The University of Jordan

Accreditation & Quality Assurance Center

COURSE Syllabus

Course Name: General Topology 1
1. **Course title**: General Topology 1

2. **Course number**: (0301361)

3. **Credit hours (theory, practical)**: 3
   
   **Contact hours (theory, practical)**: 3

4. **Prerequisites/corequisites**: (0331212)

5. **Program title**: B.Sc.

6. **Program code**: 

7. **Awarding institution**: The University of Jordan

8. **Faculty**: Science

9. **Department**: Mathematics

10. **Level of course**: Department requirement

11. **Year of study and semester (s)**: all Semesters

12. **Final Qualification**: B.Sc. in Mathematics

13. **Other department (s) involved in teaching the course**: None

14. **Language of Instruction**: English

15. **Date of production/revision**: 1.11.2016

### 16. Course Coordinator:

*Office numbers, office hours, phone numbers, and email addresses should be listed.*

Dr. Hasan Hdeib

### 17. Other instructors:

*Office numbers, office hours, phone numbers, and email addresses should be listed.*

### 18. Course Description:

Topological spaces; open sets; boundary; interior; accumulation points; topologies induced by functions; subspace topology; bases and subbases; finite products; continuous functions; open and closed functions homeomorphisms; separation axioms; countability axioms; metric spaces, connectedness and compactness.
19. Course aims and outcomes:

**A- Aims:**
1. This course aims to provide the students with the essential knowledge about basic facts and definitions of topological spaces with a great deal of emphasis on functions and product of topological spaces in the finite case.
2. Another essential purpose of the course is to train the student to solve a lot of exercises on the subject ranging from simple to moderate in difficulty and increase students participation by letting the proof of some theorems as an exercises.

**B- Intended Learning Outcomes (ILOs):** Upon successful completion of this course students will be able to ...

to achieve the following outcomes:

**A. Knowledge and Understanding Skills:** Student is expected to
A1. Define Topological spaces and the related concepts: open sets, closed sets Topologies induced by functions, the interior, Exterior and Boundary of a set, Cluster points.
A2. Identify the Bases, Subbases and Products: Bases, Finite products of topological spaces, Subbases.
A3. Define continuous functions and open functions and Homoeomorphisms and study equivalent forms, of continuous functions and homeomorphisms.
A4. Know the definitions of the following concepts: \( T_i \)-spaces \((i = 0, 1, 2)\) and the second axiom of countability and separable spaces and to prove some results concerning these concepts.
A5. Define compact spaces and to prove some results concerning these concepts.
A6. Know the definition of Metric spaces and several examples.

**B. Intellectual Analytical and Cognitive Skills:** Student is expected to
B1. Apply the Bases, Subbases and Products and to solve the problems related to these concepts.
B2. Define and apply continuous functions and open functions and Homoeomorphisms to solve and prove problems related.

**C. Subject- Specific Skills:** Student is expected to
C1. Use the properties of Compact Spaces to solve and prove the problems related.

**D. Creativity /Transferable Key Skills/Evaluation:** Student is expected to
D1. Solve and prove the problems related to Metric Spaces.
20. Topic Outline and Schedule:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Week</th>
<th>Instructor</th>
<th>Achieved ILOs</th>
<th>Evaluation Methods</th>
<th>Reference</th>
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<tbody>
<tr>
<td>Chapter (1), (2): Review</td>
<td>1-2</td>
<td></td>
<td></td>
<td>Exam</td>
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<tr>
<td>Chapter 3: Topological Spaces:</td>
<td>3-5</td>
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<td>Exam</td>
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<tr>
<td>1. Defining a topology.</td>
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<td>2. Closed sets.</td>
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<td>3. A closer look at the standard topology on $\mathbb{R}$.</td>
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<td>4. Topologies induced by functions.</td>
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<td>5. The interior, Exterior and Boundary of a set</td>
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<td>6. Cluster points.</td>
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<tr>
<td>Chapter 4: Bases, Subbases and Products:</td>
<td>6-7</td>
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<td>Exam</td>
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<tr>
<td>1. Bases.</td>
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<td>2. Finite products of topological spaces.</td>
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<td>3. Subbases.</td>
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<td>Chapter 5: Continuous Functions:</td>
<td>8-10</td>
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<td>Exam</td>
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<tr>
<td>1. Defining a Continuous Function.</td>
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<td>2. Open Functions and Homoeomorphisms.</td>
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<td>Chapter 6: Separation and Countability Axioms:</td>
<td>11-12</td>
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<td>Exam</td>
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<tr>
<td>1. Separation axioms.</td>
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<td>2. Hausdorff spaces.</td>
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<tr>
<td>3. The second axiom of countability and separable spaces.</td>
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<tr>
<td>Chapter 8: Compact Spaces:</td>
<td>13-14</td>
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<td>Exam</td>
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<td>1. Compact Spaces and their properties.</td>
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<tr>
<td>Chapter 9: Metric Spaces:</td>
<td>15</td>
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<td>Exam</td>
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<td>1. Defining a metric.</td>
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<td>2. Equivalent metric spaces.</td>
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</table>

**Suggested Problems:** All problems of the textbook.

21. Teaching Methods and Assignments:

Development of ILOs is promoted through the following teaching and learning methods:

In order to succeed in this course, each student needs to be an active participant in learning – both in class and out of class.

- The instructor will spend most of the class time on presenting the new material as well as on discussing homework problems.
- Group work in this class is encouraged.
- To actively participate in class, you need to prepare by reading the textbook and to do all assigned problems before class. (Problems will be assigned each class period, then to be discussed the following period).
- You should be prepared to discuss your homework at each class meeting.
- You are encouraged to work together with other students and to ask questions and seek help from your professor, both in and out of class.
- Students are also encouraged to use graphing calculators extensively and to use computer software supplements.
22. Evaluation Methods and Course Requirements:

Opportunities to demonstrate achievement of the ILOs are provided through the following assessment methods and requirements:

<table>
<thead>
<tr>
<th>ILO/s</th>
<th>Learning Methods</th>
<th>Evaluation Methods</th>
<th>Related ILO/s to the program</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Lectures</td>
<td>Exam</td>
<td></td>
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</tbody>
</table>

23. Course Policies:

1. Attendance is absolutely essential to succeed in this course. You are expected to attend every class; please notify your instructor if you know you are going to be absent. All exams must be taken at the scheduled time. Exceptions will be made only in extreme circumstances, by prior arrangement with the instructor.
2. If a student is absent for more than 15% of lectures without an excuse of sickness or due to other insurmountable difficulty, then he/she shall be barred from the final examination also he/she will get a failing grade in this course.
3. Medical certificates shall be given to the University Physician to be authorized by him. They should be presented to the Dean of the Faculty within two weeks of the student’s ceasing to attend classes.
4. Test papers shall be returned to students after correction. His/her mark is considered final after a lapse of one week following their return.
5. Cheating is prohibited. The University of Jordan regulations on cheating will be applied to any student who cheats in exams or on homework.

24. Required equipment:

Data Shows

25. References:

A- Required book (s), assigned reading and audio-visuals:

An Introduction to General Topology, Paul E. Long

B- Recommended books, materials, and media:

General Topology, Stephen Willard
26. Additional information:

Name of Course Coordinator: Dr. Hasan Hdeib  Signature: ---------------------  Date: 1/11/2016

Head of curriculum committee/Department: Dr. Hisham M. Hilow  Signature: -------------------

Head of Department: Dr. Baha Alzalg  Signature: -----------------------------

Head of curriculum committee/Faculty: Dr. Amal Al-Aboudi  Signature: -----------------------

Dean: Dr. Sami Mahmood  Signature: -----------------------------

Copy to:
Head of Department
Assistant Dean for Quality Assurance
Course File