Arab Academy for Science, Technology & Maritime Transport
College of Engineering & Technology
Department of Basic and Applied Sciences

University/Academy: Arab Academy for Science, Technology & Maritime Transport
Faculty/Institute: College of Engineering & Technology
Program: B.Sc. Mechanical Engineering

Form No. (12)
Course Specification

1- Course Data

Course Code: **BA 124**	Course Title: **Math 2**		Academic Year/Level: **1st** year / **2nd** semester
Specialization:	No. of Instructional Units	Lecture	Practical
	3 Credits	**2hrs.**	**2hrs.**

2- Course Aim

To learn integration using different methods.To use these techniques in solving some application like to find the area, the volume, the length of a curve, and the average of a curve. To solve problems using numerical integration. To learn elementary linear algebra, solution of linear equations using matrices and determinants.

3- Intended Learning Outcome (ILO's)

a- Knowledge and Understanding	K1) Concepts and theories of mathematics and sciences, appropriate to the discipline. - Recall basic integration rules. - Discuss the fundamental theorem of calculus. - Discuss the second fundamental theorem of calculus. - Explain a technique that can be used to transform complicated integration problems into simpler ones. - Review on last formulas and techniques. - Recall the method of completing the square. - List a formula which is particularly useful in calculating integrands involving products of algebraic and transcendental functions. - Discuss how integration by parts can be used to derive a reduction formula. - Recall trigonometric identities. - List guidelines for integrals involving trigonometric functions. - Recall that a rational function is a ratio of two Polynomials. - Define parabola, ellipse and hyperbola. - Define a formula to obtain the area between two curves. - Define a formula to obtain a described volume (The Washer Method). - Define a formula to obtain the arc length of a smooth curve. - Define a formula to obtain the area of the surface of revolution.

b- Intellectual Skills	I2) Select appropriate solutions for engineering problems based on analytical thinking. - Evaluate integrals using basic integration rules. - Evaluate definite integral using the fundamental theorem of calculus. - Evaluate integrals using appropriate substitutions. - Evaluate integrand using completion of the square may lead to an integral that can be expressed in terms of inverse trigonometric or an inverse hyperbolic functions. - Evaluate integrals using integration by parts method. - Express an integral involving a power of a function in terms of an integral involves a lower power of that function. - Evaluate integrals involving trigonometric functions. - Evaluate integrals using trigonometric substitutions. - Analyse a rational function into a sum of simple rational functions that can be integrated by methods studied earlier lectures. -Identify and Sketch the graphs of quadratic equations.
c- Professional Skills	P1) Apply knowledge of mathematics, science, information technology, design, business context and engineering practice integrally to solve engineering problems. - Calculate the area between to curves. - Calculate the volume of a solid of revolution. - Calculate the area of a surface of revolution. - Calculate the arc length.
d- General Skills	

4- **Course Content**

Lecture		
Wk	Hrs	Basic Integration Rules.
1	2	Fundamental theorem of calculus.
2	2	Integration by substitution
3	2	Integration by substitution
4	2	Review of formulas and techniques (completing the squares)
5	2	Integration by parts.
6	2	Integration by reduction and integration by induction.
7	2	7th week exam.
8	2	Trignometric Integrals
9	2	Trigonometric substitutions.
10	2	Integration of rational functions using partial fractions.
11	2	Conic sections
12	2	12th week exam.
13	2	Applications of the Definite Integral (Areas and Volumes).
14	2	Applications of the Definite Integra (Surface Area and Arch Length).
15	2	. Review
16	2	Final Exam

5- Teaching and Learning Methods

1. Lectures
2. Tutorials
3. Individual and group course homework

6-Teaching and Learning Methods for Students with Special Needs

1. Consulting with lecturer during office ours 2. Consulting with teaching assistant during office hours 3. Private sessions for redelivering the lecture contents 4. An academic supervisor is appointed for handicapped students. Constant follow ups are done for handicapped students after each assessment to evaluate their academic level of achievement.

7- Student Assessment

a- Procedures used:	1. Written examinations to assess the Intended learning outcomes. Continuous assessment (reports, discussions, etc……) to assess the Intellectual skills.
b- Schedule:	Assessment 1: 7th Week Written Exam Assessment 2: 12th Week Written Exam Assessment 3: Continuous Assessments Assessment 4: 16th Week Final Written Exam
c- Weighing of Assessment:	7th Week Examination : 30 % 12th Week Examination: 20 % Final-term Examination: 40 % Oral Examination : 0 % Practical Examination : 0 % Semester Work : 10 % Total : 100%

8- List of References:

a- Course Notes	Prepared by Lecturer
b- Required Books (Textbooks)	Calculus Early transcendental Functions, Smith Minton, 3rd Edition
c- Recommended Books	
d- Periodicals, Web Sites, ..., etc.	

Course coordinator: **Program Manager:**