

Spring 2016-2017



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

MATHEMATICS (2)

BA124



COURSE OUTLINE

Prepared by:

Hossam Shawky

Professor of Engineering Mathematics



BA124

Mathematics (2)

Spring 2016-2017

Course Outline

Instructor	Prof. Hossam Shawky
E-mail	hossams@aast.edu
Office	Deanery of Student Affairs- First Floor
Off. Hrs.	Wednesday (12:30-14:10) and also by appointment
Facebook	https://www.facebook.com/hossameldin.shawky
Skype ID	hossamshawky39
Group on Facebook	Mathematics (2) AASTMT https://www.facebook.com/groups/462307170536606/
Prerequisite	Mathematics (1) BA123
Course Aims	<ul style="list-style-type: none">• Develop the students' skills in the art of integration by studying different methods for solving integration problems, using these methods to deal with some application in engineering, like finding the area of a bounded region and the volume resulting from rotating this area around axes, obtaining the average and the length of a given curve, and studying numerical techniques to solve problems that can't be solved by analytical methods.• Introduce students to the field of linear algebra and how to use it to solve a system of linear equations which is the heart of mathematical modeling in different fields, like physics, biology, etc., moreover, study the physical meaning of Eigenvalues and Eigenvectors.
Course Objectives	<p>Upon Completion of this course, students will be able to:</p> <ul style="list-style-type: none">• Apply the definition of the definite integral and the fundamental theorem of calculus including finding areas, volumes, and length of the curve as well as numerical integration.• Master techniques of integration such as integration by parts, trigonometric substitution and integration of rational functions using partial fractions.• Solve system of linear equations using inverse matrix and Gauss elimination methods.• Find the Eigenvalues and Eigenvectors for any square matrix as well as study Cayley – Hamilton theorem.

Text Book	<ul style="list-style-type: none"> • Calculus, Early Transcendental Functions, Robert T.Smith & Roland B.Minton, Fourth Edition-Mc-Graw Hill
References	<ul style="list-style-type: none"> • Calculus, Sherman K. Stein & Anthony Barcellos, Fifth Edition-Mc-Graw Hill • Engineering Mathematics-Programmes and Problems, K.A.Stroud, Third Edition-Macmillan Education
Course Outcomes	An ability to apply knowledge of mathematics, science, and engineering
Grading Policy	<p>Assignments and attendance: 10 Marks</p> <p>Week 4: Quiz (10Marks) Tutorial</p> <p>Week 7: Exam (20Marks) Lecture</p> <p>Week 10: Quiz (5Marks) Tutorial</p> <p>Week 12: Exam (15Marks) Lecture</p> <p>Week 16: Final Exam (40Marks)</p>

Mathematics (2)BA124

Week of		E V E N T	
1	Feb. 11 th	<i>Revision, Definition of indefinite integrals, standard integrals</i>	
		Lecture	<ul style="list-style-type: none"> Problems : Sheet (1) #1-7
		Tutorial	<ul style="list-style-type: none"> Problems : Ex 4.1 Page 307 #1-10 (even),45,47,48 Sheet (1) #8-11
		Assignments	<ul style="list-style-type: none"> Problems : Ex 4.1 Page 307 #1-10 (odd),27,28 Sheet (1) #12-16
2	Feb. 18 th	<i>Integrals of the form $\int \frac{F'(x)}{F(x)} dx$ and $\int \frac{F'(x)}{\sqrt{F(x)}} dx$</i> <i>Integration of trigonometric and exponential functions</i>	
		Lecture	<ul style="list-style-type: none"> Problems : Sheet (2) #1-19
		Tutorial	<ul style="list-style-type: none"> Problems : Ex 4.1 Page 307 #11-26 (even) Sheet (2) # 20-43
		Assignments	<ul style="list-style-type: none"> Problems : Ex 4.1 Page 307 #11-26 (odd) Sheet (2) # 44-57
3	Feb. 25 th	<i>The fundamental theorem of calculus</i> <i>Integration by substitution</i>	
		Lecture	<ul style="list-style-type: none"> Problems : Sheet (3) # 1-37
		Tutorial	<ul style="list-style-type: none"> Problems : Sheet (3) # 38-79
		Assignments	<ul style="list-style-type: none"> Problems : Ex 4.5 Page 341 #1-4,11,12,17,18 Ex 4.6 Page 349 ##5-16,21,22 Sheet (3) #80-100 Review Exercises Page 374-375# 1-20,47-50
4	Mar.4 th	<i>Integration of squared trigonometric functions</i> <i>Integrals involving powers of trigonometric functions</i>	
		Lecture	Problems : Ex 6.2 Page 457 #1-10(odd), 15, 19+Sheet (4) Ex 4.8 Page 372 ##21-26 (odd) ,27-30 Sheet (1) # 39-50 Sheet (2) # Ex 6.3 Page 466 #1-14(odd)+ <ul style="list-style-type: none"> Problems : Ex 6.3 Page 466 #15-20, 45-46 +Sheet (3)
		Tutorial	<ul style="list-style-type: none"> Problems : Ex 6.2 Page 457 #1-10(even)+Sheet (4) Quiz No.1
		Assignments	<ul style="list-style-type: none"> Problems : Ex 6.2 Page 457 #13-14,17-18, 20-22+ Sheet (4)

5	Mar.11 th	Integration by Parts <i>Integration of rational functions using partial fractions</i>	
		Lecture	<ul style="list-style-type: none"> Problems : Ex 6.1 Page 451 # 11,13 Ex 6.4 Page 475 #1-6 (odd) +Sheet (5)
		Tutorial	<ul style="list-style-type: none"> Problems : Ex 6.1 Page 451 # 12,14 Ex 6.4 Page 475 #1- 6 (even) +Sheet (5)
		Assignments	<ul style="list-style-type: none"> Problems : Ex 6.1 Page 451 # 15,16 Ex 6.4 Page 475 #7,8 +Sheet (5)
6	Mar.18 th	<i>Integration of rational functions using partial fractions (continue)</i>	
		Lecture	<ul style="list-style-type: none"> Problems : Ex 6.4 Page 475 #9-20 (odd) +Sheet (6)
		Tutorial	<ul style="list-style-type: none"> Problems : Ex 6.4 Page 475 #9-20 (even)+Sheet (6)
		Assignments	<ul style="list-style-type: none"> Problems : Ex 6.4 Page 475 #21-36 +Sheet (6)
7	Mar.25 th	<i>Integration using trigonometric substitution</i>	
		Lecture	<ul style="list-style-type: none"> Problems : Ex 6.3 Page 466 #21-24(odd)+Sheet (7) 7th week exam
		Tutorial	<ul style="list-style-type: none"> Problems : Ex 6.3 Page 466 #21-24(even)+Sheet (7)
		Assignments	<ul style="list-style-type: none"> Problems : Ex 6.3 Page 466 #25,26+Sheet (7)
8	Apr. 1 st	<i>Integration using trigonometric substitution (continue), Reduction formulas</i>	
		Lecture	<ul style="list-style-type: none"> Problems : Ex 6.3 Page 466 #27-38 (odd) Ex 6.2 Page 457 #29+Sheet (8)
		Tutorial	<ul style="list-style-type: none"> Problems : Ex 6.3 Page 466 #27-38 (even) Ex 6.2 Page 457 #30+Sheet (8)
		Assignments	<ul style="list-style-type: none"> Problems : Ex 6.3 Page 466 #39-44+Sheet (8)
9	Apr. 8 th	<i>The definite integral, Riemann sum, Applications of definite integral: Areas and Volumes</i>	
		Lecture	<ul style="list-style-type: none"> Problems : Ex5.1 Page 383#5,7 Ex5.2 Page 397#25 (a,b)+Sheet (9)
		Tutorial	<ul style="list-style-type: none"> Problems : Ex5.1 Page 383#6,8 Ex5.2 Page 397#26b, 27 (a,b)+Sheet (9)
		Assignments	<ul style="list-style-type: none"> Problems : Ex5.1 Page 383#19-22 Ex5.2 Page 397#28 (a,b)+Sheet (9)
10	Apr. 15 th	<i>Average value of a function and length of the curve, Numerical Integration: Trapezoidal Rule and Simpson's Rule</i>	
		Lecture	<ul style="list-style-type: none"> Problems : Ex 4.4 Page 331 # 25 Ex 5.4 Page 412 #5-10 (odd)+Sheet (9)
		Tutorial	<ul style="list-style-type: none"> Problems : Ex 4.4 Page 331 # 26 Ex 5.4 Page 412 #5-10 (even)+Sheet (9) Quiz No.2
		Assignments	<ul style="list-style-type: none"> Problems : Ex 4.4 Page 331 # 27,28 Ex 5.4 Page 412 #11-14+Sheet (9)

11	Apr. 22 nd	<i>Matrix Algebra: Matrix addition, scalar multiplication, matrix multiplication and inverse of a matrix</i>	
		Lecture	• Problems : Sheet (10)
		Tutorial	• Problems : Sheet (10)
		Assignments	• Problems : Sheet (10)
12	Apr. 29 th	<i>Solution of system of linear equations using inverse of a matrix and Gauss elimination methods</i>	
		Lecture	• Problems : Sheet (10) • 12th week exam
		Tutorial	• Problems : Sheet (10)
		Assignments	• Problems : Sheet (10)
13	May. 6 th	<i>Eigenvalues and Eigenvectors</i>	
		Lecture	• Problems : Sheet (11)
		Tutorial	• Problems : Sheet (11)
		Assignments	• Problems : Sheet (11)
14	May. 13 th	<i>Physical meaning of Eigenvalues and Eigenvectors, Cayley – Hamilton theorem</i>	
		Lecture	• Problems : Sheet (11)
		Tutorial	• Problems : Sheet (11)
		Assignments	• Problems : Sheet (11)
15	May. 20 th	Lecture	<i>General Revision</i>
		Tutorial	<i>General Revision</i>
16	May. 27 th	Final Exam	

Good Luck