Faculty of Science Course Syllabus  
Department of MATH  
MATH 4170  
General Topology  
Fall 2016

Instructor(s): Dorette Pronk            pronkd@dal.ca           Chase 302

Lectures: TR 8:35-9:55            Chase 319

Laboratories: none

Tutorials: none

Office Hours: W 11-12, R 10-11:30, F 10-11 or by appointment

Course Description
An introduction to topological spaces that includes the following topics: classification in terms of cardinality of bases, separation, etc., product spaces, Tychonoff theorem, compactness, compactifications, Tychonoff spaces, metrization.

Course Prerequisites
None

Course Objectives/Learning Outcomes
- Students can reason abstractly about topological spaces and continuity and are able to analyze the properties of examples provided.
- Students can describe and work with relevant topological models for various concrete applications.
- Students will understand the subspace, product and quotient topologies and how their definitions are related to continuous functions.
- Students will understand the connection between metric spaces and topological spaces.
- Students will understand and be able to work with various notions of compactness and know the relations with other topological and metric properties, and be familiar with various compactification constructions.
- Students know the result and are able to prove that any product of compact spaces is compact.
- Students are able to determine for a given topology which countability and separation properties it has.
- Students know the relations between the various properties and know the importance of normality.
- Students are able to prove Urysohn’s Lemma and the Tietze Extension Theorem.
- Students know the statements of the various metrization results and are able to prove at least one of them.
• Students know the importance of paracompactness and can give at least two equivalent characterizations.
• Students know the definition of homotopy and can use Brouwer’s Fixed Point Theorem.
• Students are able to apply the topological concepts and constructions to some chosen real world problems.

Course Materials

We will mostly follow the material in these two books, but occasionally we will consider applications from other sources such as “Discrete Structures and Their Interactions” by Jason I. Brown (RCR Press, 2013)

Note that Chapter 1 of Munkres and Chapter 0 of Adams-Franzosa are expected background material, although we will occasionally review some aspect of this material.

Course Assessment

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight (% of final grade)</th>
<th>Date</th>
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<tbody>
<tr>
<td>Midterm</td>
<td>20%</td>
<td>October 20, in class</td>
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<tr>
<td>Final exam</td>
<td>40%</td>
<td>TBA</td>
</tr>
<tr>
<td>Assignments</td>
<td>40%</td>
<td>Weekly</td>
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Conversion of numerical grades to Final Letter Grades follows the Dalhousie Common Grade Scale

- A+ (90-100)
- B+ (77-79)
- C+ (65-69)
- D (50-54)
- A (85-89)
- B (73-76)
- C (60-64)
- F (<50)
- A- (80-84)
- B- (70-72)
- C- (55-59)

Course Policies
• There will be weekly assignments, which will be due on Thursday of the next week at 5 PM in my office, or the next Friday morning by 10 AM at the latest.
• You are allowed to discuss your work with your class mates when solving the assignment problems, but you are required to do your final write-up by yourself.
• This course will only be cancelled in relation to weather related emergencies when the university is officially closed. If homework was due on that date it will be due on the date of the next scheduled class for this course.
• It will not be possible to write the final exam early and there will only be a make-up of the final exam in case of illness or family emergencies.

Course Content
Week 1: Introduction to the course (history and applications of topology), definition of a topological space, bases, subbases and lots of examples.
Week 2: closed sets, limit points and applications, subspace topology, continuous functions, product topology
Week 3: product topology continued, quotient topology and homeomorphisms
Week 4: metric topologies, sequences of functions and applications
Week 5: connectedness, path connectedness and components; compactness
Week 6: compactness continued: limit point compactness, local compactness
Week 7: review and midterm
Week 8: countability and separation axioms
Week 9: normal spaces, Urysohn’s lemma, metrization results
Week 10: Tietze Extension, Tychonoff’s theorem, Stone-Cech compactification
Week 11: local finiteness and paracompactness, Smirnov metrization
Week 12: homotopy of functions and applications
Week 13: further applications

ACCOMMODATION POLICY FOR STUDENTS
Students may request accommodation as a result of barriers related to disability, religious obligation, or any characteristic protected under Canadian Human Rights legislation. The full text of Dalhousie’s Student Accommodation Policy can be accessed here:
Students who require accommodation for classroom participation or the writing of tests and exams should make their request to the Advising and Access Services Centre (AASC) prior to or at the outset of the regular academic year. More information and the Request for Accommodation form are available at www.dal.ca/access.

ACADEMIC INTEGRITY
Academic integrity, with its embodied values, is seen as a foundation of Dalhousie University. It is the responsibility of all students to be familiar with behaviours and practices associated with academic integrity. Instructors are required to forward any suspected cases of plagiarism or other forms of academic cheating to the Academic Integrity Officer for their Faculty.

The Academic Integrity website (http://academicintegrity.dal.ca) provides students and faculty with information on plagiarism and other forms of academic dishonesty, and has resources to help students succeed honestly. The full text of Dalhousie’s Policy on Intellectual Honesty and Faculty Discipline Procedures is available here:
http://www.dal.ca/dept/university_secretariat/academic-integrity/academic-policies.html
Dalhousie University has a student code of conduct, and it is expected that students will adhere to the code during their participation in lectures and other activities associated with this course. In general:

“The University treats students as adults free to organize their own personal lives, behaviour and associations subject only to the law, and to University regulations that are necessary to protect

• the integrity and proper functioning of the academic and non-academic programs and activities of the University or its faculties, schools or departments;
• the peaceful and safe enjoyment of University facilities by other members of the University and the public;
• the freedom of members of the University to participate reasonably in the programs of the University and in activities on the University’s premises;
• the property of the University or its members.”

The full text of the code can be found here:

SERVICES AVAILABLE TO STUDENTS

The following campus services are available to help students develop skills in library research, scientific writing, and effective study habits. The services are available to all Dalhousie students and, unless noted otherwise, are free.

<table>
<thead>
<tr>
<th>Service</th>
<th>Support Provided</th>
<th>Location</th>
<th>Contact</th>
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<tbody>
<tr>
<td>General Academic Advising</td>
<td>Help with understanding degree requirements and academic regulations - choosing your major - achieving your educational or career goals - dealing with academic or other difficulties</td>
<td>Killam Library Ground floor Rm G28 Bissett Centre for Academic Success</td>
<td>In person: Killam Library Rm G28 By appointment:  - e-mail: <a href="mailto:advising@dal.ca">advising@dal.ca</a>  - Phone: (902) 494-3077 - Book online through MyDal</td>
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<tr>
<td>Dalhousie Libraries</td>
<td>Help to find books and articles for assignments  Help with citing sources in the text of your paper and preparation of bibliography</td>
<td>Killam Library Ground floor Librarian offices</td>
<td>In person: Service Point (Ground floor) By appointment: Identify your subject librarian (URL below) and contact by email or phone to arrange a time:  <a href="http://dal.beta.libguides.com/sb.php?subject_id=34328">http://dal.beta.libguides.com/sb.php?subject_id=34328</a></td>
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<tr>
<td>Studying for Success (SFS)</td>
<td>Help to develop essential study skills through small group workshops or one-on-one coaching sessions Match to a tutor for help in course-specific content (for a reasonable fee)</td>
<td>Killam Library 3rd floor Coordinator Rm 3104 Study Coaches Rm 3103</td>
<td>To make an appointment:  - Visit main office (Killam Library main floor, Rm G28)  - Call (902) 494-3077  - email Coordinator at: <a href="mailto:sfs@dal.ca">sfs@dal.ca</a> or  - Simply drop in to see us during posted office hours All information can be found on our website: <a href="http://www.dal.ca/sfs">www.dal.ca/sfs</a></td>
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<td>Writing Centre</td>
<td>Meet with coach/tutor to discuss writing assignments (e.g., lab report, research paper, thesis, poster)  - Learn to integrate source material into your own work appropriately  - Learn about disciplinary writing from a peer or staff member in your field</td>
<td>Killam Library Ground floor Learning Commons &amp; Rm G25</td>
<td>To make an appointment:  - Visit the Centre (Rm G25) and book an appointment  - Call (902) 494-1963  - email <a href="mailto:writingcentre@dal.ca">writingcentre@dal.ca</a>  - Book online through MyDal We are open six days a week See our website: writingcentre.dal.ca</td>
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