

## **BA124- Mathematics (2)**

### **CREDIT HOURS**

3 Hours

### **CONTACT HOURS (Hours/week)**

Lecture: 2; Tutorial: 2

### **COURSE COORDINATOR**

Dr Mohsen Salah

### **TEXT BOOK:**

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

### **COURSE DESCRIPTION:**

This course addresses integration and some of its geometric applications, as well as elementary matrix algebra. It includes definitions and intuitive meanings of indefinite and definite integrals; Fundamental Theorem of Calculus; Basic techniques of integration; Integration by parts; Geometric applications; Integration of powers of trigonometric functions; Substitution; Miscellaneous and Trigonometric substitutions; Integration of rational functions in  $x$  through partial fractions; Numerical Integration. Gauss' method for the solution of linear equations; Matrix inversion and its use in the solution of linear equations.

### **PREREQUISITE:**

BA 123

### **RELATION OF COURSE TO PROGRAM:**

Required

### **COURSE INSTRUCTION OUTCOMES:**

The student develops skills in the techniques of integration, and enables him/her to grasp its intuitive meaning. It also provides him/her with essential knowledge and skills in matrix algebra.

### **TOPICS COVERED:**

Definition of indefinite integrals and table of famous integrals - Simple rules of integration and the fundamental theorem of calculus - Fundamental theorem of calculus and integration by parts - Integration by parts and integration of rational functions - Integration of rational functions - Integration of trigonometric powers - Trigonometric substitution and 7<sup>th</sup> week exam - Integration of quadratic forms and the reduction formulas - Definite integration - Area and volume - Area, volume and length of curve -

Average of a function, numerical integration - Matrix Algebra - Solution of systems of linear equations.

**CONTRIBUTION OF COURSE TO MEET THE REQUIREMENTS OF CRITERION 5:**

<b>Professional Component Content</b>			
<b>Math and Basic Sciences</b>	<b>Engineering Topics</b>	<b>General Education</b>	<b>Engineering Design</b>
✓			

**RELATIONSHIP OF COURSE TO STUDENT OUTCOMES:**

<b>Student Outcomes</b>		<b>Course Outcomes</b>
<b>a.</b>	An ability to apply knowledge of mathematics, science, and engineering.	✓
<b>b.</b>	An ability to design and conduct experiments, analyze and interpret data.	
<b>c.</b>	An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.	
<b>d.</b>	An ability to function on multi-disciplinary teams.	
<b>e.</b>	An ability to identify, formulate, and solve engineering problems.	✓
<b>f.</b>	An understanding of professional and ethical responsibility.	
<b>g.</b>	An ability to communicate effectively.	
<b>h.</b>	The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal content	
<b>i.</b>	A recognition of the need for, and an ability to engage in life-long learning.	
<b>j.</b>	A knowledge of contemporary issues within and outside the electrical engineering profession.	
<b>k.</b>	An ability to use the techniques, skills, and modern engineering tools necessary for electrical engineering practice.	