Class Syllabus / Policy
General Topology
MATH 5320.001
Fall 2021

Name: Jane Long, Ph.D., Associate Professor, Department of Mathematics & Statistics
Department: Mathematics & Statistics
Email: longjh@sfasu.edu
Phone: 936-468-1804
Office: Bush Mathematical Sciences Room 103 or 318
Office Hours: TR 3:30-5:00pm (immediately after class), W 3:00-5:00pm, or by arrangement

Class meeting time and place: TR 2:00-3:15pm, Bush Mathematical Sciences Room 204

Course Description: Mathematics 5320 is an introduction to general topology. The course investigates topological spaces and subspaces, metric spaces, functions on topological spaces, product spaces, and certain topological properties such as compactness, connectivity, and separability.

Credit hours: 3

SFASU Policy 5.4: The federal definition of a credit hour is an amount of work represented in intended learning outcomes and verified by evidence of student achievement that is an institutionally established equivalency that reasonably approximates:
1. Not less than one hour of classroom or direct faculty instruction and a minimum of two hours out-of-class student work each week for approximately fifteen weeks for one semester or trimester hour of credit, or 10 to 12 weeks for one quarter hour of credit, or the equivalent amount of work over a different amount of time; or
2. At least an equivalent amount of work as outlined in item 1 above for other academic activities as established by the institution including laboratory work, internships, practica, studio work, and other academic work leading to the award of credit hours.

To this end, all students who wish to be successful should plan to spend at least two hours outside of class for every credit hour associated with this course. Expected activities to be completed in the time outside of class include reviewing notes from previous class meetings, reading assigned course resources, completing all assigned exercises and projects, and performing periodic assessment preparation.

Text and Materials:
- No textbook is required for the course. Material studied will be provided in the form of class notes. Moreover, we will work together to generate proofs for concepts studied in class, so you should not seek outside sources. See Course Requirements below

Course Requirements:
- The class will be conducted using an inquiry-based learning approach. Homework, which will be assigned on a regular basis, consists of writing proofs of theorems and constructing examples and counterexamples. Homework will be presented by students in class and turned in to be graded. Most of the theorems and problems you will be given for homework can be found in the mathematical literature. It is not the purpose
of the homework to see if you can find a proof that someone else has written. Using the work of others and presenting it as your own constitutes plagiarism. (This includes using books, research articles, internet sources of any kind, verbal or written coaching from another person, or relying on/copying work that another student completed in an earlier semester.) Participants in this course will adhere to the SFA Academic Integrity Policy (see the link below)

- **Final Exam**, comprehensive, 1:00-3:00pm, Tuesday, December 7, 2021. May also include a take-home portion
- **Two in-class exams**, dates will be announced at least one week prior to the exam
- **Homework** will be presented in class and also turned in for grading in written form. Read the homework grading policy carefully
- **Attendance and participation in class** are expected
- **Microsoft Teams access**. You will be required to access Microsoft Teams regularly to obtain documents and turn in assignments
- **Late work will not be accepted**
- **Some work may be due during “Dead Week”**
- **There is no extra credit**

**Course Calendar:**

- Exam 1 – before mid-semester. Date TBD
- Exam 2 – after mid-semester. Date TBD
  
  Final Exam – comprehensive, 1:00-3:00pm, Tuesday, December 7, 2021. May also include a take-home portion

Course topics and percentage (time spent in class):

<table>
<thead>
<tr>
<th>Topic</th>
<th>Approximate time spent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topological spaces</td>
<td>20%</td>
</tr>
<tr>
<td>Metric spaces</td>
<td>20%</td>
</tr>
<tr>
<td>Functions</td>
<td>20%</td>
</tr>
<tr>
<td>Product spaces</td>
<td>20%</td>
</tr>
<tr>
<td>Axiom of Choice</td>
<td>5%</td>
</tr>
<tr>
<td>Separation axioms</td>
<td>15%</td>
</tr>
</tbody>
</table>

**Department syllabus:** Please read the official Department of Mathematics & Statistics syllabus for MATH 5320 at [http://www3.sfasu.edu/math/docs/syllabi/MTH508Syllabus.pdf](http://www3.sfasu.edu/math/docs/syllabi/MTH508Syllabus.pdf).

**Grading Policy:**

- NO LATE WORK IS ACCEPTED
- There is no extra credit
- The final exam will not replace any in-class exam scores
- Please read the attached homework grading policy carefully
- The homework grade will determine 1/3 of the final average and each of the three exams will be 2/9. Half of the homework grade will be determined by work presented in class and half by work turned in.

The Final Grade will be determined by the scale:
100%-90% A, 89%-80% B, 79%-70% C, 69%-60% D, and 59% and below is an F.

Attendance Policy:

- Attendance and participation in class are expected. Please keep in communication with the instructor about all absences. If you cannot attend class at the scheduled time, you must contact the instructor as soon as possible
- **If you are ill, stay home** and contact your instructor
- Exam make-ups must be approved **beforehand** with documentation of a valid university sanctioned excuse; other make-ups are solely at the instructor’s discretion
- Late work will be accepted at the instructor’s discretion and requires prior communication
- Bring your university ID card to all exams
- The university’s attendance policy can be found at [https://www.sfasu.edu/policies/class-attendance-6.7.pdf](https://www.sfasu.edu/policies/class-attendance-6.7.pdf)

Dropping or Withdrawing
Please see the following for more information:
Drops/Withdraws (Dates): [https://www.sfasu.edu/registrar/registration-information/dates-deadlines](https://www.sfasu.edu/registrar/registration-information/dates-deadlines)
Drops/Withdraws (Procedures): [https://www.sfasu.edu/registrar/registration-information/how-to-drop-withdraw](https://www.sfasu.edu/registrar/registration-information/how-to-drop-withdraw)

Academic Integrity (4.1)
Academic integrity is a responsibility of all university faculty and students. Faculty members promote academic integrity in multiple ways including instruction on the components of academic honesty, as well as abiding by university policy on penalties for cheating and plagiarism.

Definition of Academic Dishonesty
Academic dishonesty includes both cheating and plagiarism. Cheating includes but is not limited to

1. using or attempting to use unauthorized materials to aid in achieving a better grade on a component of a class;
2. the falsification or invention of any information, including citations, on an assigned exercise; and/or
3. helping or attempting to help another in an act of cheating or plagiarism.

Plagiarism is presenting the words or ideas of another person as if they were your own. Examples of plagiarism are

1. submitting an assignment as if it were one's own work when, in fact, it is at least partly the work of another;
2. submitting a work that has been purchased or otherwise obtained from an Internet source or another source; and
(3) incorporating the words or ideas of an author into one's paper without giving the author due credit.

Please read the complete policy at [http://www.sfasu.edu/policies/student-academic-dishonesty-4.1.pdf](http://www.sfasu.edu/policies/student-academic-dishonesty-4.1.pdf)

**Withheld Grades Semester Grades Policy (5.5)**
Ordinarily, at the discretion of the instructor of record and with the approval of the academic chair/director, a grade of WH will be assigned only if the student cannot complete the course work because of unavoidable circumstances. Students must complete the work within one calendar year from the end of the semester in which they receive a WH, or the grade automatically becomes an F. If students register for the same course in future terms the WH will automatically become an F and will be counted as a repeated course for the purpose of computing the grade point average.

**Students with Disabilities**
To obtain disability related accommodations, alternate formats and/or auxiliary aids, students with disabilities must contact the Office of Disability Services (ODS), Human Services Building, and Room 325, 468-3004 / 468-1004 (TDD) as early as possible in the semester. Once verified, ODS will notify the course instructor and outline the accommodation and/or auxiliary aids to be provided. Failure to request services in a timely manner may delay your accommodations. For additional information, go to [http://www.sfasu.edu/disabilityservices/](http://www.sfasu.edu/disabilityservices/).

**Mental Health and Wellness**
SFA values students’ mental health and the role it plays in academic and overall student success. SFA provides a variety of resources to support students' mental health and wellness. Many of these resources are free, and all of them are confidential.

**On-campus Resources:**

**SFA Counseling Services**
[www.sfasu.edu/counselingservices](http://www.sfasu.edu/counselingservices)
Rusk Building, 3rd Floor
936.468.2401

**SFA Human Services Counseling Clinic**
[www.sfasu.edu/humanservices/139.asp](http://www.sfasu.edu/humanservices/139.asp)
Human Services, Room 202
936.468.1041

**Crisis Resources:**
Burke 24-hour crisis line: 1.800.392.8343
Suicide Prevention Lifeline: 1.800.273.TALK (8255)
Crisis Text Line: Text HELLO to 741-741

**Student Code of Conduct (University Policy 10.4)**
Available at [http://www.sfasu.edu/policies/student-code-of-conduct-10.4.pdf](http://www.sfasu.edu/policies/student-code-of-conduct-10.4.pdf)
Parts of this syllabus are from Mr. Scott Lewis and Dr. Pamela Roberson.
Math 5320 - Topology  
Course Syllabus

Course description: Metric spaces, topological spaces and Cartesian product spaces are studied together with certain topological properties such as compactness, connectivity and separability.

Credit hours: 3

The following is an excerpt from SFA Policy 5.4:

The federal definition of a credit hour is an amount of work represented in intended learning outcomes and verified by evidence of student achievement that is an institutionally established equivalency that reasonably approximates:

1. Not less than one hour of classroom or direct faculty instruction and a minimum of two hours out-of-class student work each week for approximately fifteen weeks for one semester or trimester hour of credit, or 10 to 12 weeks for one quarter hour of credit, or the equivalent amount of work over a different amount of time, or;

2. At least an equivalent amount of work as outlined in item 1 above for other academic activities as established by the institution including laboratory work, internships, practica, studio work, and other academic work leading to the award of credit hours.

To this end, all students in courses offered by the Department of Mathematics and Statistics that wish to be successful should plan to spend a minimum of two hours outside of class for every credit hour associated with this course. Expected activities to be completed in the time outside of class include reviewing notes from previous class meetings, reading assigned course resources, completing all assigned exercises and projects, and performing periodic assessment preparation.

Course Prerequisites and Corequisites: MATH 4330 or equivalent

Course outline: Approximate time spent

- **Topological Spaces**
  - Definition of topology
  - Closed set
  - Base for a topological space
  - Subbase for a topological space
  - Relative topology and subspaces
  - Limit point
  - Convergence
  
- **Metric Spaces**
  - Definition of a metric space
  - Open ball
  - Interior point
  - Open set
  
- **Functions**
  - Continuity
  - Homeomorphism
  - Topological property

- **Axiom of Choice**

- **Product Spaces**
  - Product topology
  - The Tychonoff Theorem
Selected topics as time permits

- **Separation Axioms**
  - $T_0$ space
  - $T_1$ space
  - $T_2$ space (Hausdorff space)
  - Regular space
  - $T_3$ space
  - Normal
    - Urysohn’s Lemma
    - Tietze Extension Theorem
  - $T_4$ space

- **Special Topological Spaces**
  - Separable Space
  - First axiom of countability
  - Second axiom of countability
  - Lindelof space
  - Connected space
  - Compact space
    - Alexandroff’s One Point Compactification
    - The Stone-Cech compactification

- **The principle of transfinite induction**

- **Continua**
  - Irreducible continuum
  - Limiting set

**Student Learning Outcomes (SLO):** At the end of MATH 5320, a student who has studied and learned the material should be able to:
1. Fully discuss the basic notions covered in this topology course. [PLO: 1,2,3]
2. Read and interpret written mathematics. [PLO: 1,2,3]
3. Recognize those things that must be proven and how to best describe their thoughts that lead to an easily understandable proof of a basic theorem. [PLO: 1,2,3]
4. Use the language successfully, in oral and written form, while expressing their mathematical thoughts. [PLO: 1,2,3]
5. Present their proofs in class by relying on their material they generated prior to class. [PLO: 1,2,3]

**Program Learning Outcomes (PLO):** Students graduating from SFA with a M.S. Mathematical Sciences Degree will:
1. Written Communication - SFA Mathematics majors communicate mathematical ideas effectively in written form, integrating mathematical notation correctly and consistently.
2. Verbal Communication - SFA Mathematics majors communicate mathematics effectively to diverse audiences.
3. Mathematical Maturation - SFA Mathematics majors grow from a computational understanding of mathematics to an integrated approach which includes critical thinking proficiency, computational facility, conceptual understanding, and problem-solving persistence.

**Academic Integrity**
Academic integrity is a responsibility of all university faculty and students. Faculty members promote academic integrity in multiple ways including instruction on the components of academic honesty, as well as abiding by university policy on penalties for cheating and plagiarism.

The penalty for a student found cheating on any part of an assignment, quiz, or exam in this class will range from a grade of zero on the work to a grade of F in the course, and may result in additional, more severe disciplinary measures. A student who allows another to copy his work and the student copying the work are both guilty of cheating. Do your own work. Do not show your completed work to others. Do not allow others to copy your work.

**Definition of Academic Dishonesty (SFA policy 4.1):**
Academic dishonesty includes both cheating and plagiarism. Cheating includes, but is not limited to:
- using or attempting to use unauthorized materials on any class assignment or exam;
- falsifying or inventing of any information, including citations, on an assignment;
- helping or attempting to help other student(s) in an act of cheating or plagiarism.

Plagiarism is presenting the words or ideas of another person as if they were one's own. Examples of plagiarism include, but are not limited to:
- submitting an assignment as one's own work when it is at least partly the work of another person;
- submitting a work that has been purchased or otherwise obtained from the Internet or another source;
- incorporating the words or ideas of an author into one's paper or presentation without giving the author credit.

Withheld Grades Semester Grades (SFA Policy 5.5)
Ordinarily, at the discretion of the instructor of record and with the approval of the academic chair/director, a grade of WH will be assigned only if the student cannot complete the course work because of unavoidable circumstances. Students must complete the work within one calendar year from the end of the semester in which they receive a WH, or the grade automatically becomes an F. If students register for the same course in future terms the WH will automatically become an F and will be counted as a repeated course for the purpose of computing the grade point average. The circumstances precipitating the request must have occurred after the last day in which a student could withdraw from a course. Students requesting a WH must be passing the course with a minimum projected grade of C.

Students with Disabilities
To obtain disability related accommodations, alternate formats and/or auxiliary aids, students with disabilities must contact the Office of Disability Services (ODS), Human Services Building, and Room 325, 468-3004 / 468-1004 (TDD) as early as possible in the semester. Once verified, ODS will notify the course instructor and outline the accommodation and/or auxiliary aids to be provided. Failure to request services in a timely manner may delay your accommodations. For additional information, go to http://www.sfasu.edu/disabilityservices.

SFASU Mental Health Statement: SFASU values students’ mental health and the role it plays in academic and overall student success. SFA provides a variety of resources to support students mental health and wellness. Many of these resources are free, and all of them are confidential.

On-campus Resources:
SFASU Counseling Services
www.sfasu.edu/counselingservices
3rd Floor Rusk Building
936-468-2401

SFASU Human Services Counseling Clinic
www.sfasu.edu/humanservices/139.asp
Human Services Room 202
936-468-1041

Crisis Resources:
Burke 24-hour crisis line 1(800) 392-8343
Suicide Prevention Lifeline 1(800) 273-TALK (8255)
Crisis Text Line: Text HELLO to 741-741

Acceptable Student Behavior
Classroom behavior should not interfere with the instructor's ability to conduct the class or the ability of other students to learn from the instructional program (see the Student Conduct Code, policy 10.4). Unacceptable or disruptive behavior will not be tolerated. Students who disrupt the learning environment may be asked to leave class and may be subject to judicial, academic or other penalties. This prohibition applies to all instructional forums, including electronic, classroom, labs, discussion groups, field trips, etc. The instructor shall have full discretion over what behavior is appropriate/inappropriate in the classroom. Students who do not attend class regularly or who perform poorly on class projects/exams may be referred to the Early Alert Program. This program provides students with recommendations for resources or other assistance that is available to help SFA students succeed.