Philadelphia University
Faculty of Science
Department of Basic Sciences and Mathematics
Second Semester, 2018 – 2019

Course Syllabus	
Course Title: Calculus II	**Course code: 250102**
Course Level: 1st year	**Course prerequisite: 0250101**
Lecture Time:	**Credit hours:** 3
Location:	**Contact hours:** 3

Academic Staff Specifics				
Name	**Rank**	**Office number and location**	**Office hours**	**E-mail address**

Course description (According to the University Catalogue)

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

Course objectives:

Upon completion of the course, the student will be able to:

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. Calculate the slope of a tangent line to and the arc length of a polar graph, and determine the volume and surface area of solids formed by revolving regions bound by polar functions.
6. Determine and compute convergence/divergence of sequences and series.
7. Find power series and Taylor and Maclaurin series representations of a given function and determine their intervals of convergence.

Course

- **Text book**

  Howard Anton, Irl C. Bivens and Stephen Davis, **Calculus: Early Transcendentals, 10th Edition**, John Wiley & Sons, Inc. 2013.

Teaching methods

(Lectures, discussion groups, tutorials, problem solving, debates, etc.)

- **Duration**: 16 weeks, 48 hours in total.
- **Lectures**: 48 hours, 3 per week + two exams (two hours).
- **Assignments**: 3 quizzes.

Learning outcomes:

- **Knowledge and understanding**

  The student will have the knowledge and understanding of how to:

1. Use techniques to compute integrals of various kinds of functions.
2. Be familiar with conic sections forms and polar coordinates, and transform curves from rectangular form to the polar and vice versa.
3. The definition of both infinite sequences and series.
4. Use the techniques of limits to determine whether a sequence or series converges or diverges.

- **Cognitive skills (thinking and analysis).**

1. To identify and solve problems. Work with given information and handle mathematical proofs based on mathematical theorems.
2. Student should be able to develop their deeper understanding of the concepts they learned in Calculus I.
3. Should be able to use the analytical techniques to attack mathematical and geometrical problems.
4. Should be able decompose the function into power series.
5. Students should be able to determine appropriate techniques and knowledge necessary to solve mathematical or applied problems involving Calculus.

- **Communication skills (personal and academic).**

1. Discussion of appropriate topics in calculus; solve problems individually, in groups, or as a class quizzes and exams.
2. Reading and studying the text; daily homework problems from the text; writing assignments on concepts covered in class.
3. The ability to clearly express an opinion, and accept the opinions of others.
4. The student should illustrate how to communicate with: Peers, Lecturers and Community.
5. The student should interpret how to Know the basic mathematical principles using the internet.
6. The student should appraise how to Use the computer skills and library.
7. The student should illustrate how to Search the internet and using software programs to deal with problems.

- **Transferable Skills.**

  Gaining knowledge and experience of working with many pure mathematical problems.

Assessment instruments

- Exams (First, Second and Final Exams)
- Quizzes.
- Homework assignments

Allocation of Marks		
Assessment Instruments	**Expected Time**	**Mark**
First examination	28/3/2018 - 5/4/2018	**20%**
Second examination	2/5/2018 - 10/5/2018	**20%**
Final examination	6/6/2018 - 14/6/2018	**40%**
Quizzes, Home works, Attendance	3 at least	**20%**
Total		**100%**

Course/ academic calendar

week	**Basic and support material to be covered**	**Homework/reports and their due dates**
(1-5)	**Techniques of Integration:** Basic Integration Rules. Integration by Parts. Trigonometric Integrals. Trigonometric Substitutions. Partial Fractions. Improper Integrals. Strategy for Integration.	**Quiz 1**
(6-8) **1st examination**	**Infinite Series:** Sequences. Series and Convergence.	**Quiz 2**
(9-12) **2nd examination**	The Integral Test and *Pi*-series. Comparisons of Series. Alternating Series. The Ratio and Root Tests. Strategies for Testing Series. Power Series. Representation of Functions by Power Series. Taylor and Maclaurin Series.	**Quiz 3**
(13-15)	**Conics, Parametric Equations, and Polar Coordinates**: Introduction to Conics. Parabolas. Ellipses. Hyperbolas. Plane Curves and Parametric Equations.	
(16) **Final Examination**	Polar Coordinates. Arc Length.	

Expected workload:

On average students need to spend 2 hours of study and preparation for each 50-minute lecture/tutorial.

Documentation and academic honesty

Any form of dishonest conduct will be strictly punished. A student who is caught cheating, or attempting to do so in an exam will be given a zero for the exam and a report will be written to the Dean for further action. A student who helps another student or is seen communicating with another student in an exam will be given the same penalty stated in the previous point. Students with different exam forms are not exempt from the above rules. Repeat offenders will be expelled permanently and banned from future courses.

Attendance policy:

Absence from lectures and/or tutorials 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.

Other Education Resources

Books

- James Stewart, **Calculus: Early Transcendentals, 7th Edition**, Brooks/ Cole 2012.

- Saturnino L. Salas, Garret J. Etgen, Einar Hille, **Calculus: One and Several Variables, 10th Edition**, John Wiley & Sons, Inc. 2007.