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| **Approval date:** |  | **Philadelphia University** |
| **Issue:** | **Faculty of Science** |
| **Credit hours:3** | **Department: Basic Science and Mathematic** |
| **Bachelor** | **Course Syllabus** | **Academic year:2021/2022** |

**Course information**

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| **Prerequisite** | | **Course title** | | **Course#** |
| **0250311** | | **Topology** | | **0250461** |
| **Room #** | **Class time** | | **Course type** | |
| **21004** | **Mon, Wed.**  **8:15-9:45** | | University Requirement  Faculty Requirement  Major Requirement  Elective  Compulsory | |

**Instructor Information**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **E-mail** | **Office Hours** | **Phone No.** | **Office No.** | **Name** |
| **ralseidi@philadelphia.edu.jo** | **Sun. to Wed.**  **10:00-11:00** | **009626479900/**  **Ext. 2312** | **812** | **Dr. Rola Alseidi** |

**Course Delivery Method**

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

**Course Description**

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| This is an introductory course in Topology. This course will provide a firm foundation in topology to enable the student to continue more advanced study in this area. As several important areas of mathematics, in particular modern analysis, depend upon or are clarified by certain topics in topology, this course will present and emphasize those topics in order to aid the student in his future mathematical studies. Finally, this course hopes to expose the students to both mathematical rigor and abstraction, giving there an opportunity further to develop his mathematical maturity.  Topics will include Topological Spaces: Open sets, closed sets, closure, interior and boundary of a set, cluster points and the derived set, isolated points. Relative topology and subspaces. Bases. Finite product of topological spaces. Continuous functions, open functions, closed functions, homeomorphism, T0, T1 and T2 spaces, connected and compact space. |

**Course Learning Outcomes**

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| **Corresponding Program outcomes** | **Outcomes** | **Number** |
| **Knowledge** | | |
| **Kp1** | Understanding the basic topics of Topology, such as: the concepts; topology, topological spaces, open sets, closed sets, closure, cluster points and compact. | K1 |
|  | Understanding the concepts of continuous functions and homeomorphism. | **K2** |
| **Kp1** | Defining some examples of topological spaces, such as: discrete, indiscrete, usual, co-finite and co-countable topologies | **K3** |
| Skills | | |
| **Sp1** | Analyze and synthesize proofs to build proofs of topological theorems in a deductive reasoning. | **S1** |
| **Sp1** | Thinking and talking logically through the principle of proving a big amount of theorems. | **S2** |
| **Competencies** | | |
| **Cp4** | Prepare the students to take graduate course in topology | **C1** |

**Learning Resources**

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| --- | --- |
| Foundations of Topology, C.WAYNE PATTY, Second edition 2009. | Course textbook |
| - Long E. Paul, An Introduction To General Topology, Amman: Jordan Book Center, 1986  -Benjamin T. Sims, Fundamentals of Topology, 1976, Macmillan Publishing Co. - Seymour Lipschutz Kendall e. Atkinson, Theory and Problems of General Topology (Schaum’s Outline Series), Schaum Publishing Co., ISBN: 0-471-02985-8. - Munkres, James R., Topology, 2nd Edition (2000), Upper Saddle River, New Jersey: Prentice- Hall, 2000, ISBN: 0-13-178449-8. - Willard,Stephen, GENERAL TOPOLOGY, London: Adelison-Wesley, 1970. - Armstrong, M. A, BASIC TOPOLOGY, New York: Springer, 2003. | Supporting References |
|  | Supporting websites |
| **Classroom**  **laboratory Learning platform Other** | Teaching Environment |

**Meetings and subjects timetable**

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| **Learning Material** | **Tasks** | **Learning Methods** | **Topic** | **Week** |
| **Ch.1** |  | Lecture | **Topological Spaces**: Defining a topology, some examples | **1** |
| **Ch. 1** | Quiz (1)  5 points  **28/03/2022** | Lecture | Closed sets. A closer look at the standard topology on R. | **2** |
| **Ch. 1** |  | Lecture | The Interior, Exterior and Boundary of a set.. | **3** |
| **Ch. 1** | Assignment (1) 5 points  **11/04/2022** | Lecture | Cluster points | **4** |
| **Ch. 1** |  | Lecture | Topologies induced by functions. | **5** |
| **Ch. 1** | Quiz (2)  5 points  **25/04/2022** | Lecture | Examples of topological spaces. | **6** |
|  |  | Lecture | **New Spaces from Old Spaces** | **7** |
| **Ch. 2** | Assignment (2) 5 points  **16/05/2022** | Lecture | Bases, Subbases and Products: Bases. | **8** |
| **Ch. 2** |  | Lecture | Finite products of topological spaces. Subspaces. | **9** |
| **Ch. 1** | Quiz (3)  5 points  **30/05/2022** | Lecture | Continuous functions: Defining a Continuous Function. Open functions, closed functions | **10** |
| **Ch. 1** |  | Lecture | Homoemorphisms | **11** |
| **Ch. 5** |  | Lecture | **Separation and Countability Axioms**  Separation axioms. | **12** |
| **Ch. 5** | Assignment (3) 5 points  **13/06/2022** | Lecture | Hausdorff Spaces | **13** |
| **Ch. 5** |  | Lecture | The Second axiom of Countability and Separable Spaces | **14** |
| **Ch.4** |  | Lecture | **Compact Spaces:**  Compact Spaces and their properties. | **15** |
|  | **Final Exam 40** |  | Review and Final Exam | **16** |

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

**Course Contributing to Learner Skill Development**

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| Using Technology |
| - |
| Communication skills |
| Improve the communication skills of students by giving oral quizzes and discuss the assignments at the class |
| Application of concepts learnt |
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**Assessment Methods and Grade Distribution**

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| --- | --- | --- | --- |
| **Link to Course Outcomes** | **Assessment Time**  **(Week No.)** | **Grade Weight** | **Assessment Methods** |
| **K1, K3** | **Week 11** | **30 %** | **Mid Term Exam** |
| **K1, S1** | **Continued** | **30 %** | **Various Assessments \*** |
| **K1, K2, K3** | **Week 16** | **40 %** | **Final Exam** |
|  |  | **100%** | **Total** |

\* 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**

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| --- | --- | --- | --- |
| **Assessment Method\*\*** | **Learning Method\*** | **Learning Outcomes** | **Number** |
| **Knowledge** | | | |
| **Quiz** | Lecture | Understanding the basic topics of Topology, such as: the concepts; topology, topological spaces, open sets, closed sets, closure, cluster points and compact. | **K1** |
| **Quiz** | Lecture | Understanding the concepts of continuous functions and homeomorphism. | **K2** |
| **Assignment** | Lecture | Defining some examples of topological spaces, such as: discrete, indiscrete, usual, co-finite and co-countable topologies | **K3** |
| **Skills** | | | |
| **Midterm Exam** | Lecture | Analyze and synthesize proofs to build proofs of topological theorems in a deductive reasoning. | **S1** |
| **Midterm Exam** | Lecture | Thinking and talking logically through the principle of proving a big amount of theorems. | **S2** |
| **Competencies** | | | |
| **Final Exam** | Lecture | Prepare the students to take graduate course in topology | **C1** |

\* 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**

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| **Policy Requirements** | **Policy** |
| The minimum passing grade for the course is (50%) and the minimum final mark recorded on transcript is (35%). | **Passing Grade** |
| * 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. | **Missing Exams** |
| 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. | **Attendance** |
| 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. | **Academic Honesty** |

**Program Learning Outcomes to be Assessed in this Course**

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| **Target Performance level** | **Assessment Method** | **Course Title** | **Learning Outcome** | **Number** |
| 75 % have a degree above 8 | Quizzes | Topology | Understanding the main concepts | Kp1 |
| 75 % have a degree above 18 | Midterm Exam | Topology | Proving many theorems | Sp1 |
| 40% have a degree above 20 | Midterm Exam | Topology | Preparing the students to involve in graduate program | Cp4 |
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**Description of Program Learning Outcome Assessment Method**

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| **Detailed Description of Assessment** | **Number** |
| Short quizzes mainly (3) with 5 points each | Kp1 |
| Midterm Exam with 30 points | Sp1 |
| Final Exam with 40 points | Cp4 |

**Assessment Rubric of the Program Learning Outcome**

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| Under Construction |