Course Description

Introduction to the study of algebraic systems with particular emphasis on concrete examples of the basic algebraic structures, groups, rings, integral domains, and fields. Prerequisite: MATH 3360 (MTH 311) and MATH 3365 (MTH 317). For a more detailed course description, Student Learning Outcomes, and Exemplary Educational Objectives, go to http://www2.sfasu.edu/math/docs/syllabi/MTH412Syllabus.pdf

Course Prerequisites

MATH 3360 (MTH 311) and MATH 3365 (MTH 317)

Course Time and Meeting Place

MATH 4320 will be live-streamed on Zoom for Fall 2020. Make sure that you have a computer, a webcam, and good internet access. Face-to-face classes will resume if circumstances permit in October. If face-to-face classes resume, students will still have the option of attending remotely. Classes will meet on Zoom at 8:00-8:50 MWF.

COVID-19 MASK POLICY

Masks (cloth face coverings) must be worn over the nose and mouth at all times in this class and appropriate physical distancing must be observed. Students not wearing a mask and/or not observing appropriate physical distancing will be asked to leave the class. All incidents of not wearing a mask and/or not observing appropriate physical distancing will be reported to the Office of Student Rights and Responsibilities. Students who are reported for multiple infractions of not wearing a mask and/or not observing appropriate physical distancing may be subject to disciplinary actions.


Instructor

Thomas W. Judson, Professor
Department of Mathematics and Statistics
Office: Math 316
TEL: (936) 468-1704
Email: judsontw@sfasu.edu
Office Hours:
• Monday: 5–6 PM
• Tuesday: 12:30–2 PM
• Wednesday: 5–6 PM
• Thursday: 12:30–2 PM
• Additional office hours by appointment

Course Goals

• To be able to demonstrate comprehension of core mathematical concepts such as axiomatic systems, mathematical proof, and logical argument.
• To be able to execute mathematical procedures accurately, appropriately, and efficiently.
• To be able to apply the principles of logic to develop and analyze conjectures and proofs.
• To be able to demonstrate competence in using various mathematical tools, including technology, to formulate, represent, and solve problems.

Learning Objectives

Upon successfully completing MATH 4320, you should have acquired a solid foundation of the following topics and be able to move directly more advanced courses in mathematics.

• Sets & binary operations.
• Introductory Group Theory.
• Permutations, Cosets and Direct Products.
• Homomorphisms.
• Rings and Fields.

Textbook

http://faculty.sfasu.edu/judsontw/math4320/syllabus.html
The textbook for this course is *Abstract Algebra: Theory and Applications*. 1997 (revised 2020). The textbook is available free online at [http://abstract.ups.edu/index.html](http://abstract.ups.edu/index.html), or you may order a hardbound copy from Amazon. Make sure that you purchase the latest copy (2020) of the textbook as errors have been corrected and chapters, theorems, and exercises may be numbered differently.

**CoCalc**

We will make heavy use of technology in MATH 4320. Our primary platform will be CoCalc ([https://cocalc.com](https://cocalc.com)). You will need to obtain an account on CoCalc if you do not already have one. To avoid confusion, please use your SFA email to create your account. Directions for getting a CoCalc account can be found at CoCalc-Quick-Start.pdf! We strongly suggest that you purchase a paid CoCalc subscription for the semester for $14.

We can use CoCalc to access Sage, Jupyter notebooks, and LaTeX. Sage is a computer algebra system like Mathematica or Maple. Unlike Mathematica or Maple, Sage is free open-source software. You can access Sage online or download it to your computer. You can even run Sage on your iPad or iPhone. We will be using Sage extensively in MATH 4320. You can find out more about Sage at [http://www.sagemath.org/](http://www.sagemath.org/). The Jupyter Notebook is an open-source web application that allows you to create and share documents that contain live code (including Octave, R, and Sage), equations, visualizations and narrative text. For more information on the Jupyter Notebook see [https://jupyter.org](https://jupyter.org). LaTeX is a mathematical typesetting program. You will be asked to submit your assignments in LaTeX.

**You may not use your cellphone in class for a calculator.**

**Grading and Exams**

Your MATH 4320 course grade will be determined by exams and homework as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>35%</td>
</tr>
<tr>
<td>Exam I</td>
<td>15%</td>
</tr>
<tr>
<td>Exam II</td>
<td>15%</td>
</tr>
<tr>
<td>Exam III</td>
<td>15%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>20%</td>
</tr>
</tbody>
</table>

Semester numerical scores will be converted into letter grades according to the following method.

<table>
<thead>
<tr>
<th>Range of numerical values</th>
<th>Corresponding Letter</th>
</tr>
</thead>
<tbody>
<tr>
<td>90-100</td>
<td>A</td>
</tr>
<tr>
<td>80-89</td>
<td>B</td>
</tr>
<tr>
<td>70-79</td>
<td>C</td>
</tr>
<tr>
<td>60-69</td>
<td>D</td>
</tr>
<tr>
<td>0-59</td>
<td>E</td>
</tr>
</tbody>
</table>

When we calculate your final grade at the end of the course, we will calculate a score on a 0-100 point scale using the scores that you have obtained during the course, and using the grade breakdown given above. Your course grade will then be obtained using this table. In the event of a fractional score, we will always round up to the nearest integer.

**Exam Policy**

Exams are scheduled far in advance, and it is impossible to move the time or date. However, in rare cases where it is impossible for an individual to take the exam at the scheduled time, we will work with you to make other arrangements. Exceptions for taking the exam out of sequence are the following:

1. A medical excuse. Please provide proper documentation according to university rules.
2. A University sponsored event such as an athletic tournament, a play, or a musical performance. Your coach or director must contact us in advance. Athletic practices and rehearsals do not fall into this category.
3. A religious holiday. Please send a short email explaining the situation.
4. Extreme hardship such as a family emergency. Please have the proper university office us.
The above are the only allowable excuses for taking the exam before the scheduled time. Under no circumstances do we give late exams. Since we can only accommodate a limited number of students taking the exam at an earlier time, please make sure that you fall into one of the above categories before you contact us. If you miss an exam due to illness or a family emergency, you will not be penalized. We will assign you a grade based on the rest of your coursework. If you have a conflict with the final exam, you must contact the Registrar. Only the Registrar can schedule an out-of-sequence final exam.

**Cell phone use is not permitted in or out of the classroom during all exams. If you bring your cell phone to the exam venue, please remember to turn it off. Violation of this policy will be considered as academic dishonesty and dealt with accordingly. You will not be permitted to use your cell phone as a calculator, so plan ahead.**

**Homework**

Homework assignments will be available on the calendar page or in the SageMathCloud. There is no question that the best way to learn math is by doing math, and homework exercises are an essential part of any math course. If you just go to a math class and watch the teacher work problems, but do not actually try doing any problems on your own, then there is very little chance you will really learn the subject. It is also very unlikely that you will do well on exams without working through homework problems ahead of time. When doing homework, do not just write down answers. Think about the problems posed, your strategies, the meaning of your computations, and the answers you get. The main point is not to come up with specific answers to the specific problems you are working on, but to develop an understanding of what you are doing so that you can apply your reasoning to a wide range of similar situations. It is very unlikely that later on in life you will see exactly the same math problems you are working on now, so learn the material in such a way that you are prepared to use your general knowledge of mathematics in the future, not just how to apply particular formulas for very specific problems.

You are encouraged to form study groups with other students in the class so that you can discuss your work with each other; however, all work submitted must be written up individually. Make sure that even if you do work in groups, that you come away with the ability to explain everything you end up writing up in your homework.

Generally, there will be a problem set due weekly. Assignments will be graded and will typically be returned to you at the following class meeting. Since getting behind in a math class is one of the most uncomfortable things you can do to yourself, homework must be turned in on time. **Since we will drop your lowest homework grade, we will not accept late homework assignments.**

**Copying solutions off of the Internet will be considered an act of academic dishonesty.**

**Homework Grading**

In general, each problem or part of a multi-part problem will be worth one point. More complex problems will be graded according to the following rubric.

- **3 Points.** Work is completely accurate and essentially perfect. Work is thoroughly developed, neat, and easy to read. Complete sentences are used where appropriate.
- **2 Points.** Work is good, but incompletely developed, hard to read, unexplained, or jumbled. Answers that are not explained may received 2 points even if correct. The work contains the right idea but is flawed.
- **1 Points.** Work is sketchy. There is some correct work, but most of the work is incorrect.
- **0 Points.** Work is minimal or non-existent. Solution is completely incorrect.

Exercises marked with a (*) are pre-reading problems and are graded differently. You will usually receive full credit for a pre-reading problem if you have made a good effort and some progress toward the solution.

**Homework must be submitted on SageMathCloud in LaTeX.** Handwritten homework will not be accepted.

**The Classroom**

Any questions you ask in class will likely be ones that other students will want answered as well, so get over any hesitation you might have and ask questions as the material is presented. You will not be penalized for doing this, no matter how trivial or simple you think your questions might seem. Remember, the class is being held for you to learn the material, not just to give you a time to copy notes off of a blackboard, so be sure to get help when you need it and stay involved in your class.

**Getting Help with MATH 4320**

Ask lots of questions in class and remember to take advantage of office hours.

**Add/Drop Policy**

The Add/Drop Policy can be found at [http://www.sfasu.edu/policies/add_drop.asp](http://www.sfasu.edu/policies/add_drop.asp)

**Attendance Policy**

Regular attendance is expected in MATH 4320. Attendance and Excused Absences Policy can be found at [http://www.sfasu.edu/policies/class_attendance_excused_abs.asp](http://www.sfasu.edu/policies/class_attendance_excused_abs.asp)

**Credit Hours**

Per SFA policy 5.4, your schedule should reflect that there is (1) an amount of student work per credit hour that reasonably approximates not less than one hour of class or direct faculty instruction and two hours of out-of-class student work per week for fifteen weeks over a long semester, 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.

**Withheld Grades Semester Grades Policy (A-54)**

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/

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 D-34.1). 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.

You are off the grid in MATH 4320. You may use your tablet or notebook computer to access the textbook or SageMathCloud in class; otherwise, consider yourself off the grid when you are in MATH 4320. Please be respectful of your fellow students and your instructor. Cell phone use and texting are not allowed in class. Remember to turn your cell phone off and place it in your bag or backpack before entering the classroom. Any cell phone that is visible will be collected and returned to you at the end of class. Exceptions to this rule include volunteer firemen, physicians on-call, those who are on the shortlist to receive an organ transplant, etc.

Academic Integrity (A-9.1)
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.

Any acts of academic dishonesty will be dealt with according to University policy. Penalties for academic dishonesty may result in a failing grade for the assignment, failing the course, or even dismissal from the university.

Please read the complete Academic Integrity Policy at http://www.sfasu.edu/policies/academic_integrity.asp

Last modified: August 24, 2020