Modern Algebra, Math 4306.001  
Department of Mathematics and Statistics  
Spring 2020

A. COURSE INFORMATION

Course number/section: MATH 4306.001  
Class meeting time: MW 5:30 – 6:45 PM  
Class location: OCNR-259  
Course Website: bb9.tamucc.edu

B. INSTRUCTOR INFORMATION

Instructor: George Tintera  
Office location: CI 319  
Office hours: Monday and Wednesday, 1 to 2 pm and 3:30 to 5:30 pm.  
Telephone: 361-825-6028  
E-mail: george.tintera@tamucc.edu  
Appointments: Appointments outside of office hours are available by request

C. COURSE DESCRIPTION

Fundamentals of set operations, maps and relations, groups, rings and field theory. Topics include permutation groups, cosets, homomorphisms and isomorphisms, direct product of groups and rings, integral domains field of quotients, fundamental properties of integers, the ring of integers modulo n, and rings of polynomials. Applications.

D. PREREQUISITES AND COREQUISITES

MATH 3311 and MATH 3313. There are no co-requisites.

E. REQUIRED TEXTBOOK(S), READINGS AND SUPPLIES


F. STUDENT LEARNING OUTCOMES AND ASSESSMENT

Assessment is a process used by instructors to help improve learning. Assessment is essential for effective learning because it provides feedback to both students and instructors. A critical step in this process is making clear the course’s student learning outcomes that describe what students are expected to learn to be successful in the course. The students learning outcomes for this course are listed below. By collecting data and sharing it with students on how well they are accomplishing these learning outcomes students can more efficiently and effectively focus their learning efforts. This information can also help instructors identify challenging areas for students and adjust their teaching approach to facilitate learning.

Upon successful completion of this course, students should be able to:
1. Understand the importance of sets and mappings in algebra and other areas of mathematics.
2. Understand the properties of the most important algebraic structures, and to recognize the relationship between them.
3. Use physical models to discover properties and relationships
4. Read and reproduce proofs for relevant theorems, and apply these techniques to construct arguments and proofs for textbook and other problems.
5. Perform self-guided learning to support the development of independent thinking, and participate in classroom discussions and presentations to develop communication skills.
6. Establish connections between Modern Algebra and other topics in mathematics.

G. INSTRUCTIONAL METHODS AND ACTIVITIES

The class uses the lecture format with student participation and discussion. The primary tool for investigations will be homework and office hours.

H. MAJOR COURSE REQUIREMENTS AND GRADING

Grades will be calculated by homework, test, and exam, according to the following percentages.

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>50</td>
</tr>
<tr>
<td>Sage Programming</td>
<td>50</td>
</tr>
<tr>
<td>Midterm Exams</td>
<td>100</td>
</tr>
<tr>
<td>Final Exam</td>
<td>100</td>
</tr>
</tbody>
</table>

- **Homework**: Homework will be assigned after each class. It will be due Monday of the week after it is assigned.

- **Sage Programming**: Sage is a shareware program available online. There are sections of the text and exercises to complete to demonstrate your understanding of the material.

- **Test**: There will be two midterm exams.

- **Final Exam**: Wednesday, May 8 from 4:30 to 7 PM. It will be comprehensive.

Your final grade will be assigned according to the following table:

<table>
<thead>
<tr>
<th>Point Total</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥270 points</td>
<td>A</td>
</tr>
<tr>
<td>≥240 points</td>
<td>B</td>
</tr>
<tr>
<td>≥210 points</td>
<td>C</td>
</tr>
<tr>
<td>≥180 points</td>
<td>D</td>
</tr>
<tr>
<td>Below 180 points</td>
<td>F</td>
</tr>
</tbody>
</table>
I. **COURSE CONTENT/SCHEDULE**

**Important dates:**

- January 20: First Day of Classes
- March 9-13: Spring Break
- April 10: Last Day to Drop a Class
- May 6: Last Day of Classes
- May 7: Reading Day

**Course Schedule:**

<table>
<thead>
<tr>
<th>Week of</th>
<th>Monday</th>
<th>Wednesday</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 20</td>
<td>No Class, MLK Day</td>
<td>Intro to Syllabus, review of preliminaries</td>
</tr>
<tr>
<td>Jan 27</td>
<td>The Integers</td>
<td>Integer Equivalence classes and symmetries</td>
</tr>
<tr>
<td>Feb 3</td>
<td>Definitions, examples and subgroups</td>
<td>Cyclic Subgroups</td>
</tr>
<tr>
<td>Feb 10</td>
<td>Examples of Cyclic Subgroups</td>
<td>Permutation Groups</td>
</tr>
<tr>
<td>Feb 17</td>
<td>Dihedral Groups</td>
<td>Cosets</td>
</tr>
<tr>
<td>Feb 24</td>
<td>Lagrange’s Theorem</td>
<td>Isomorphisms</td>
</tr>
<tr>
<td>Mar 2</td>
<td>Midterm 1</td>
<td>Direct Products</td>
</tr>
<tr>
<td>Mar 9</td>
<td>No Class</td>
<td>Spring Break</td>
</tr>
<tr>
<td>Mar 16</td>
<td>Factor Groups, Normal Groups</td>
<td>Simple Groups</td>
</tr>
<tr>
<td>Mar 23</td>
<td>Homomorphisms</td>
<td>The Isomorphism Theorems</td>
</tr>
<tr>
<td>Mar 30</td>
<td>Finite Abelian Groups</td>
<td>Midterm 2</td>
</tr>
<tr>
<td>Apr 6</td>
<td>Rings, Domains Fields</td>
<td>Ring Homomorphisms</td>
</tr>
<tr>
<td>Apr 13</td>
<td>Polynomial Rings</td>
<td>Division Algorithm</td>
</tr>
<tr>
<td>Apr 20</td>
<td>Fields of Fractions</td>
<td>Vector Spaces</td>
</tr>
<tr>
<td>Apr 27</td>
<td>Linear Independence</td>
<td>Field Extensions</td>
</tr>
<tr>
<td>May 4</td>
<td>Geometric Constructions</td>
<td>Review</td>
</tr>
<tr>
<td>May 11</td>
<td>Final Exam: 4:30-7 PM</td>
<td></td>
</tr>
</tbody>
</table>

Note: Changes in this course schedule may be necessary and will be announced to the class by the Instructor. The assignments and exams shown are directly related to the Student Learning Outcomes described in Section F.

J. **COURSE POLICIES**

- **Attendance/Tardiness**
  
  I will check the attendance in every class. Attendance is mandatory by Texas A&M University. Please save absences for emergencies.
Late Homework Assignments
Late assignments will not be accepted, unless exceptional circumstances prevent you from completing them. Extension of deadlines will be at the instructor’s discretion. Late assignments may result in partial or total loss of credit. There are NO make-ups for exams or in-class activities.

No Make-up for Midterm/Final Exams
Missed Exam:
No make-ups will be given without written evidence of an Official University excused absence. For an absence to be considered excused, the student must notify his or her instructor in writing (acknowledged e-mail message is acceptable) prior to the date of absence if such notification is feasible. In cases where advance notification is not feasible (e.g. accident or emergency) the student must provide notification by the end of the second working day after the absence. In the case of illness or injury, students are required to obtain a confirmation note from a health care professional affirming date and time of a medical office visit regarding the illness or injury.

Extra Credit
There will be no extra credit for this course. Do your best to complete the work assigned.

Cell Phone Use
Please silence phone before coming to class. If you need to make a call, please go outside the classroom. ANY USE OF A CELL PHONE OR WIRELESS DEVICE DURING A TEST CARRIES THE PRESUMPTION OF CHEATING. A GRADE OF 0 WILL BE AWARDED FOR THAT ASSIGNMENT FOR USING, TOUCHING OR GLANCING AT A CELL PHONE OR WIRELESS DEVICE.

Laptop Use
Laptops, or any form of a new technology device is NOT allowed in the classroom during lecture and exam.

Food in Class
Food is not allowed in the classroom.

K. COLLEGE AND UNIVERSITY POLICIES

Academic Integrity (University)
University students are expected to conduct themselves in accordance with the highest standards of academic honesty. Academic misconduct for which a student is subject to penalty includes all forms of cheating, such as illicit possession of examinations or examination materials, falsification, forgery, complicity or plagiarism. (Plagiarism is the presentation of the work of another as one’s own work.) In this class, academic misconduct or complicity in an act of academic misconduct on an assignment or test will result in a failing grade.

Classroom/Professional Behavior
Texas A&M University-Corpus Christi, as an academic community, requires that each individual respect the needs of others to study and learn in a peaceful atmosphere. Under Article III of the Student Code of Conduct, classroom behavior that interferes with either (a) the instructor’s ability to conduct the class or (b) the ability of other students to profit from the instructional program may be considered a breach of the peace and is subject to disciplinary sanction outlined in article VII of the Student Code of Conduct. Students engaging in unacceptable behavior may be instructed to leave the classroom. This prohibition applies to all instructional forums, including classrooms, electronic classrooms, labs, discussion groups, field trips, etc.

- **Statement of Civility**
  Texas A&M University-Corpus Christi has a diverse student population that represents the population of the state. Our goal is to provide you with a high quality educational experience that is free from repression. You are responsible for following the rules of the University, city, state and federal government. We expect that you will behave in a manner that is dignified, respectful and courteous to all people, regardless of sex, ethnic/racial origin, religious background, sexual orientation or disability. Behaviors that infringe on the rights of another individual will not be tolerated.

- **Deadline for Dropping a Course with a Grade of W (University)**
  I hope that you never find it necessary to drop this or any other class. However, events can sometimes occur that make dropping a course necessary or wise. *Please consult with your academic advisor, the Financial Aid Office, and me, before you decide to drop this course.* Should dropping the course be the best course of action, you must initiate the process to drop the course by going to the Student Services Center and filling out a course drop form. Just stopping attendance and participation WILL NOT automatically result in your being dropped from the class. Please consult the Academic Calendar ([http://www.tamucc.edu/academics/calendar/](http://www.tamucc.edu/academics/calendar/)) for the last day to drop a course.

- **Grade Appeals (College of Science and Engineering)**
  As stated in University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures, a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules website at [http://www.tamucc.edu/provost/university_rules/index.html](http://www.tamucc.edu/provost/university_rules/index.html), and the College of Science and Engineering Grade Appeals webpage at [http://sci.tamucc.edu/students/GradeAppeal.html](http://sci.tamucc.edu/students/GradeAppeal.html). For assistance and/or guidance in the grade appeal process, students may contact the chair or director of the appropriate department or school, the Office of the College of Science and Engineering Dean, or the Office of the Provost.
• Disability Services
The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please call (361) 825-5816 or visit Disability Services in Corpus Christi Hall 116.
If you are a returning veteran and are experiencing cognitive and/or physical access issues in the classroom or on campus, please contact the Disability Services office for assistance at (361) 825-5816.  [http://disabilityservices.tamucc.edu/](http://disabilityservices.tamucc.edu/)

• Statement of Academic Continuity
In the event of an unforeseen adverse event, such as a major hurricane and classes could not be held on the campus of Texas A&M University–Corpus Christi; this course would continue through the use of Blackboard and/or email. In addition, the syllabus and class activities may be modified to allow continuation of the course. Ideally, University facilities (i.e., emails, web sites, and Blackboard) will be operational within two days of the closing of the physical campus. However, students need to make certain that the course instructor has a primary and a secondary means of contacting each student.

L. OTHER INFORMATION
• Academic Advising
The College of Science & Engineering requires that students meet with an Academic Advisor as soon as they are ready to declare a major. The Academic Advisor will set up a degree plan, which must be signed by the student, a faculty mentor, and the department chair. Meetings are by appointment only; advisors do not take walk-ins. Please call or stop by the Advising Center to check availability and schedule an appointment. The College’s Academic Advising Center is located in Center for Instruction 350 or can be reached at (361) 825-3928.

M. GENERAL DISCLAIMER
I reserve the right to modify the information, schedule, assignments, deadlines, and course policies in this syllabus if and when necessary. I will announce such changes in a timely manner during regularly scheduled lecture periods.