

BA123- Mathematics (1)

CREDIT HOURS

3 Hours

CONTACT HOURS (Hours/week)

Lecture: 2; Tutorial: 2

TEXT BOOK

- Robert T. Smith and Roland B. Minton, Calculus: Early Transcendental Functions, Mc GRAW. Hill, latest edition.
- Printed Notes.

COURSE DESCRIPTION

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; Analytic geometry; Translation of Axes; Conic sections.

PREREQUISITE:

None

RELATION OF COURSE TO PROGRAM

Required

COURSE INSTRUCTION OUTCOMES

The student will be able to understand basic transcendental functions and their properties, develop skills in the techniques of differentiation, and grasp its intuitive meaning, essential knowledge and skills in analytic geometry.

TOPICS COVERED

- Basic techniques and rules of differentiation.
- Trigonometric function: properties, basic identities and their derivatives.
- Inverse of trigonometric and their derivatives.
- Logarithmic functions: their properties, basic identities and derivatives.
- Exponential functions: their properties, basic identities and derivatives.
- Derivative of hyperbolic functions and their inverse.
- Parametric differentiation and implicit differentiation.
- The N^{th} derivative.
- L' Hopital rule.
- Partial differentiation.

- Maclaurin's expansion.
- Physical application.
- Curve sketching.
- Conic sections.

CONTRIBUTION OF COURSE TO MEET THE REQUIREMENTS OF CRITERION 5:

Professional component Content			
Math and Basic Sciences	Engineering Topics	General Education	Other
✓			

RELATIONSHIP OF COURSE TO STUDENT OUTCOMES:

Student Outcomes		Course aspects
A	An ability to apply knowledge of mathematics, science, and engineering	a ₁ a ₂
B	An ability to design and conduct experiments, analyze and interpret data.	
C	An ability to design a system, component, or process to meet desired needs within realistic constraints such as economics, environmental, social, political, ethical, health, and safety, manufacturability, and sustainability	
D	An ability to function on multi-disciplinary teams.	
E	An ability to identify, formulate, and solve engineering problems	e ₁ e ₂ e ₃
F	An understanding of professional and ethical responsibility	
G	An ability to communicate effectively	
H	The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and social content	
I	A recognition of the need for, and an ability to engage in life-long learning.	
J	A knowledge of contemporary issues within and outside the electrical engineering profession.	
K	An ability to use the techniques, skills, and modern engineering tools necessary for electrical engineering practice.	