



1. Basic Information

<b>Program Title</b>	All academic programs
<b>Department offering the Program</b>	
<b>Department Responsible for the Course</b>	Mathematics and Engineering Physics
<b>Course Code</b>	BAS011
<b>Year/ Level</b>	Primary Year-First Semester
<b>Specialization</b>	Faculty requirement
<b>Authorization data of course specification</b>	

<b>Teaching Hours</b>	Lectures	Tutorial	Practical
	3	2	0

2. Course aims:

No.	Aim
1	Apply methods of differential calculus and algebra to formulate and solve different engineering problems.

3. Learning Outcomes (LOs):

A1.1	Illustrate the concepts of transcendental functions, Mean value theorem, Taylor series and Leibniz's rule, l'hospital rule, binomial theorem, and Eigen Value.
A1.2	Discuss methodologies of differentiation and matrix algebra.
A8.1	Communicate effectively in writing
A9.1	Apply appropriate methods of differentiation and matrix algebra to solve simple engineering problems.

4. Course Contents:

No.	Topics	week
1	Transcendental functions	1-3
2	Inverse of Transcendental functions	4-6
3	derivative of transcendental functions	7-9
4	Mean value theorem, Taylor series and Leibniz's rule	10-11
5	l'hospital rule	12
6	functions of several variables and applied theorems on partial differentiation	13-14
7	Partial Fractions decomposition methods	1-2
8	Theory of equations	3-4
9	mathematical induction	5-6
10	binomial theorem	7-8
11	algebra of matrices, determinants and vectors	9-10
12	Linear Systems	11-12
13	Eigen Value Problem	13
14	Vector space	14



**5. Teaching and Learning Methods:**

No.	Teaching Method
1	Interactive lectures (hybrid learning)
2	Discussion Sessions
3	Flipped classroom

**6. Teaching and Learning Methods for Disable Students:**

No.	Teaching Method
1	Additional Tutorials
2	Online lectures and assignments

**7. Student Assessment:**

**7.1 Student Assessment Methods:**

No.	Assessment Method	LOs
1	Mid Term Examination	A1.1, A9.1
2	Semester work (Quizzes, presentation, Portfolio)	A8.1, A9.1
4	Final Term Examination	A1.1, A1.2, A9.1

**7.2 Assessment Schedule:**

No.	Assessment Method	Weeks
1	Mid Term Examination	8
2	Semester work (Quizzes, presentation, Portfolio)	weekly
3	Final Term Examination	15

**7.3 Weighting of Assessments:**

No.	Assessment Method	Weights
1	Mid Term Examination	17%
2	Semester work (Quizzes, presentation, Portfolio)	10%
3	Final Term Examination	73%
Total		100%

**8. List of References**

No.	Reference List
1	Akhtar & Ahsan, Textbook of Differential Calculus, second edition, 2009, PHI Learning Private limited.
2	Allan Jeffery, Matrix operations for Engineer and Scientists, 2010, Springer science & business Media.



**9. Facilities Required for Teaching and Learning:**

No.	Facility
1	Lecture Classroom
2	White Board
3	Data Show System
4	Visualizer
5	Presenter
6	Sound System

**10. Matrix of Knowledge and Skills of the Course:**

No.	Topic	aim	LO's
1	Transcendental functions	1	A1.1
2	Inverse of Transcendental functions	1	A1.1, A8.1
3	derivative of transcendental functions	1	A1.1, A1.2, A9.1
4	Mean value theorem, Taylor series and Leibniz's rule	1	A1.1
5	l'hospital rule	1	A1.1
6	functions of several variables and applied theorems on partial differentiation	1	A1.1, A8.1
7	Partial Fractions decomposition methods	1	A1.1, A9.1
8	Theory of equations	1	A1.2, A8.1, A9.1
9	mathematical induction	1	A1.1, A8.1
10	binomial theorem	1	A1.1
11	algebra of matrices, determinants and vectors	1	A1.1, A1.2, A9.1
12	Linear Systems	1	A1.1, A1.2, A8.1, A9.1
	Eigen Value Problem	1	A1.1, A1.2, A3.1
	Vector space	1	A1.1, A1.2, A8.1, A9.1

**Course Coordinator: Dr. Mona Ahmed Sameeh**

**Head of Department: Prof. Dr. Mohamed Mohamed El Metwally El Gamal**

**Date of Approval:**



## Course Specifications: Mathematics 1



Course: Mathematics 1	
Program LOs	Course LOs
A1. Identify, formulate, and solve complex engineering problems by applying engineering fundamentals, basic science and mathematics.	A1.1 Recognize properties of transcendental functions, different methods of differentiation, elementary row operation on matrices using standard techniques of elimination and algebra of matrices.  A1.2 Discuss methodologies of differentiation and matrix algebra.
A8. Communicate effectively—graphically, verbally and in writing—with a range of audiences using contemporary tools.	A8.1 Communicate effectively In writing
A9. Use creative, innovative and flexible thinking and acquire entrepreneurial and leadership skills to anticipate and respond to new situations.	A9.1 Apply appropriate methods of differentiation and matrix algebra to solve simple engineering problems.