	a.1	b.1	c.3	
6	Discrete probability distributions.	2	a.1, a.2	b.2, b.4	c.3	
7	Continuous probability distributions.	2	a.1, a.2	b.2, b.4	c.3	

**Course Coordinator :** Dr. Mohamed Eid**Head of Department :**

**Matrix of The Course Aims and ILO's**

Course Code: EEC 325                      Course Title: Engineering Mathematics 6  
 Course Type : Compulsory              Level : 2  
 Teaching Hours : 4                      Lecture : 2                      Tutorial : 2                      Practical : 0  
 Date of specifications approval:      2017

No	Aims	Weeks	Knowledge and Understanding	Intellectual Skills	Practical and Professional Skills	General and Transferable Skills
2.1	Provide the students the concepts of probability and statistics and their applications in engineering.	4	a.1, a.2	b.1, b.2 b.4	c.1, c.3	
2.2	Teach the students methods for solving partial differential equations.	2	a.3	b.3	c.2	
2.3	Teach the students numerical methods for solving differential equations and linear systems.	3	a.3, a.4, a.5	b.3	c.2, c.4, c.5	d.2
2.4	Teach the students data collection and data analysis.	2	a.1, a.2	b.4	c.1, c.5	d.1, d.2 d.3, d.4
2.5	Teach the students the methods of interpolation.	1	a.5		c.5	

**Course Coordinator :** Dr. Mohamed Eid

**Head of Department :**