



Arab Academy for Science, Technology & Maritime Transport
College of Engineering & Technology
Department of Basic and Applied Science

University/Academy: Arab Academy for Science, Technology & Maritime Transport
Faculty/Institute: College of Engineering & Technology
Program: B.Sc. Mechanical Engineering

Form No. (12)
Course Specification

1- Course Data

Course Code: BA 123	Course Title: Mathematics I	Academic Year/Level: 1 st year / 1 st semester	
Specialization: All Programs	No. of Instructional Units 3 credits	Lecture 2hrs.	Practical 2hrs.

2-Course Aim

The aim of this course is the differentiation and some of its applications, basic differentiable functions of one variable. It includes definitions and intuitive meanings of derivatives; Higher derivatives; Basic techniques of differentiation; Chain Rule; Parametric equations; Partial differentiation; Implicit differentiation; Inverse function theorem; Logarithmic differentiation; differentiation; Logarithmic functions; Exponential functions; Trigonometric functions; Inverse trigonometric functions; Hyperbolic functions; Differentiation of those; Physical and geometric applications of differentiation; Limits; Nth derivative; L'Hôpital rule; Maclaurin's expansion as approximations of functions; curve sketching; complex numbers; Conic sections.

3- Intended Learning Outcome (ILO's)

a- Knowledge and Understanding	<p>K1) Concepts and theories of mathematics and sciences, appropriate to the discipline.</p> <ul style="list-style-type: none"> - Recall basic differentiation rules. - Define trigonometric functions. - Define the inverse trigonometric functions. - Define logarithmic function and their derivatives. - Define exponential functions. - Define hyperbolic functions and their inverse. - Define parametric and implicit differentiation. - Define the undetermined forms. - Define a critical number, relative extreme of a function, points of inflection, asymptotes. - Define a function as a power series. - Define partial derivatives of a function of two variables. - Define a complex number.
b- Intellectual Skills	<p>I2) Select appropriate solutions for engineering problems based on analytical thinking.</p> <ul style="list-style-type: none"> - Explain how to derive the derivatives of the inverse trigonometric functions. - Explain how to derive the derivatives of the logarithmic Functions. - Explain how to derive the derivatives of the exponential Functions. - Explain how to derive the derivatives of the hyperbolic functions and their inverse . - Explain when and how to use L'Hospital rule.

<p>c- Professional Skills</p>	<p>P1) Apply knowledge of mathematics, science, information technology, design, business context and engineering practice integrally to solve engineering problems.</p> <ul style="list-style-type: none"> - Apply basic rules of differentiation in driving the derivatives of the trigonometric functions. - Apply calculus to analyze and sketch graphs of functions. - Apply a basic list of Maclaurin's expansion to find other Macluarin's expansions.
<p>d- General Skills</p>	

4- Course Content

Lecture		
Wk	Hrs	
1	2	Basic rules of differentiation.
2	2	Trigonometric function and their derivatives
3	2	Inverse of trigonometric and their derivatives
4	2	Logarithmic function and their derivatives
5	2	Exponential function and their derivatives
6	2	Hyperbolic functions , Inverse hyperbolic functions and their derivatives
7	2	7 th week exam
8	2	Parametric differentiation, Implicit differentiation
9	2	L'Hospital rule
10	2	Curve sketching
11	2	Maclaurin's expansions
12	2	12 th week exam
13	2	Partial Differentiation
14	2	Complex numbers
15	2	. Revision
16	2	Final Exam

5-Teaching and Learning Methods

<ol style="list-style-type: none"> 1. Lectures 2. Tutorials 3. Individual and group course homework
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6-Teaching and Learning Methods for Students with Special Needs

<ol style="list-style-type: none"> 1. Consulting with lecturer during office ours 2. Consulting with teaching assistant during office hours 3. Private sessions for redelivering the lecture contents 4. An academic supervisor is appointed for handicapped students. Constant follow ups are done for handicapped students after each assessment to evaluate their academic level of achievement.

7- Student Assessment

<p>a- Procedures used:</p>	<ol style="list-style-type: none"> 1. Written examinations to assess the Intended learning outcomes. Continuous assessment (reports, discussions, etc.....) to assess the Intellectual skills.
<p>b- Schedule:</p>	<p>Assessment 1: 7th Week Written Exam Assessment 2: 12th Week Written Exam</p>

	Assessment 3: Continuous Assessments Assessment 4: 16 th Week Final Written Exam
c- Weighing of Assessment:	7 th Week Examination : 30 % 12 th Week Examination: 20 % Final-term Examination: 40 % Oral Examination : 0 % Practical Examination : 0 % Semester Work : 10 % Total : 100%

8- List of References:

a- Course Notes	Prepared by Lecturer
b- Required Books (Textbooks)	Smith R. Minton R. Calculus : Early Transcendental Function Fourth edition , McGraw-Hill,2007
c- Recommended Books	
d- Periodicals, Web Sites, ..., etc.	

Course coordinator:**Program Manager:**