

## **Basic and Applied Sciences and Non Engineering Courses**

### **BA 123 – Mathematics (1)**

#### **C O U R S E I N F O R M A T I O N**

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Course Title: Mathematics (1).

Code: BA123.

Contact Hours (hours/week): Lecture – 2 Hrs.                      Tutorial – 2 Hrs.                      Credit – 3.

Prerequisite: None

Course Coordinator: Dr. Ahmed M. El-Bakly

#### **G R A D I N G**

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Class Performance/Attendance: 10%

Midterm # 1/Assignments – (7<sup>th</sup> Week): 30%

Midterm # 2/Assignments – (12<sup>th</sup> Week): 20%

Final Exam: 40%

#### **C O U R S E D E S C R I P T I O N**

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Basic rules of differentiation. Trigonometric function and their derivatives .Inverse of trigonometric and their derivatives .Logarithmic function and their derivatives. Exponential function and their derivatives. Derivatives of hyperbolic functions and their inverse. Parametric differentiation. Implicit differentiation. The n<sup>th</sup> derivatives. L'Hospital rule .Partial Differentiation .Taylor and Maclaurin's expansions. Complex numbers .Curve sketching. Conic sections.

#### **T E X T B O O K S**

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Smith R., Minton R., Calculus: Early Transcendental Function fourth edition, McGraw-Hill, 2007

#### **C O U R S E A I M**

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Introduce students to differentiation, trigonometric, inverse trigonometric, algorithmic, exponential and hyperbolic functions, as well as to curve sketching, complex numbers and conic sections.

#### **C O U R S E O B J E C T I V E S**

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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;  $N^{\text{th}}$  derivative; L'Hôpital rule; Maclaurin's expansion as approximations of functions; curve sketching; complex numbers; Conic sections.

## COURSE OUTLINE

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*Week Number 1:* Basic techniques and rules of differentiation.

*Week Number 2:* Trigonometric function: properties, basic identities and their derivatives.

*Week Number 3:* Inverse of trigonometric and their derivatives.

*Week Number 4:* Logarithmic functions: their properties, basic identities and derivatives.

*Week Number 5:* Exponential functions: their properties, basic identities and derivatives.

*Week Number 6:* Derivative of hyperbolic functions and their inverse

*Week Number 7:* Parametric differentiation and implicit differentiation.

*Week Number 8:* The  $N^{\text{th}}$  derivative.

*Week Number 9:* L' Hopital rule

*Week Number 10:* Partial differentiation.

*Week Number 11:* Maclaurin's expansion.

*Week Number 12:* Physical and geometric application.

*Week Number 13:* Curve sketching

*Week Number 14:* Conic sections.

*Week Number 15:* General Revision

*Week Number 16:* Final Exam.