Philadelphia University	PHILADELPHIA UNIVERSITY THE WAY TO THE FUTURE	**Approval date:**
Faculty of Science		**Issue:**
Department of Math		**Credit hours: 3**
Academic year 2023/2024	**Course Syllabus**	**Bachelor**

Course information

Course#	Course title	Prerequisite
250102	**Calculus (2)**	**Calculus (1) 216111**

Course type	Class time	Room #
☐ University Requirement ☐ Faculty Requirement ☒ Major Requirement ☐ Elective ☒ Compulsory	ST 11:15-12:30	21003

Instructor Information

Name	Office No.	Phone No.	Office Hours	E-mail
Feras Awad	822	2132	SM 11:15–12:30 ST 12:45–14:00	fawad@philadelphia.edu.jo

Course Delivery Method

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

Course Description

In this course, students will dive into three main areas of study: Techniques of integration, Sequences and Series, and Applications of the Definite Integrals in Geometry, Science, and Engineering.

Course Learning Outcomes

Number	Outcomes	Corresponding Program outcomes
Knowledge		
K1	Students will gain a deep knowledge of various integration techniques, including integration by parts, trigonometric integrals, and partial fractions, allowing them to solve a wide range of integration problems.	**K_p1**
K2	Students will develop a thorough understanding of the concepts of sequences and series, learning about convergence, divergence, and theorems related to these mathematical structures.	**K_p1**

K3	Students will acquire knowledge about how definite integrals are applied in geometry, science, and engineering, and will be able to recognize and solve real-world problems using this knowledge.	**K_p3**
Skills		
S1	Students will learn to critically evaluate and choose the appropriate integration technique or series approach to solve complex mathematical problems effectively.	**S_p2**
S2	Students will acquire proficiency in using mathematical software and tools to aid in solving integration and series problems.	**S_p4**
Competencies		
C1	Students will develop the ability to communicate their mathematical reasoning and problem-solving processes effectively, both in writing and orally.	**C_p1**

Learning Resources

Course textbook	Howard Anton, Irl C. Bivens, and Stephen Davis. (2016) Calculus: Early Transcendentals. (11th ed.). Wiley.
Supporting References	• James Stewart. (2015) Calculus: Early Transcendentals. (8th ed.). Brooks Cole. • Joel R. Hass, Christopher E. Heil, and Maurice D. Weir. (2017) Thomas' Calculus. (14th ed.). Pearson. • Dennis G. Zill. (2009) Calculus: Early Transcendentals. (4th ed.). Jones and Bartlett. • Ron Larson, Bruce H. Edwards. (2018) Calculus: Early Transcendental Functions. (7th ed.). Cengage Learning.
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. **Principles of Integral Evaluation** 7.1 An Overview of Integration Methods	Lecture		Course Syllabus Chapter 7
2	7.2 Integration by Parts	Lecture		Chapter 7
3	7.3 Integrating Trigonometric Functions	Lecture		Chapter 7
4	7.4 Trigonometric Substitutions	Lecture	Quiz	Chapter 7
5	7.5 Integrating Rational Functions by Partial Fractions	Lecture		Chapter 7
6	7.8 Improper Integrals	Lecture	Computer Task	Chapter 7
7	**Infinite Series** 9.1 Sequences	Lecture		Chapter 9
8	9.3 Infinite Series	Lecture	Midterm Exam	Chapter 9
9	9.4 Convergence Tests	Lecture		Chapter 9
10	9.5 The Comparison, Ratio, and Root Tests	Lecture		Chapter 9

11	9.6 Alternating Series; Absolute and Conditional Convergence	Lecture	Quiz	Chapter 9
12	9.8 Maclaurin and Taylor Series; Power Series 9.10 Differentiating and Integrating Power Series; Modeling with Taylor Series	Lecture		Chapter 9
13	**Applications of the Definite Integral in Geometry, Science, and Engineering** 6.1 Area Between Two Curves 6.2 Volumes by Slicing; Disks and Washers	Lecture		Chapter 6
14	6.3 Volumes by Cylindrical Shells 6.4 Length of a Plane Curve	Lecture	Quiz	Chapter 6
15	6.5 Area of a Surface of Revolution 6.6 Work	Lecture		Chapter 6
16	Final Exam	Lecture		

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

Course Contributing to Learner Skill Development

Using Technology
Students will be encouraged to use mathematical software (e.g., GeoGebra) to solve complex integration and series problems. This enhances their ability to leverage technology for mathematical computation and analysis, a valuable skill for both academia and real-world applications.
Communication Skills
Group projects and discussions in the course encourage collaborative learning and effective communication within teams, improving interpersonal and teamwork skills.
Application of Concepts Learnt
Students gain practical experience in utilizing their calculus knowledge to solve tangible issues, reinforcing their problem-solving skills.

Assessment Methods and Grade Distribution

Assessment Methods	Grade Weight	Assessment Time (Week No.)	Link to Course Outcomes
Mid Term Exam	**30%**	**8**	**K1, K2**
Various Assessments *	**30%**	**Continuous**	**S1, S2, C1**
Final Exam	**40%**	**16**	**K1, K2, K3**
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	Students will gain a deep knowledge of various integration techniques, including integration by parts, trigonometric integrals, and partial fractions, allowing them to solve a wide range of integration problems.	Lecture	**Exam**

K2	Students will develop a thorough understanding of the concepts of sequences and series, learning about convergence, divergence, and theorems related to these mathematical structures.	Lecture	**Exam**
K3	Students will acquire knowledge about how definite integrals are applied in geometry, science, and engineering, and will be able to recognize and solve real-world problems using this knowledge.	Lecture	**Exam**
Skills			
S1	Students will learn to critically evaluate and choose the appropriate integration technique or series approach to solve complex mathematical problems effectively.	Quiz	**Computer Task**
S2	Students will acquire proficiency in using mathematical software and tools to aid in solving integration and series problems.	Lecture	**Computer Task**
Competencies			
C1	Work in a team to implement one of the tasks of the course.	Collaborative learning	**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 seven lectures (S, T, 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
S_p2	The ability to employ mathematics in various life problems.	Calculus 2	Homework	100% of the students get 60% or more on the rubric

Description of Program Learning Outcome Assessment Method

Number	Detailed Description of Assessment
S_p4	The student selects a real-life problem or scenario that requires mathematical analysis and provide a comprehensive solution.

Assessment Rubric of the Program Learning Outcome

	Excellent (4 pts**)** Student understands the concept perfectly.	**Good (**3 pts**)** Student is almost perfect in their understanding of the topic, with some minor confusion or mistakes.	**Fair (**2 pts**)** Student has a decent grasp of the process but makes some major mistakes.	**Poor (**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.
Problem Selection	Relevant, complex, and mathematically rich problem chosen.	Relevant problem selected.	Basic problem with limited mathematical relevance.	Irrelevant or inappropriate problem chosen.
Problem Definition	Clear, thorough, and context-rich problem definition.	Adequate problem definition with context.	Basic problem definition, lacking depth.	Unclear or inadequate problem definition.
Mathematical Analysis	Skillful application of appropriate mathematical concepts.	Effective use of relevant mathematical concepts.	Some mathematical concepts applied with limited depth.	Inaccurate or incomplete mathematical analysis.
Solution Clarity	Highly detailed, organized, and clear solution.	Clear and organized solution.	Somewhat clear solution, lacking organization.	Unclear, disorganized, or incomplete solution.
Real-Life Application	Deep understanding of practical implications demonstrated.	Understanding of practical implications shown.	Basic interpretation with limited depth.	Interpretation does not effectively relate to real-life applications