f16–mas6331–syllabus

MAS 6331 Algebra 1

Fall 2016

Section	Period	Meeting Time	Room
14BA	MWF 3rd	9:35 – 10:25	LIT 221

Professor Alexandre Turull

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Office Hours

Monday	Tuesday	Wednesday	Thursday	Friday
12:50 – 1:40		12:50 – 1:40		12:50 – 1:40

Also by appointment

- **Calendar** — Lecture topics and their approximate dates.
- **Homework Problems** — List of homework assignments.

Prerequisites:

MAS 5312 Introduction to Algebra 2, or equivalent.

Textbook:

Algebra, by Thomas W. Hungerford.

Content:

As well as a subject in its own right, **Algebra** is the language of modern mathematics. As such, it plays a role for Mathematics, similar to the role Mathematics plays for all of Science. Hence, the study of Algebra is indespensible for serious work in modern mathematics. MAS 6331 Algebra 1 and its continuation MAS 6332 Algebra 2 are designed to introduce the student to the basic concepts and results of Modern Algebra. Having become familiar with basic algebraic thinking (in MAS 5312 or elsewhere), the student is expected to learn the basics of algebra as a language for all of mathematics. Hence, the student will learn about **free** objects, **tensor** products, **localization**, **projective** modules, **injective** modules, **exact** sequences, **symmetric functions** , **Galois** groups, **simple** rings and algebras, **semi-simple** rings and algebras, **fractional** ideals, **Dedekind** domains, the Jacobson **radical** , **algebraic sets** , **Hilbert's Basis Theorem** , **Hilbert's Nullstellensatz**, etc.

We will begin with Galois Theory, the theory that gave rise to modern algebra. This will include the study of solutions of algebraic equations by radicals, as well as Hilbert's Theorem 90. We will then continue with Group Theory, with an emphasis on categorical concepts such as *free* groups, generators and relations, direct products and coproducts. These concepts readily generalize to other structures. We will prove the Krull-Schmidt Theorem for direct products of groups, and Hall's Theorem on finite solvable groups.

The second semester will begin with a review of rings and ideals. Next, we will discuss Modules, including *free* , *projective* and *injective* modules. Then, we will discuss commutative rings and modules, including chain conditions, *Dedekind* domains, and *algebraic* sets and Hilbert's *Nullstellensatz*. This will be followed by the study of *simple* and *primitive* non-commutative rings, the Jacobson *radical*, *semisimple* rings, algebras and division algebras.

Format and grade:

Lectures. Homework will be assigned regularly and discussed in class. Homework will not be graded. The grade will be earned through oral presentations and discussions, and a final test.

Tests:

Final: Thursday, December 15, 3:00 p.m. — 5:00 p.m.

UF grading policies for assigning grade points

See https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

Students with disabilities

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, http://www.dso.ufl.edu/drc/) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

Attendance policy

Students are expected to attend class regularly.

The UF policy on attendance is here: https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx

Honor Code

UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code."

On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment."

The Honor Code (http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obliged to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor of this class.

Website:

http://people.clas.ufl.edu/turull/f16-MAS6331-syllabus