

MA 745, Fall 2019 (MWF 1:25-2:15PM @ CAS 221)
--

- **Instructor:** Yu-Shen Lin
Office: MSC 249, 111 Cummington Mall
Email: yslin@bu.edu
- **Office hours:** MW 10:30-12pm
- **TextBook:** Algebraic Geometry, Robin Hartshorne. Graduate Texts in Mathematics, No. 52. Springer-Verlag, New York-Heidelberg, 1977. xvi+496 pp. ISBN: 0-387-90244-9
- **Prerequisite** Suitable doze of commutative algebra. I would recommend certain familiarity of first 9 chapters of "Introduction to Commutative Algebra" Atiyah McDonald.
- **Homework:** There will be biweekly homework assignment (except for the first two weeks). In total, one has to turn in 10 problems in the semester.
- **Exams:** There will be no exams.
- **Presentation:** Each student would be present a topic related to the course material. The topic will depend on the discussion with the instructor.
- **Grades:**
The grades will be calculated base on the following: **Homework (50 %)** and **presentation (50 %)**

Syllabus The following is the topics we will tempt to cover in a semester:

1. Varieties
2. Sheaves
3. Introduction to Schemes
4. Properties of Schemes
5. Fibre Product
6. Separatedness and Valuation Criterion

7. Properness and Valuation Criterion
8. Sheaves of Modules
9. Divisors
10. Projective morphisms and Blow-ups
11. Cohomology of Sheaves
12. Cohomology of Affine Schemes/Projective Spaces
13. Higher Derived Images of Sheaves
14. Flat Morphisms

Homework

1. Homework I (due date: Sep 27)
 - (a) I. 1.1 (a)(b), 1.2, 1.4
 - (b) II. 1.2, 1.7, 1.13, 1.22
 - (c) II. 2.1, 2.3, 2.7, 2.8, 2.18
2. Homework II (due date: Oct 11)
 - (a) II. 3.3, 3.8, 3.11, 3.13, 3.17
3. Homework III (due date: Oct 25)
 - (a) II. 4.3, 4.9, 4.11
 - (b) II. 5.1, 5.6(c), 5.7, 5.8(a), 5.12, 5.18
4. Homework IV (due date: Dec 9)
 - (a) II. 6.8, 6.9, 6.10, 6.12
 - (b) II. 7.9, 7.11
 - (c) II. 8.3, 8.5, 8.6, 8.8