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

Course information

Course#	Course title	Prerequisite
0250311	**Real Analysis (1)**	**0250251**

Course type	Class time	Room #
☐ University Requirement ☐ Faculty Requirement ☒ Major Requirement ☐ Elective ☐ Compulsory	**Sat. and Tue. 9:45-11:00** **Sat. and Tue. 12:40-1:55**	**6001** **1005**

Instructor Information

Name	Office No.	Phone No.	Office Hours	E-mail
Dr. Abdullah Alsoboh	**809**	**009626479900 Ext: 2339**	**Sun. Tuesday 10:00-11:00**	**aalsoboh@philadelphia.edu.jo**

Course Delivery Method

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

Course Description

This course includes the Algebraic properties of ℝ, order property, the absolute value function, triangle inequality, bounded sets, the completeness property of R, Archimedean property in ℝ, supremum and infimum.
Sequences: Limit of a sequence. convergent sequences. monotone and bounded sequences. Cauchy sequences. Subsequences and limit points. Bolzano-Weierstrass Theorem.
Limits of real valued functions. Definition of limits by neighborhoods. Definition of limits by sequences. Limit theorems.
Continuous functions on R: Sequence definition and neighborhood definition of continuity. Boundedness of continuous functions on compact intervals. The extreme value theorem. Uniform continuity. The intermediate value theorem.

Course Learning Outcomes

Number	Outcomes	Corresponding Program outcomes
Knowledge		
K1	Understanding of the concepts of limit.	**Kp_1**
K2	Understand the properties of sequences and the fundamental theorems.	**Kp_1**
K3	Understanding the concepts of continuity.	**Kp_1**
Skills		
S1	Prove the fundamental theorems for limits and continuity.	**Sp_1**
S2	Apply the basic properties of real numbers.	**Sp_2**
Competencies		
C2	Work in a team to implement one of the tasks of the course	**Cp_1**

Learning Resources

Course textbook	"Introduction to Real Analysis". Bartle and Sherbert. John Wiley & Sons, Inc.4th Edition,2001.
Supporting References	Malik, S. C., and Savita Arora. *Mathematical analysis*. New Age International, 1992. Stromberg, Karl R. *An introduction to classical real analysis*. 1981.
Supporting websites	
Teaching Environment	☒Classroom ☐laboratory ☐Learning platform ☐Other

Meetings and subjects timetable

Week	Topic	Learning Methods	Tasks	Learning Material
1	**Ch. 1: Preliminaries:** Sets and Functions. Mathematical Induction. Finite and Infinite Sets.	Lecture		**Ch. 1**

2	**Ch. 2: The Real numbers:** The Algebraic properties of R. The order properties of R.	Lecture		**Ch. 2**
3	Absolute Value and Real Line. The Completeness Property of R.	Lecture		**Ch. 2**
4	Applications of the Supremum Property. Intervals.	Lecture	Quiz 1 **/03/2024**	**Ch. 2**
5	**Ch3**:**Sequences and Series:** Sequences and Their Limits.	Lecture		**Ch. 3**
6	Limit Theorems. Monotone Sequences.	Lecture		**Ch. 3**
7	Subsequences and the Bolzano-Weierstrass Theorem.	Lecture		**Ch. 3**
8	The Cauchy Criterion. Properly Divergent Sequences.	Lecture		**Ch. 3**
9	Introduction to Infinite Series.	Lecture	Quiz 2 **/04/2023**	**Ch. 3**
10	**Ch4: Limits:** Limits of Functions. Limit Theorems.	Lecture		**Ch. 4**
11	Some Extensions of Limit Concept.	Lecture		**Ch. 4**
12	**Ch 5: Continuous Functions :** Continuous Functions.	Lecture		**Ch. 5**
13	Combinations of Continuous Functions.	Lecture	Assignment (10 points) **/05/2023**	**Ch. 6**
14	Continuous Functions on Intervals	Lecture		**Ch. 5**
15	Uniform Continuity.	Lecture		**Ch. 5**
16	Review.		**Final Exam**	

* 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 the student by giving oral quizzes and discuss the assignments at 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**	**C_2, C_3**
Final Exam	**% 40**	**Week 16**	**K_1, K_2 K_3, K_4**
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	Understanding of the concepts of limit.	Lecture	**Quiz**
K2	Understand the properties of sequences and the fundamental theorems.	Lecture	**Assignment**
K3	Understanding the concepts of continuity.	Lecture	**Assignment**
Skills			

S2	Prove the fundamental theorems for limits and continuity.	Lecture	**Assignment**
Competencies			
C2	Recognize the sequences and series of real numbers and convergence.	Lecture	**Final Exan**
C3	Recognize the real functions and its limits, the continuity of real functions.	Lecture	**Final Exan**

* 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 the 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,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, 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		Assessment	Target Performance

		Course Title	Method	level
Kp1	Understanding the main concepts	Real Analysis (1)	Quizzes and Assignment	75% have a degree above 8

Description of Program Learning Outcome Assessment Method

Number	Detailed Description of Assessment
Kp1	Short quizzes mainly (2) with 10 points each
Sp4	Assignment (10) points

Assessment Rubric of the Program Learning Outcome

Construct during the course.