Philadelphia University	PHILADELPHIA UNIVERSITY THE WAY TO THE FUTURE	Approval date:
Faculty of Science		Issue:
Department of Math		Credit hours: 3
Academic year 2022/2023	Course Syllabus	Bachelor

Course information

Course#	Course title	Prerequisite
0250101	**Calculus 1**	**None**

Course type		Class time	Room #
☐ University Requirement ☒ Faculty Requirement		ST 14:15-15:45	21004
☐ Major Requirement ☐ Elective ☒ Compulsory		MW 09:45-11:15	21004

Instructor Information

Name	Office No.	Phone No.	Office Hours	E-mail
Feras Awad	822	2132	ST 13:00-14:00 MW 11:30-12:30	fawad@philadelphia.edu.jo

Course Delivery Method

Course Delivery Method		
☒ **Physical** ☐ **Online** ☐ **Blended**		
Learning Model		
Precentage	**Synchronous**	**Asynchronous**	**Physical**
	0%	**0%**	**100%**

Course Description

This is a first-year course which covers the following main concepts and topics: Functions: domain, operations, graphs, trigonometric functions, transcendental, functions, inverse functions, logarithms and exponentials, inverse trigonometric functions. Limits: definition, rules, infinite limits and limits at infinity, continuity, continuity of trigonometric functions, Derivative: rules, derivative of trigonometric functions, chain rule, implicit differentiation, Roll's theorem, mean-value-theorem, L'Hopital's rule, increasing and decreasing, extreme values, asymptotes. Integration: anti-derivative, definite and indefinite integrals, fundamental theorem of calculus, area under the curve, area between tow curves.

Course Learning Outcomes

Number	Outcomes	Corresponding Program outcomes *
Knowledge		
K1	Understand the basic properties of algebraic and transcendental functions, and their operations.	**K$_p$1**
K2	Know the concepts of limits and continuity.	**K$_p$1**
K3	Understand the definition of derivative and integral, and how to differentiation and integration elementary functions.	**K$_p$1**

	Skills		
S1	Students should be able to use derivatives and integrals to solve real-life problems involving optimization and areas.	**S$_p$2**
S2	Use Mathematical Packages, like GeoGebra to solve problems.	**S$_p$4**
	Competencies		
C1	Thinking reasonably and the ability to make decisions.	**C$_p$1**
C2	Work in a team to implement one of the tasks of the course.	**C$_p$2**

* According to learning outcomes of the faculty of pharmacy.

Learning Resources

Course textbook	• Anton H., Bivens I., Davis S. (2011) Calculus: Early Transcendentals (10th ed.). Wiley.
Supporting References	• Stewart J. (2015) Calculus: Early Transcendentals (8th ed.). Brooks Cole.
Supporting websites	• GeoGebra: https://www.geogebra.org/
Teaching Environment	☒**Classroom** ☐ **laboratory** ☐**Learning platform** ☐**Other**

Meetings and Subjects Timetable

Week	Topic	Learning Methods	Tasks	Learning Material
1	Explanation of the study plan for the course, and what is expected to be accomplished by the students. **Technology Preliminaries:** Moodle. Microsoft Teams. Geogebra	Lecture		Course Syllabus Software
2	**BEFORE CALCULUS:** 0.1 Functions	Lecture		Chapter 0
3	0.2 New Functions from Old	Lecture		Chapter 0
4	0.4 Inverse Functions; Inverse Trigonometric Functions	Lecture	Quiz	Chapter 0
5	0.5 Exponential and Logarithmic Functions	Lecture		Chapter 0
6	**LIMITS AND CONTINUITY:** 1.1 Limits (An Intuitive Approach) 1.2 Computing Limits	Lecture		Chapter 1
7	1.3 Limits at Infinity; End Behavior of a Function 1.5 Continuity 1.6 Continuity of Trig., Exp., Inverse functions.	Lecture	Quiz	Chapter 1
8	**THE DERIVATIVE:** 2.1 Tangent Lines and Rates of Change 2.2 The Derivative Function 2.3 Introduction to Techniques of Differentiation 2.4 The Product and Quotient Rules	Lecture		Chapter 2
9	2.5 Derivatives of Trigonometric Functions 2.6 The Chain Rule.	Lecture		Chapter 2
10	**TOPICS IN DIFFERENTIATION:** 3.1 Implicit Differentiation 3.2 Derivatives of Logarithmic Functions	Lecture		Chapter 3
11	3.3 Derivatives of Exp. and Inverse Trig. Functions 3.6 L'Hopital's Rule; Indeterminate Forms	Lecture		Chapter 3

12	**THE DERIVATIVE IN GRAPHING AND APPLICATIONS:** 4.1 Increase, Decrease, and Concavity 4.2 Relative Extrema; Graphing Polynomials 4.4 Absolute Maxima and Minima 4.8 Rolle's Theorem; Mean-Value Theorem	Lecture		Chapter 4
13	**INTEGRATION:** 5.2 The Indefinite Integral 5.3 Integration by Substitution	Lecture	Quiz	Chapter 5
14	5.5 The Definite Integral 5.6 The Fundamental Theorem of Calculus 5.9 Evaluating Definite Integrals by Substitution	Lecture		Chapter 5
15	5.10 Logarithmic and Other Functions Defined by Integrals 6.1 Area Between Two Curves	Lecture	Quiz	Chapter 5 Chapter 6
16	Final Exam			

* Includes: Lecture, flipped Class, project- based learning, problem solving based learning, collaborative learning

Course Contributing to Learner Skill Development

Using Technology
• Use GeoGebra to draw functions and do calculations.
Communication Skills
• Making a GeoGebra applet that do calculations of any main topic of the course and represents it to the students in class.
Application of Concepts Learnt
• Choose a physical model of any main topic of the course and briefly solve it.

Assessment Methods and Grade Distribution

Assessment Methods	Grade Weight	Assessment Time (Week No.)	Link to Course Outcomes
Mid Term Exam	**30%**	**8**	**K1, K2, C1**
Various Assessments *	**30%**	**Continuous**	**S1, S2, C1, C2**
Final Exam	**40%**	**16**	**K1, K2, K3, C1**
Total	**100%**		

* Includes: quiz, in class and out of class assignment, presentations, reports, videotaped assignment, group or individual projects.

Alignment of Course Outcomes with Learning and Assessment Methods

Number	Learning Outcomes	Learning Method*	Assessment Method**
Knowledge			
K1	Understand the basic properties of algebraic and transcendental functions, and their operations.	Lecture	**Exam**
K2	Know the concepts of limits and continuity.	Lecture	**Exam**
K3	Understand the definition of derivative and integral, and how to differentiation and integration elementary functions.	Lecture	**Exam**

	Skills		
S1	Students should be able to use derivatives and integrals to solve real-life problems involving optimization and areas.	Problem Solving	**Homework**
S2	Use Mathematical Packages, like GeoGebra to solve problems.	Problem Solving	**Computer Project**
	Competencies		
C1	Thinking reasonably and the ability to make decisions.	Discussion	**Quiz**
C2	Work in a team to implement one of the tasks of the course.	Case study	**Group project**

* Includes: Lecture, flipped Class, project- based learning, problem solving based learning, collaborative learning

** Includes: quiz, in class and out of class assignment, presentations, reports, videotaped assignment, group or individual projects.

Course Polices

Policy	Policy Requirements
Passing Grade	The minimum passing grade for the course is (50%) and the minimum final mark recorded on transcript is (35%).
Missing Exams	• Missing an exam without a valid excuse will result in a zero grade to be assigned to the exam or assessment. • A Student who misses an exam or scheduled assessment, for a legitimate reason, must submit an official written excuse within a week from an exam or assessment due date. • A student who has an excuse for missing a final exam should submit the excuse to the dean within three days of the missed exam date.
Attendance	The student is not allowed to be absent more than (15%) of the total hours prescribed for the course, which equates to six lectures days (M, W) and six lectures (S, T). If the student misses more than (15%) of the total hours prescribed for the course without a satisfactory excuse accepted by the dean of the faculty, s/he will be prohibited from taking the final exam and the grade in that course is considered (zero), but if the absence is due to illness or a compulsive excuse accepted by the dean of the college, then withdrawal grade will be recorded.
Academic Honesty	Philadelphia University pays special attention to the issue of academic integrity, and the penalties stipulated in the university's instructions are applied to those who are proven to have committed an act that violates academic integrity, such as: cheating, plagiarism (academic theft), collusion, and violating intellectual property rights.

Program Learning Outcomes to be Assessed in this Course

Number	Learning Outcome	Course Title	Assessment Method	Target Performance level
K3	Understand the definition of derivative and integral, and how to differentiation and integration elementary functions.	Calculus 1	Quiz	100% of the students get 65% or more on the rubric.

Description of Program Learning Outcome Assessment Method

Number	Detailed Description of Assessment
K_p1	The student will be given a polynomial on a closed interval and is asked to find the extremum and classify them, the intervals of increasing and decreasing, the intervals of concavity and inflection points, the area enclosed by the polynomial and the $x-$axis on the given interval.

Assessment Rubric of the Program Learning Outcome

	Weak (1 pt.) Student is very confused and does not understand the topic, nor is able to clearly grasp how to apply it or when to use it.	Not Bad (2 pts) Student has a decent grasp of the process but makes some major mistakes.	Good (3 pts) Student is almost perfect in their understanding of the topic, with some minor confusion or mistakes.	Excellent (4 pts) Student understands the concept perfectly.
Critical Numbers Student should find the critical numbers and determine the sign of 1st derivative	The 1st derivative calculated is wrong.	The 1st derivative calculated is correct but the critical numbers wrong.	The critical numbers are found with minor mistakes.	The critical numbers are correctly found.
Intervals of increasing and decreasing Student should find the intervals of increasing or decreasing.	The 1st derivative sign is incorrect.	The 1st derivative sign is calculated, and the intervals are found but with major errors.	The 1st derivative sign is calculated, and the intervals are found but with minor errors.	The intervals of increasing and decreasing are calculated correctly.
Extremum Student should find the minimum and maximum values and classify them as local or absolute	The extremum points found are incorrect.	The extremum found correctly but their classification is wrong.	The extremum found with classification but with minor errors.	The extremum with their classification is correct.
Intervals of Concavity and Inflection Points Student should find the intervals of concavity, up or down, and find the inflection points.	The 2nd derivative sign is incorrect.	The 2nd derivative sign is calculated and the intervals with inflection points are found but with major errors.	The 2nd derivative sign is calculated and the intervals with inflection points are found but with minor errors.	The intervals of concavity and inflection points are calculated correctly.
The Area Student should use the definite integral to calculate the area.	An inappropriate order of integration is used.	An appropriate order of integration is used but with major calculations errors.	An appropriate order of integration is used but with minor calculations errors.	An appropriate order of integration is used with correct calculations.