

UNITED ARAB EMIRATES UNIVERSITY
COLLEGE REQUIREMENT UNIT, ENGINEERING
MATH 1110: CALCULUS I FOR ENGINEERS

Spring 2010- Overall Sections

I- Course Description:

A- General Information	
Subject	Calculus I for Engineers MATH1110
Textbook	Robert T. Smith & Roland B. Minton "Calculus", 3rd Ed, 2007.
References	Thomas, "Calculus", Pearson Education, 11th ed, 2005 Stewart, "Calculus", Thomson, 5th Ed, 2003. Anton- Bivens- Davis, "Calculus", John Wiley, 7th Ed, 2002.
Prerequisite	MATU 1332, ENGU 1303
Coordinator	Dr. Fathalla A. Rihan (frihan@uaeu.ac.ae)
Instructors	Dr. Waleed Emmam (Sec.# 01 & 02); Dr. Adama Diene (Sec.# 03 & 04) Dr. Youssef Al-Khatib (Sec. # 51 & 53); Dr. Fathalla Rihan (Sec.# 52 & 54)
B- Professional Information	
Course Description	<p>I- Differential Calculus of functions of one variable</p> <p>Functions of one variable. Concept of limits, Definitions and Techniques of Differentiation. Derivatives of Trigonometric, Exponential, and Logarithmic Functions - Chain Rule - Implicit Differentiation. Maximum and Minimum Values. Increasing, Decreasing and Concave Functions - Inverse Trigonometric Functions - Hyperbolic Functions - Some Engineering Applications.</p> <p>II - Integral Calculus of functions of one variable</p> <p>Definite and Indefinite Integrals. Techniques of Integration: Integration by Substitution - Integration by Trigonometric Substitutions - Integration by Parts - Integration by Partial Fractions. Applications of Definite Integrals in Geometry. Some Engineering Applications.</p>

Intended Learning outcomes (ILO's):	<p>Upon successful completion of this course, the student should be able to:</p> <ol style="list-style-type: none"> 1. Find limits of functions and determine continuity of functions. 2. Find derivatives of algebraic, logarithmic, and exponential functions, and use derivatives to solve applied problems. 3. Understand the conceptual foundations of rate of change, slope of tangent line, and their application to engineering problems. 4. Demonstrate ability to think critically in analyzing engineering problems. 5. Work effectively with others. 6. Find integrals of some algebraic and trigonometric functions, and use integrals to solve applied and engineering problems. 7. Able to use the integration to find the areas under or between curves, displacements given the accelerations, work done by a particle or so. 																																				
Relation to ABET Outcomes:	<table border="1"> <tr> <td></td> <td colspan="11">ABET A→ K Criteria</td> </tr> <tr> <td>CRU Course</td> <td>A</td> <td>b</td> <td>C</td> <td>d</td> <td>e</td> <td>f</td> <td>g</td> <td>h</td> <td>I</td> <td>j</td> <td>k</td> </tr> <tr> <td>Engineering Thermodynamics</td> <td>√</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>		ABET A→ K Criteria											CRU Course	A	b	C	d	e	f	g	h	I	j	k	Engineering Thermodynamics	√										
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Relation to ABET Criterion 5	<p>Math and Basic Science: 1 semester hours, Engineering Topics (Science 2 hour, Design 0 hour), General Education: 0 semester hours, Others: 0 semester hours</p>																																				
Covered Topics	<p>Function of One Variable, including exponential and Logarithmic functions</p> <p>Topics in Limits and Continuity</p> <p>Techniques of Differentiation</p> <p>Maximum and Minimum Values</p> <p>Definite and Indefinite Integrals</p> <p>Techniques of Integrations, Areas Between two Curves, Volumes, Applications</p>																																				
Assessment	<table> <tr> <td>Students Four Worksheets</td> <td>% 10</td> <td></td> </tr> <tr> <td>Two Quizzes</td> <td>% 10</td> <td></td> </tr> <tr> <td>Two Tests</td> <td>% 20</td> <td></td> </tr> <tr> <td>Midterm Exam</td> <td>% 20</td> <td>(07:00-08:00 pm, 11th April 2010)</td> </tr> <tr> <td>Final Exam</td> <td>% 40</td> <td>(08:00-10:00 am, 9th June 2010)</td> </tr> </table>	Students Four Worksheets	% 10		Two Quizzes	% 10		Two Tests	% 20		Midterm Exam	% 20	(07:00-08:00 pm, 11 th April 2010)	Final Exam	% 40	(08:00-10:00 am, 9 th June 2010)																					
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Attendance:	<p>Attendance is required for all classes. Students who are absent for any reason more than 15% of required classes are prohibited from participating in subsequent exams and received a grade of "F" for the course.</p> <p>.</p>																																				

II- COURSE SCHEDULE AND CONTENTS:

Week#	Topics	Textbook Sections	Solved Examples	Exercises (H.W)
Ch1. LIMITS (In brief)				
1	1.a. The conception of limits	1.2	2 Examples	Odd 1-10
	1.b. Continuity	1.4	2 Examples	Odd 1-15
	1.c. Limits Involving Infinity	1.5	2 Examples	Odd 1-17
Ch2. DIFFERENTIATION				
2	2.a. The Derivative	2.2	2 Examples	
	2.b. Computation of the Derivative: The power Rule	2.3	3.1--3.6	1-16 odd, 21,23, 27,29
	2.c. Product and Quotient Rules	2.4	4.1 -- 4.5	1-27 odd
3	2.d. The Chain Rule	2.5	5.1 -- 5.4	1-34 odd
	2.e. Derivative of Trigonometric Functions	2.6	6.1 -- 6.6	3-37 odd
4	2.f. Derivatives of Exponential and Logarithmic Functions	2.7	7.1 -- 7.6	1-34 odd, 39-44 odd, 61, 65
	2.g. Implicit Differentiation and Inverse Trigonometric functions	2.8	8.1--8.3, 8.5	1-38 odd, 45,47
Ch3. APPLICATIONS OF DIFFERENTIATION				
5	3.a. Indeterminate Forms & L'Hopital's Rule	3.2	2 Examples	3-21 odd
	3.b. Maximum and Minimum Values	3.3	3.1--3.12	5--55 odd
	TEST 1			
6	3.d. Increasing and Decreasing Functions	3.4	4.1 -- 4.5	5--25 odd, 55
	3.e. Concavity and second Derivative Test	3.5	5.1- -5.6	9--37 odd
7	3.f. Optimization	3.7	7.1 -- 7.4	3-15 odd
	3.g. Related Rates	3.8	8.1--8.3	1-15 odd

Ch4. INTEGRATION				
8	4.a. Antiderivatives	4.1	3 Examples	5-30 odd
	4.b. The Definite Integral	4.4	Th.4.1,Th.4.2, 4 Examples	39-50 odd
	4.c. Fundamental Theorem of Calculus	4.5	3 Examples	3,5,11,15, 33,35, 47, 49
9	4.d. Integration by Substitution	4.6	All Examples	1--47 odd
	MIDTERM REVIEW			
	4.f. the Natural Logarithm as an Integral	4.8	8.2	9--30 odd
10	Ch6. INTEGRATION TECHNIQUES			
	6.a. Integration by Parts	6.2	All Examples	1-36 odd
11	6.b. Trigonometric Techniques of Integration	6.3	All Examples	1-30 odd
12	6.c. Integration of Rational Function (RF)	6.4	All Examples	1-33 odd
13	6.c. Integration of RF Using Partial Fractions	6.4	All Examples	1-35 odd
	TEST 2			
14	Ch5. APPLICATIONS OF THE DEFINITE INTEGRAL			
	5.a. Area between Curves	5.1	1.1—1.6	1—7 odd
	5.b. Volume: Slicing, Disk	5.2	2.1—2.4	9, 11
15	5.c. Method of Washers	5.2	2.3—2.6	21, 23, 29
	5.d. Method of Cylindrical Shells	5.3	3.1—3.3	9,11,13,15
16	REVISION			

Wish you the best of luck

Coordinator: Fathalla Rihax

Office Hours will be on Wednesdays 2-4 pm for Sections 52 & 54.

E-mail: frihax@uaeu.ac.ae, Tel. Office 037134457, Building # 132 (Magam) Room # 101