

**Math 621: Combinatorial Commutative Algebra**  
**Spring 2020**  
**Lecture Schedule**

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Below is a list of the topics we intend to cover, along with a rough schedule. Actual schedule is subject to change without notice. Last updated March 30, 2020.

<b>Week</b>	<b>Topic</b>
1/22 – 1/24	Introduction and Roadmap
	<b>Combinatorial Setup</b>
1/27 – 1/31	Numerical and Affine Semigroups
2/3 – 2/7	Graded Rings and Modules
	Hilbert Functions
2/10 – 2/14	Rational Generating Functions
2/17 – 2/21	Hilbert Series
	Hilbert's Theorem
2/24 – 2/28	Hilbert Quasipolynomials
	<b>Polyhedral Geometry</b>
3/2 – 3/6	Polytopes
3/9 – 3/13	Ehrhart's Theorem
3/16 – 3/20	Applications to Enumerative Combinatorics
	<b>Commutative Algebra Backend</b>
3/23 – 3/27	Gröbner Bases
3/30 – 4/3	<i>Spring Break: No Classes</i>
4/6 – 4/10	Gröbner Bases (Deep Cuts)
4/13 – 4/17	Noetherian Rings
	Hilbert Basis Theorem
4/20 – 4/24	Homological Algebra
	Free Resolutions
4/27 – 5/1	Hilbert Syzygy Theorem
5/4 – 5/7	Staircase Diagrams
	Buchberger Graphs
5/12	<b>Final Presentations: Tuesday, May 12</b>