

**765-510: ADVANCED PLANT GENETICS 2018** (25 80'-lectures; 3 exams)  
Mon - Thurs 12:35-1:55

<b>Topics (~ number of classes: dates)</b>	<b>Instructor</b>
<b>I. Introduction (3: T 9/6, M 9/10, T9/13)</b> <ul style="list-style-type: none"><li>- Brief history of plant genetics</li><li>- Chromosomes, chromatin and life cycle</li><li>- Review of mendelian genetics</li></ul>	Gallavotti
<b>II. Linkage analysis, molecular markers and recombination (3: M 9/17, T 9/20, M 9/24)</b> <ul style="list-style-type: none"><li>- Markers</li><li>- Detection and estimation of linkage from testcross and F2 data</li><li>- Interval mapping, bulked segregant analysis, near isogenic lines</li><li>- Mapping with recombinant inbreds</li><li>- Synteny: orthologous and paralogous genes</li><li>- Meiotic and somatic recombination</li></ul>	Gallavotti
<b>III. Mutations (2: T 9/27, M 10/1)</b> <ul style="list-style-type: none"><li>- Spontaneous and induced</li><li>- McClintock's transposable elements and related transposons</li><li>- Retrotransposons, T-DNA, and heterologous tagging</li><li>- Gene editing</li></ul>	Gallavotti
<b>EXAM 1 (30%; covers classes 1-8: Topics I-III) Thur. Oct. 4</b>	
<b>IV. Aneuploidy and polyploidy (1: M 10/8)</b> <ul style="list-style-type: none"><li>- Aneuploidy and genetics of polyploids</li></ul>	Maliga
<b>V. Genetic screens (1: T 10/11)</b> <ul style="list-style-type: none"><li>- Genetic interactions and screens</li></ul>	Gallavotti
<b>VI. Plant domestication (1: M 10/15)</b> <ul style="list-style-type: none"><li>- Domestication of crop species: maize, rice, tomato</li></ul>	Gallavotti
<b>VII. Map-based gene isolation (2: T 10/18, M10/22)</b> <ul style="list-style-type: none"><li>- Theory and strategies</li><li>- Practical exercise: positional cloning of a recessive mutant</li></ul>	Dong/Gallavotti
<b>VIII. Guest lecture (1: T 10/25)</b> <ul style="list-style-type: none"><li>- Physcomitrella: a unique recombination system</li></ul>	Lawton
<b>IX. Haploid use and production (1: M 10/29)</b> <ul style="list-style-type: none"><li>- Haploids</li></ul>	Maliga
<b>X. Extrachromosomal inheritance (2: T 11/1, M 11/5)</b> <ul style="list-style-type: none"><li>- Organelle genetics</li><li>- Transmission</li><li>- Recombination</li><li>- Nuclear cytoplasmic interactions</li><li>- Cytoplasmic male sterility &amp; hybrid production</li></ul>	Maliga

**EXAM 2 (30%; covers classes 9-17: Topics IV-X) Thurs. Nov. 8**

**XI. Epigenetics (3: M 11/12, T 11/15, M 11/19)**

Gallavotti/Dong

- Paramutation
- Cosuppression and transgene silencing in transgenic systems
- Methylation and chromatin remodeling

**XII. Genomics (3: M 11/26, T11/29, M 12/3)**

Messing/Gallavotti/Lam

- Guest lecture: history of plant genomics
- Genomic resources and new tools for genetic analysis
- Genomics of duckweed

**XIII. Developmental Genetics (2: T 12/6, M 12/10)**

Gallavotti/Dong

- Paper/discussion

**FINAL EXAM (40%: 20/40 from classes 18-25, Topics XI-XIII; 20/40 from classes 1-19, Topics I-X) Mon. Dec. 17 @ 12:30 PM in 138B Foran**

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