



Philadelphia University
Faculty of Science
Department of Basic Sciences and Mathematics
First (fall) Semester 2010/2011

Course Syllabus

Course Title	Mathematics I	Course Code	210101
Course Level	"1"	Course Prerequisite	None
Lecture Time	Sun., Tue., Thu. 08:10–09:00	Credit Hours	"3"

Academic Staff Specific

Name	Feras Awad Mahmoud	Office Hours	Sunday	09:30 – 10:30
Rank	Lecturer "M.Sc"		Tuesday	
Office Number	"819"		Thursday	
Location	Faculty of Science		Monday	09:45 – 11:00
E – mail	fawad@philadelphia.edu.jo	Wednesday		

Course Description:

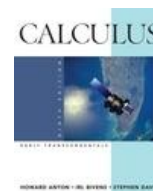
This course deals with the following main topics: differentiation of algebraic and transcendental functions, an introduction to analytic geometry, applications of differentiation, and a brief introduction to integration.

Course Objectives:

1. Learn the concept of inverse functions and related techniques.
2. Understand the concept of limits and its related topics such as continuity. Then understanding the concept of derivative as a consequence of applying the limit as a tool in solving the problem of finding the instantaneous rate of change. Then learn the techniques of differentiation of functions such as trigonometric, inverse trigonometric, exponential, and logarithmic function.
3. Studying the behavior of the function through exploring its first and second derivatives.
4. Understanding the concept of integration as a tool in solving the problem of finding the area under the curve of a function.

Course Components (Text Book):

Title : Calculus Early Transcendentals Combined.
 Author : Anton, Bivens, and Davis.
 Publisher : John Wiley & Sons, Inc.
 Edition : 9th Edition.
 Year : 2009
 ISBN : 978-0-470-18345-8



Teaching Methods:

1. To learn it is imperative for the student to take an active interest in their own education. To learn mathematics the student must read, think, and write in an analytical manner and this takes practice. Such practice is by working exercises. When troubles arise, and they will, the student must ask questions. Questions may be posed to the instructor or to other students in a variety of ways; online office hours, or in class.
2. There are many different styles of learning. Some people gain better understanding from listening to something being explained orally. Some get better understanding from written material. Some like a combination of both. I do my best to accommodate various styles of learning. However, feel free to let me know what your learning style is so that I can take that into account when determining the future direction of the course.
3. There will be required readings associated with each lecture. Most readings will be from the course text, but students are encouraged to seek supplementary material. Links to supplementary reading material can be accessed from the course page.
4. Homework will be assigned each week; not to be collected or graded by the instructor. In addition, at the end of a chapter, challenge problems will be assigned for "work-hard" students. Furthermore, mathematical projects on real-life problems will be assigned to the students throughout the semester.
5. I encourage the use of research materials as a way to supplement your understanding of the course material, as long you heed the following common-sense ground rules. First, you may not consult my solutions or the problems sets of other students from previous offerings of this course. Second, external sources may be used only to improve your own understanding. You may not quote directly from any source and you should not write down anything that you do not understand. When you write your solutions, you should do it on your own without the direct help of any external sources. If you do use external references in improving your understanding, please cite them! Failure to cite references will be treated as cheating and will not be tolerated. If you are diligent about citing references, you will come out ahead in the end. Please ensure that you understand the spirit and the letter of these rules before beginning any class work.
6. You are encouraged to work together on problem sets, especially those designated as group work. However, unless the problem set is specifically designated as group work, you must ultimately demonstrate your understanding of the material by writing up your

own solutions without the help of other students or their written work. If you consult with other students (or faculty) on a problem set, this should be considered equivalent to consulting any other reference and should be cited appropriately. This policy will be strictly enforced.

7. Higher learning involves not just acquiring knowledge, but developing the ability to know what you don't know. Among other things, this involves the ability to know when you do and do not have a rigorous proof or an accurate answer. One of the goals of this course is to cultivate your ability to perform an accurate self-assessment of your work. Hence, you are encouraged to think about and state accurately not only the parts that you do understand from each homework, but also the parts that you do not. Please do not muddle your way through proofs and other exercises in the hope that I will not read them carefully. You will get additional credit for an accurate self-assessment of your answer or approach. If you have gotten most of the way through a proof and just cannot complete the last step or even if you are missing a step in the middle but know how to do the rest, just try to write down what you have done so far and what it is that you don't know how to do. This will help me to better gauge where your understanding is incomplete so that we can review these areas in class. It will also demonstrate your understanding of your own work.
8. Effective learning also involves knowing where to go to get help when you realize that your knowledge or understanding of a topic is incomplete. This could mean consulting external references or coming to office hours. It can also mean asking a question in class when you don't understand part of the lecture.
9. I very much appreciate and enjoy getting as much feedback from my students as possible, even if it is not all positive. Please don't be afraid to tell me what you think. If you want to just stop by to chat, feel free. My door is usually open, but if you could utilize office hours as much as possible, I would appreciate it. If you would like to make an appointment outside office hours, just call or send an e-mail.

Learning Outcomes:

1. Use techniques to compute limits of various kinds of functions.
2. Relate the concepts of limit and continuity and apply some consequences of continuity such as the Intermediate Value Theorem.
3. Recognize the existence of the vertical, horizontal, or slant asymptotes.
4. Use the techniques of computing limits to define the derivative of a function at some point as the instantaneous rate of change.
5. Derive the rules of differentiation and use them to find the derivatives of various kinds of functions of single variable.
6. Apply Rolle's and the Mean value Theorems.
7. Use the first and the second derivatives to: find the minimum and the maximum values of a function, find the intervals of increasing and decreasing, and find the intervals of concavity. Then using this information to draw a sketch of the curve of the given function.
8. Use the techniques of computing limits to define the integration of a function as the area under its curve.
9. Learn the Fundamental Theorem of calculus and use it to define the definite integral as the anti-derivate.
10. Integrate various kinds of functions by using the rules of integration and the substitution as first technique of substitution.

Assessment Instruments:

Allocation of Marks				
Assessment Instruments	Mark	Expected Appointment		
		Date	Day	Time
First Examination	15	[22 to 30].11.2010	Mon. to Tue.	To be determined later
Second Examination	15	[22 to 30].12.2010	Wed. to Thu.	To be determined later
Quizzes	20	Expected short exam will be on Sunday of each Week.		
Final Examination	50	23.01.2011 – 01.02.2011		
Total	100			

Course Academic Calendar:

Week	Basic and Support Material to be Covered
(1)	<u>Chapter 0: Before Calculus.</u> 1. Functions. 2. New Functions from Old.
(2)	3. Inverse Functions; Inverse Trigonometric Functions. 4. Exponential and Logarithmic Functions.
(3)	<u>Chapter 1: Limits and Continuity.</u> 1. Limits (An Intuitive Approach). 2. Computing Limits. 3. Limits at Infinity; End Behavior of a Function.
(4)	4. Continuity. 5. Continuity of Trigonometric, Exponential, and Inverse Functions.
(5)	<u>Chapter 2: The Derivative.</u> 1. Tangent Lines and Rates of Change. 2. The Derivative Function. 3. Introduction to Techniques of Differentiation. 4. The Product and Quotient Rules.
(6)	5. Derivatives of Trigonometric Functions. 6. The Chain Rule. • <i>First Exam.</i>
(7)	<u>Chapter 3: Topics in Differentiation.</u> 1. Implicit Differentiation.

	2. Derivatives of Logarithmic Functions. 3. Derivatives of Exponential and Inverse Trigonometric Functions.
(8)	4. L'Hôpital's Rule; Indeterminate Forms. <u>Chapter 4: The Derivative in Graphing and Applications.</u> 1. Analysis of Functions I: Increase, Decrease, and Concavity.
(9)	2. Analysis of Functions II: Relative Extrema; Graphing Polynomials. 3. Analysis of Functions III: Rational Functions, Cusps, and Vertical Tangents.
(10)	4. Absolute Maxima and Minima. 5. Rolle's Theorem; Mean-Value Theorem.
(11)	<u>Chapter 5: Integration.</u> 1. An Overview of the Area Problem. 2. The Indefinite Integral. • <i>Second Exam.</i>
(12)	3. The Indefinite Integral. 4. Integration by Substitution.
(13)	5. The Definite Integral. 6. The Fundamental Theorem of Calculus.
(14)	7. Evaluating Definite Integrals by Substitution. 8. Logarithmic and Other Functions Defined by Integrals.
(15)	<u>Chapter 6: Applications of the Definite Integral.</u> 1. Area between Two Curves. 2. Volumes.
(16)	• <i>Final Exam.</i>

Expected Workload:

On average students need to spend, at least, 9 hours of study and preparation per week for this course.

Attendance Policy:

Absence from lectures shall not exceed 15%. Students who exceed the 15% limit without a medical or emergency excuse acceptable to and approved by the Dean of the relevant college/faculty shall not be allowed to take the final examination and shall receive a mark of zero for the course. If the excuse is approved by the Dean, the student shall be considered to have withdrawn from the course.

Module Reference:

Title : Calculus: Early Transcendentals.
 Author : James Stewart.
 Publisher : Brooks Cole.
 Edition : 6th Edition.
 Year : 2007
 ISBN : 0495011665



Website:

1. <http://ecourse.philadelphia.edu.jo/login/index.php> E–Course (Philadelphia University - Avicenna Center). Remark: The user name and password, if any, is the student university number.
2. <http://eu.wiley.com/WileyCDA/WileyTitle/productCd-EHEP001692.html> Calculus Early Transcendentals Single Variable 9th Edition. (Howard Anton, Irl C. Bivens, Stephen Davis).
3. <http://www.stewartcalculus.com/> Stewart Calculus.
4. <http://academicearth.org/subjects/mathematics> Online video courses.
5. <http://www.wolframalpha.com/> Wolfram|Alpha (Scientific knowledge engine)