

**Form (H)**  
**Short course description**

Course title: Integral calculus	Course number and code: MATH 111
Previous course requirement: MATH150 or MATH 101	Language of the course: Arabic
Course level: 3rd	Effective hours: 4(3+2+0)

Course description

Definition of definite integral and its properties, the anti-derivative, indefinite integral and the fundamental theorem of calculus. Change of variables. Integrals of natural and general exponential functions. Integrals of natural and general logarithmic functions. Derivatives and integrals of hyperbolic and inverse-hyperbolic functions. Techniques of integration: by parts, trigonometric substitutions, completing the square, integrals of rational functions, miscellaneous substitutions. Indeterminate forms, improper Integrals. Applications of integration: area, solids of revolution, arc length and surface of revolution, linear Motion, work, momentum and center of mass. Numerical integration. Polar coordinates, relation between polar and Cartesian coordinates, graphs of polar curves, area in polar coordinates. Parametric equations.

Course objectives

1- To introduce definite integrals to the students.
2- To introduce indefinite integrals to the students.
3- To introduce fundamental theorem of calculus to the students.
4- To introduce methods of integration to the students.
5- To introduce several applications of integration to the students.
6- To introduce polar coordinates to the students.

Learning outcomes (understanding, knowledge, and intellectual and scientific skills)

After studying this course, the student is expected to be able to:

1- Find the indefinite integrals of various types of functions.
2- Find the definite integrals of various types of functions.
3- To use integration to find areas, volumes, arc lengths, and centers of gravities.
4- To convert rectangular coordinates to polar coordinates and vice versa.

Textbook adopted and supporting references

Title of the book	Author's name	Publisher's name	Date of publication
1- Calculus, early Transcendental functions	Robert T. Smith, and Roland R. Minton	McGraw Hill	2007
2- Calculus	Earl W. Swokowski, Michael Olinick, Dennis Pence, and Jeffery A. Cole	PWS Publishing Company, Boston	1994