



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

Course Syllabus

Course Title	Mathematics for Engineering	Course Code	210106
Course Level	"1"	Course Prerequisite	210101 "Mathematics I"
Lecture Time	Mon. and Wed. 08:15–09:45	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:

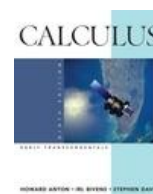
This course introduces advanced principles of engineering calculus to form the foundation needed for student's advancement. The module deals with the following main topics: Techniques of Integration, Conic Sections and Polar Coordinates, Sequences and Series, Functions of Several Variables, and Double and Triple Integrals.

Course Objectives:

1. To study integration methods and techniques for functions of one variable.
2. To teach the use of technology to explore topics related to: Sequences and Series, differentiation and integration and illustrate applications of those techniques and technology to problem solving in mathematics and engineering.
3. Have enough knowledge about analytical geometry especially in conic sections and polar coordinates and their applications.
4. Represent curves parametrically, implicitly and explicitly and be able to convert from one form of representation to another.
5. Analyze real valued functions of several variables and study its applications in sciences and engineers.
6. Evaluate volumes of bounded solids and areas of bounded regions by using the ideas of double and triple integrals.

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.

- 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.
- 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.
- 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.
- 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:

- Use techniques to compute integrals of various kinds of functions.
- Be familiar with conic sections forms and polar coordinates, and transform curves from rectangular form to the polar and visa versa.
- Use the techniques of limits to determine whether a sequence or series converges or diverges.
- Derive the rules of differentiation and use them to find the derivatives of various kinds of functions of several variables.
- Derive the rules of differentiation and use them to find the derivatives of various kinds of functions of single variable.
- Integrate various kinds of functions by using the double and triple integrals.

Assessment Instruments

<u>Allocation of Marks</u>				
<u>Assessment Instruments</u>	<u>Mark</u>	<u>Expected Appointment</u>		
		<u>Date</u>	<u>Day</u>	<u>Time</u>
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 Monday of each Week.		
Final Examination	50	23.01.2011 – 01.02.2011		
Total	100			

Course Academic Calendar

<u>Week</u>	<u>Basic and Support Material to be Covered</u>
(1)	<u>Chapter 08: Integration Techniques, L'Hôpital's Rule, and Improper Integrals.</u> 1. Basic integration rules. 2. Integration by parts. 3. Trigonometric integrals.
(2)	4. Trigonometric substitution. 5. Partial fractions.
(3)	6. Integration by tables and other integration techniques. 7. Indeterminate forms and L'Hôpital's rule. 8. Improper integrals.
(4)	<u>Chapter 10: Conics, Parametric Equations, and Polar Coordinates.</u> 1. Conics and calculus.
(5)	2. Plane curves and parametric equations. 3. Parametric equations and calculus.
(6)	4. Polar coordinates and polar graphs. 5. Area and arc length in polar coordinates. • <i>First Exam.</i>
(7)	<u>Chapter 09: Infinite Series.</u> 1. Sequences. 2. Series and convergence.
(8)	3. The integral test and p -series. 4. Comparisons of series.
(9)	5. Alternating series. 6. The ratio and root tests.
(10)	7. Taylor polynomials and approximations.

	8. Power series.
(11)	9. Representation of functions by power series. 10. Taylor and Maclaurin series. • <i>Second Exam.</i>
(12)	<u>Chapter 11: Vectors and the Geometry of Space.</u> 1. Vectors in the plane. 2. Space coordinates and vectors in space.
(13)	<u>Chapter 13: Functions of Several Variables.</u> 1. Introduction to functions of several variables. 3. Partial derivatives.
(14)	5. Chain rules of functions of several variables. 6. Directional derivatives and gradients. <u>Chapter 14: Multiple Integration.</u> 1. Iterated integrals and area in the plane.
(15)	2. Double integrals and volume. 3. Change of variables: Polar coordinates. 6. Triple integrals and applications.
(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)