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

Course information

Course#	Course title	Prerequisite
250202	Calculus (3)	250102

Course type	Class time	Room #
☐ University Requirement ☐ Faculty Requirement ☒ Major Requirement ☐ Elective ☐ Compulsory	Sec. 3: Sat. – Mon. 11:15 - 12:30	6719

Instructor Information

Name	Office No.	Phone No.	Office Hours	E-mail
Mr. Ahmad Hamdan	S/819	2341	Sat. – Tue. 9:45 – 11:00	ahamdan@philadelphia.edu.jo

Course Delivery Method

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

Course Description

The course covers various topics, such as three-dimensional space including vectors, lines, and planes. It also includes vector-valued functions, covering the calculus of vector-valued functions, arc length parameterization, curvature, and motion along a curve. Another topic is partial derivatives, which covers limits and continuity, partial derivatives, the chain rule, gradient and directional derivatives, and Lagrange multipliers. Additionally, the course covers multiple and triple integrals, including double integrals over rectangular and non-rectangular regions, double integrals in polar coordinates, and applications such as finding area, surface area, and volume. It also covers triple integrals over rectangular and non-rectangular solids, triple integrals in cylindrical and spherical coordinates, and applications such as finding volume.

Course Learning Outcomes

Number	Outcomes	Corresponding Program outcomes
Knowledge		
K1	Recognize the rectangular coordinate systems in three dimensions, and the analytic geometry of lines, planes, and other basic surfaces	**Kp_1**
K2	Understand the calculus of vector-valued functions	**Kp_1**
K3	Know the real valued functions of several variables, their graphs: level curves, and level surfaces, and their analytical geometry	**Kp_1**
Skills		
S1	Apply the concepts in the course to describe basic characteristics of curves (as curvature) and to explain various physical phenomena	**Sp_2**
S2	Solve optimization problems involving two and three variables.	**Sp_3**
Competencies		
C1	Evaluate double and triple integrals, volumes of bounded solids, and areas of bounded region	**Cp_1**

Learning Resources

Course textbook	Howard Anton, Irl C. Bivens and Stephen Davis, **Calculus: Early Transcendentals, 10th Edition**, JohnWiley & Sons, Inc. 2013.
Supporting References	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.
Supporting websites	http://www.sfu.ca/~vjungic/Calculus%203/Calculus3.pdf
Teaching Environment	☒**Classroom** ☐ **laboratory** ☐**Learning platform** ☐**Other**

Meetings and subject timetable

Week	Topic	Learning Methodsl	Tasks	Learning Material
1	**Three-Dimensional Spaces; Vectors:** Rectangular Coordinates in3-Space; Spheres; Cylindrical Surfaces.	Lecture		Ch. 11
2	Vectors Dot Product; Projections.	Lecture		Ch. 11
3	Cross Product. Parametric Equations of Lines.	Lecture		Ch.11
4	Planes in 3-Space.	Lecture		Ch. 11
5	Cylindrical and Spherical Coordinates.	Lecture		Ch.11

6	**Vector-Valued Functions:** Introduction to Vector-Valued Functions	Lecture		Ch.12
7	Calculus of Vector-Valued Functions.	Lecture		Ch.12
8	Arc Length. Unit Tangent, Normal, and Binormal Vectors. Curvature.	Lecture		Ch.12
9	**Partial Derivatives:** Functions of Two or More Variables. Limits and Continuity.	Lecture		Ch. 13
10	Partial Derivatives. Differentiability.	Lecture		Ch. 13
11	The Chain Rule. Directional Derivatives and Gradients.	Lecture		Ch. 13
12	Tangent Planes and Normal Vectors. Maxima and Minima of Functions of Two Variables.	Lecture		Ch. 13
13	Lagrange multipliers.	Lecture		Ch. 13
14	**Multiple Integrals:** Double Integrals. Double Integrals over Rectangular and Non-rectangular Regions.	Lecture		Ch. 14
15	Double Integrals in Polar Coordinates, Triple Integrals over rectangular coordinate.	Lecture		Ch. 14
16	Triple Integrals in Cylindrical and Spherical Coordinates. **Final Exam**	Lecture		Ch. 14

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

Course Contributing to Learner Skill Development

Using Technology
Communication skills
Improve the communication skills of students by giving oral quizzes and discussing the assignments in the class
Application of concepts learnt

Assessment Methods and Grade Distribution

Assessment Methods	Grade Weight	Assessment Time (Week No.)	Link to Course Outcomes
Mid Term Exam	**% 30**	**Week 11**	**K_1,K_2**
Various Assessments *	**% 30**	**Continued**	**S_2, C_1**
Final Exam	**% 40**	**Week 16**	**K_1,K_2 K_3**
Total	**%100**		

* includes: quizzes, in-class and out-of-class assignments, presentations, reports, videotaped assignments, and group or individual projects.

Alignment of Course Outcomes with Learning and Assessment Methods

Number	Learning Outcomes	Learning Method*	Assessment Method**
Knowledge			
K1	Recognize the rectangular coordinate systems in three dimensions, and the analytic geometry of lines, planes, and other basic surfaces	Lecture	**Quiz**
K2	Understand the calculus of vector-valued functions	Lecture	**Quiz**
K3	Know the real-valued functions of several variables, their graphs: level curves, and level surfaces, and their analytical geometry	Lecture	**Assignment**
Skills			
S1	Apply the concepts in the course to describe the basic characteristics of curves (as curvature) and to explain various physical phenomena	Lecture	**Midterm Exam**
S2	Solve optimization problems involving two and three variables.	Lecture	**Midterm Exam**
Competencies			
C1	Evaluate double and triple integrals, volumes of bounded solids, and areas of bounded region	Lecture	**Final Exam**

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

** includes: quizzes, in-class and out-of-class assignments, presentations, reports, videotaped assignments, and group or individual projects.

Course Policies

Policy	Policy Requirements
Passing Grade	The minimum passing grade for the course is (50%) and the minimum final mark recorded on the 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 the 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 for more than 15% of the total hours prescribed for the course, which is equivalent to six lecture days (M, W) and seven lectures (S, T, R). 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, he or she will be prohibited from taking the final exam and the grade in that course will be recorded as zero. However, if the absence is due to illness or a valid excuse accepted by the dean of the college, a 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
Kp_1	Understanding the main concepts	Calculus (3)	Quizzes	75 % have a degree above 8
Sp_2	Apply mathematical concepts in real-life problems	Calculus (3)	Assignment	75 % have a degree above 5
Cp_1	Apply critical and logical thinking in solving many problems	Calculus (3)	Final Exam	60% have a degree above 20

Description of Program Learning Outcome Assessment Method

Number	Detailed Description of Assessment
Kp_1	Short quizzes mainly (3) with 5 points each
Sp_2	Assignment to solve real-life problems with 5 points
Cp_1	Final Exam with 40 points

Assessment Rubric of the Program Learning Outcome

Under Construction