Math 548
Geometry, Algebra, and Algorithms
Spring 2018

Instructor:	Alexander Duncan
Email:	duncan@math.sc.edu
Office:	LeConte 300D
Office hours:	Tuesday 1:00 pm - 2:00 pm Wednesday 10:00 am – 12:00 pm
Lectures:	LC 303B Tuesday, Thursday 10:05 am – 11:20 am
Course webpage:	`http://people.math.sc.edu/duncan/Math548/`
Prerequisites:	Math 300 and Math 544 (or see instructor)
Text:	Ideals, Varieties, and Algorithms, Fourth Edition. David A. Cox, John Little, Donal O'Shea.

Learning Outcomes:

Upon successful completion of this course, students will be able to:

- translate between the languages of geometry, algebra, and computation using the ideal-variety correspondence,
- determine the solutions to systems of multivariate polynomial equations, and
- solve problems using computer algebra systems.

Computer Algebra Systems:

A substantial fraction of the course deals with computer algebra. Consequently, computer algebra systems will be used in lecture and required for portions of the homework assignments.

The "official" system used by the course is `Macaulay2`:

`http://www.macaulay2.com`

Any functionality required to complete assignments will be present in `Macaulay2` and will usually be demonstrated in class or in supplementary material. There are several options for using `Macaulay2` during the course:

- It is freely available and can be downloaded and installed on most computers.
- It will be installed on the computers in the Linux lab LeConte 316.
- There is an online web application available at:

`http://web.macaulay2.com/`

Students are welcome to use a different computer algebra system to complete assignments or explore the topics of the course. However, the necessary functionality may not be present and the instructor may not be able to help troubleshoot.

Grading scheme:

Your raw numerical grade will be computed as follows:

Homework:	40%
Midterm exams:	$15\% \times 2 = 30\%$
Final exam:	30%

Your raw numerical score will be converted into a final letter grade, which should be interpreted as follows:

A	Demonstrates the potential to apply the course material confidently and correctly with minimal supervision in undergraduate research, graduate school, or industrial applications.
B+/B	Can apply ideas from the course in situations requiring more than a superficial understanding of the material.
C+/C	Able to consistently solve routine problems.

Homework:

The lectures will usually follow the textbook, but not every topic will be covered in as much depth (or at all). Reading the corresponding sections of the textbook is considered part of your homework.

There will be written homeworks due roughly every other week. It is your responsibility to check the course website regularly for new assignments. When a computer algebra system is used on an assignment, be sure to explicitly state the commands used and their output (for example, by including a printout of your session).

Unless explicitly told not to do so, you may use any resource you'd like for assignments (e.g., computer algebra systems, the textbook, your classmates, online videos, or the instructor). However, **you must write up your assignment on your own using your own words** and **list any resources used to do the assignment**. Failure to abide by these guidelines will be considered a breach of academic integrity.

Reading the textbook and doing the assignments is necessary, but not sufficient, to succeed in this course! Also, relying too much on external resources will negatively impact your performance on the exams.

Exams:

The final exam will be a take-home exam and will be due on Tuesday, May 8. There are two in-class midterm exams on the following dates:

Midterm Exam 1: Tuesday, February 20 (in class)
Midterm Exam 2: Tuesday, April 3 (in class)

No notes, calculators, dictionaries, or other aids are allowed during the midterm exams.

Course Policies:

There will be no credit for late assignments. There will be no make-up exams. If you expect to miss an exam for any reason, then let the instructor know at least two weeks in advance. In the case of an excused absence from a midterm exam, the other midterm exam grade will be used for the missed midterm (adjusted to account for differences in the difficulty of the exams).

Office of Student Disability Services:

Any student with a documented disability should contact the Office of Student Disability Services at 803-777-6142 to make arrangements for appropriate accommodations.

Academic Integrity:

The University of South Carolina has clearly articulated its policies governing academic integrity and students are encouraged to carefully review the policy on the Honor Code in the Carolina Community. Any deviation from these expectations will result in academic penalties as well as disciplinary action.

Withdrawal Deadline:

The deadline to drop the course without a WF being recorded is March 9.