

PLANT MOLECULAR GENETICS
SOCR 740/BSPM 740
FALL, 2007

Location: E005 Plant Sciences Building
Time: 11:00 a.m. - 12:15 p.m. on Tuesday/Thursday
Prerequisites: SOCR 330 or equivalent and BC 351

Instructor: Dr. Nora Lapitan
(http://www.soilcrop.colostate.edu/find_a_person/faculty/lapitan_intro.htm)

Contact information 491-1921; Nora.Lapitan@Colostate.edu
Office hours: 1:00-3:00 pm, MWF (or e-mail to set up an appointment outside office hours)

COURSE GOALS:

- Present current knowledge on plant gene and genome organization, and regulation of gene expression
- Discuss genomics approaches for understanding plant biology.
- Discuss genomics applications in plant improvement.
- Critically read journal articles and learn to present effectively.
- Develop problem-solving skills by applying genomic methods to biological questions and agriculture-related problems

CLASS GUIDELINES:

Attendance: Regular attendance is highly encouraged. Since each lecture is put together from several references, you will get the most from each lecture by being in class and engaging in class discussions.

Class materials: Handouts, reading materials, assignments, review questions, etc., will all be available at RamCT (<https://ramct.colostate.edu/>).

Class participation will be considered when making final grades.

Consultation: Do not hesitate to talk to me about questions or if you require support regarding class materials and requirements.

Research proposal: When choosing a topic for your research proposal, any topic involving plant genetics will work as long as the questions or problems being addressed are different from your thesis research.

GRADING:

2 exams	55%
Class presentations	15%
Proposals	25%
Homeworks/ Class participation	5%

REFERENCES:

There is no required textbook for this class. References for each lecture will be included in handouts and the papers will be available in RamCT.

TOPICS:

I. Gene and Genome Organization

- Molecular structure of eukaryotic chromosome and chromatin
- Molecular structure and functions of centromere and telomere
- Techniques for the study of genome organization
- Organization of repeated and unique DNA sequences
- Transposition and its role in the evolution of plant genomes

II. Structural, Functional, and Comparative Genomics

- Introduction to Genomics
- Genetic Mapping and Molecular marker systems
- Positional cloning and Physical Mapping
- Genome Sequencing and Model Organisms
- Comparative genomics
- The transcriptome and how it is studied
- Single nucleotide polymorphisms (SNPs) and Association analysis
- Reverse genetics
- Bioinformatics

III. Gene Regulation

- Regulation of transcription; Transcription factors
- MicroRNA and functions in gene regulation and development
- Signal transduction: MAPK signal pathway
- Calcium-signaling (Dr. A.S.N. Reddy)
- Using genomics to understand plant-pathogen interaction (Dr. Stephen Chisholm)