

King Saud University
College of Science
Integral Calculus
Course Syllabus
First Semester 1437 – 1438H

1. Course General Information:

Course Title: Integral Calculus	Course Code: MATH 111
Course Level: 3	Course Prerequisite: MATH150 Co-requisites for this course (if any): None
Lecture Time: 9-10 AM, Sun., Tue., Thu.	Credit Hours: 4

2. Faculty Member Responsible for the Course:

Name	Rank	Office Number and Location	Office Hours	Email Address
Dr. Borhen Halouani	Assistant Professor	2A157, Building 4, Main Campus		halouani@ksu.edu.sa

3. Course Description:

Definite integral, Indefinite integral and the Fundamental Theorem of calculus, integration by substitution, Logarithmic and Exponential Functions, Hyperbolic Functions and inverse Hyperbolic Functions, Methods of integration: integration by parts, integrals of trigonometric functions, trigonometric substitutions, completing the square, partial fractions, Indeterminate Forms and Improper integrals, Application of integrations: Area of a region under a graph of a continuous function, arc length, volume of a solid of revolution, area of a surface of revolution, Polar coordinates.

4. Course Academic Calendar

Week	Basic material to be covered
1-2	Definite integral
3	Indefinite integral and the Fundamental Theorem of calculus
4	Logarithmic and Exponential Functions
5-6	Hyperbolic Functions and inverse Hyperbolic Functions
7-9	Methods of integration: by parts, trigonometric substitutions, completing the square, partial fractions
10	Indeterminate Forms and Improper integrals
11-13	Application of integrations: Area of a region under a graph of a continuous function, arc length, volume of a solid of revolution, surface area
14-15	Polar coordinates
(16)	Final Examination

5. Course Objectives:

The main purpose for this course is to introduce the following:

- The concepts of definite and indefinite integrals
- Methods of integration
- Some applications of integral calculus.

- Polar coordinates.

6. Course References:

6.1 Textbooks:

اسم الكتاب	اسم المؤلف	اسم الناشر	سنة النشر
مبادئ حساب التفاضل والتكامل	د. صالح السنوسي وآخرون	دار الخريجي للطباعة والنشر	1425هـ
Principals of differentiation and integration	Dr. Saleh <u>A</u> lsanosi etal;	AlKoraiji	1425H

6.2 Recommended Reference, Material (Journals, Reports, etc)

1- Calculus; an international edition by Sowkowski, Olinic and Penny, 6th edition.

6.3 Websites:

1- <http://lms.ksu.edu.sa>

2- Internet sites relevant to the course

6.4 Other learning material such as computer-based programs/CD, professional standards or regulations and software.

- Computational computer programs such as Maple and Mathematica

7. Teaching Methods:

- At the beginning of studying each topic some examples will be laid out and discussed with the students encouraging them to discover the relevant concepts.
- At the beginning of each lecture, a discussion is conducted with the students about what has been done in the previous lecture in order to establish a link with the current lecture.
- Discussions in the class
- Homework assignments
- Independent study

8. Learning Outcomes:

8.1 Knowledge and Understanding:

After studying this course, the student will acquire the following knowledge and be able to:

- Recall the definition of indefinite and definite integrals.
- State the Mean – Value Theorem and the Fundamental Theorem of Calculus.
- Define the natural logarithmic, natural exponential, general exponential, general logarithmic functions, their derivatives and integrals.
- Recognize the different techniques of integration (by parts, trigonometric integrals, partial fractions).
- Recall formulas for calculating: Area of a plane region, volume of solid of revolution, Arc length, and the area of a surface of revolution
- Recognize the different types of indeterminate forms and improper integrals
- Convert between polar and Cartesian coordinate systems
- Outline the method of finding area of plane regions using polar coordinates.

8.2 Cognitive Skills (Thinking and Analysis):

After studying this course, the student will able to:

- Evaluate definite integrals using its definition
- Solve problems involving Mean – Value Theorem and the Fundamental Theorem of Calculus
- Evaluate integrals by different methods of integration.
- Test improper integrals for convergence
- Differentiate between different types of indeterminate forms and finding the limits of function.
- Calculate areas of plane regions and arc length
- Calculate volumes by both washers and cylindrical shells methods.
- Calculate areas of plane regions using polar coordinates

8.3 Interpersonal Skills and Responsibility:

After studying this course, the student is expected to:

- Study, learn and work independently.
- Work effectively in teams.
- Meet deadlines and manage time properly.
- Exhibit ethical behaviour and respect different points of view.

8.4 Communication, Information Technology and Numerical Skills

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

- Present mathematics to others, both in oral and written form clearly and in a well-organized manner.
 - Use IT facilities as an aid to mathematical processes and for acquiring available information
 - Use library to locate mathematical information

9. Methods of Assessment:

Course Assessment	Mark
Class activates (in class quizzes, and homework)	10
Midterm exams I	25
Midterm exams II	25
Final Examination	40
Total	100

10. Course Policies:

- All exams are closed book.
- The final exam will be comprehensive.

11. Attendance Policy:

Absence from lectures and/or tutorials shouldn't 25%. Students who exceed the 25% limit without an accepted medical or emergency excuse aren't allowed to set for the final exam and they will receive a grade of “DN” for the course.