

Course Information

Course Number:	Math 3360
Course Name:	Introduction to Fields and Rings
CRN:	20367
Location:	MCS 220
Class Hours:	3pm-3:50pm (Monday, Wednesday, Friday)
Textbook:	A First Course in Abstract Algebra by Anderson and Feil, 3 rd edition
Prerequisites:	Math 2335

Instructor Information

Name:	Dr. Jeffrey Beyerl
Office Location:	MCS 237
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Course Description

A required course for majors in pure mathematics, UCA STEMteach Pure Mathematics, and UCA STEMteach Mathematics Education tracks. This course is designed to introduce students to abstract mathematics. Topics include binary operations, the integers, modular number systems, rings, and fields

Office Hours

My availability changes every day. Go to the website below for up to date availability. When you schedule an appointment, please specify what you're coming for.

Walk-ins are also welcome: if my office door is open, I'm available. However, if somebody with an appointment comes, they will receive priority.

Office Hours Website: <https://ucamath.youcanbook.me/>

**Course Objectives and Requirements**

The primary objective in this course is to develop the theory of fields and rings.

Student Learning Objectives

Upon completion of the course, student will be able to:

- Be able to describe the minimal information on a set to guarantee the ability to solve equations in that set.
- Be able to extend a number system to a larger one so as to solve an equation previously unsolvable in the original system.
- Be able to explain in a general setting the standard rules of arithmetic.
- Run the Euclidean algorithm in the polynomial ring setting.

Grading Policy

This course will be a mastery-based-learning course. The accompanying sheet lists 100 skills and concepts you are expected to master throughout this course. For each skill, you have four chances to show that you have mastered it (listed below). You may decide when and which methods of assessment are best for you. To achieve an “A”, you must master 90 of the skills/concepts. For a “B”, you must master 80 of them, etc.

- Homework
- Problem Presentation
- Test
- Final Exam

Homework:

- Solve the selected problems and clearly illustrate your work.
- Each homework assignment may have up to 5 problems.
- You may submit up to one homework assignment per week.
- Your solutions should be your own. On the day of your submission, there is a one-in-six chance you will need to explain a randomly selected solution to the class. If you cannot explain your method, work, and thought process, the penalty is 5% of your final course grade. If you study in a group, be sure your only turn in your own work and that you understand it. Submitting a solution you cannot fully explain will result in the 5% final course grade penalty. The instructor reserves the right to request a verbal explanation of any submitted homework that he suspects you might not understand.

Problem Presentation:

- You will orally present the solution to the selected problems in Dr. Beyerl’s office.
- You may use the whiteboard.
- You can use up to three lifelines:
 - Pause and look back at your notes/book. (Clock does not stop)
 - Minor hint from the instructor
 - Major hint from the instructor
- You may present up to 3 problems in a single 20-minute presentation.
- You may present up to one presentation per week.

Tests:

- No notes, calculators, or other aids.
- You may take up to 1 test per week.
- You may request up to 10 questions on the test.
- The time allotted will be 12 minutes per question.

Final Exam:

- The final exam will be similar to other tests, except that it will have one question for every skill you have not yet mastered. The time allotted will be 15 minutes per question.
- The final exam will start at 1pm on Friday December 14th.

Tentative Course Outline

Chapter 1	The Natural Numbers Review – read it on your own
Chapter 2	The Integers
Chapter 3	\mathbb{Z}_n
Chapter 4	$\mathbb{Q}[x]$
Chapter 5	Factoring Polynomials
Chapter 6	Rings
Chapter 7	Subrings and Identity
Chapter 8	Integral domains and fields
Chapter 9	Ideals
Chapter 10	$\mathbb{F}[x]$
Chapter 11	Ring Homomorphisms
Chapter 12	The Kernel of a Homomorphism
Chapter 13	Rings of Cosets
Chapter 14	The Isomorphism Theorem
Chapter 15	Maximal and Prime ideals
Chapter 16	CRT

Skills List Revisions

Note that this is the first time Dr. Beyerl is using the mastery-based-learning technique for this course. As such it is expected that the skills list will go through some modifications as the semester progresses. On October 1st and November 1st a new version of the skill list will be published. All previously completed skills will remain completed. All uncompleted skills must be completed according to the new version. Aside from these two dates, the skill list will not be changed. The total number of skills will remain at exactly 100, although the description, problems, etc, may change at these two dates.

Important Dates

Last day to Drop Drop means the course is not on your record	August 29 th
Skills List Revised	October 1 st
Skills List Revised	November 1 st
Last day to Withdraw Withdraw means the course is on your record with a "W" but does not factor into your GPA	November 9 th
Final Exam	Friday December 14 th 1pm

Outside of class resources

- The Textbook
 - Description of material
 - Example problems
 - Exercise problems
 - Homework problems
- Blackboard
 - Course Information
 - Notes from class
- Office Hours
 - Individual help
 - Availability changes every day. See <https://ucamath.youcanbook.me/> for up to date availability
- Previous course materials
 - <http://faculty.uca.edu/jbeyerl/courses.html>
- The Math Resource Lab
 - Study Area
 - Tutors available throughout the day

Attendance Policy

Your active participation in this course is expected and required for you to learn the material and earn a passing grade. If you miss more than two weeks of class meetings throughout the term, you may be administratively dropped from the course.

Academic Integrity Statement

The University of Central Arkansas affirms its commitment to academic integrity and expects all members of the university community to accept shared responsibility for maintaining academic integrity. Students in this course are subject to the provisions of the university's Academic Integrity Policy, approved by the Board of Trustees as Board Policy No. 709 on February 10, 2010, and published in the Student Handbook. Penalties for academic misconduct in this course may include a failing grade on an assignment, a failing grade in the course, or any other course-related sanction the instructor determines to be appropriate. Continued enrollment in this course affirms a student's acceptance of this university policy.

Academic integrity is taken seriously: cheating on a test will result in a failing grade in the course; helping another student cheat will result in a one-letter-grade penalty.

Americans with Disabilities Act Statement

The University of Central Arkansas adheres to the requirements of the Americans with Disabilities Act. If you need an accommodation under this Act due to a disability, please contact the UCA Office of Disability Services, 450-3613.

Title IX disclosure:

If a student discloses an act of sexual harassment, discrimination, assault, or other sexual misconduct to a faculty member (as it relates to "student-on-student" or "employee-on-student"), the faculty member cannot maintain complete confidentiality and is required to report the act and may be required to reveal the names of the parties involved. Any allegations made by a student may or may not trigger an investigation. Each situation differs and the obligation to conduct an investigation will depend on those specific set of circumstances. The determination to conduct an investigation will be made by the Title IX Coordinator. For further information, please visit: <https://uca.edu/titleix>. *Disclosure of sexual misconduct by a third party who is not a student and/or employee is also required if the misconduct occurs when the third party is a participant in a university-sponsored program, event, or activity.

Sexual Harassment and Academic Policies Statement

All students are required to familiarize themselves with the University of Central Arkansas policy on sexual harassment and on academic policies. These policies are printed in the Student Handbook.

Building Emergency Plan Statement

An Emergency Procedures Summary (EPS) for the building in which this class is held will be discussed during the first week of this course. EPS documents for most buildings on campus are available at <http://uca.edu/mysafety/bep/>. Every student should be familiar with emergency procedures for any campus building in which he/she spends time for classes or other purposes.