

AGR 4304 - Plant Chromosomes and Genomes
Spring 2016
(3 credits)

Instructors:

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Course Description

Concepts to be introduced include plant DNA organization in chromosome structure, principles and technologies of cytogenetics, plant genomic DNA structure and function, transcriptome, DNA sequencing technologies/applications, basic tools for nucleotide sequence analysis, and plant genomic databases. This course is designed to introduce students to plant chromosome structures, inheritance, and the basic genomic tools to analyze plant genomes.

Course Objectives

By the end of this course students will be able to:

1. Understand how the genetic material is organized in the chromosome structure for determining inheritance.
2. Explain how chromosome number and structure variations are associated with the abnormal inheritance and disorders.
3. Identify appropriate cytogenetic techniques to address genetic questions.
4. Understand how DNA sequence is determined and genomic information is generated
5. Apply the sequencing technologies for genotyping
6. Annotate the plant genome and analyze the genomic sequences using basic bioinformatics tools.
7. Mine the GenBank to solve related biological and genetic problems.

Course Format

The course includes readings, lectures, paper discussion, exams, and pop quizzes

Prerequisites

AGR3303 Genetics or PCB 3063 Genetics

Meeting Periods and Rooms

Tuesday period 3 and 4 (9:35-11:30am) and Thursday period 3 (9:35-10:25am) at McCarty A 1142.

Course Website

Lectures handouts, reading assignments, course announcements, grades and other related information and materials are available in E-Learning system (Canvas) <https://ufl.instructure.com/courses/324474>. Students need to login with their GatorLink user name and password for access.

Text Book and Recommended Reading

No textbook is required; instead various reading materials primarily a collection of recently published articles in scientific journals and selected book chapters will be assigned according to each topic. The reading material will be posted on the course website. Students should do the reading assignments in order to study and to better understand the lectures.

Attendance Policy

Students are expected to attend every class and be on time. There will be five bonus pop quizzes. Each quiz will be worth 1 point and given randomly in class throughout the semester. You must attend class to have the opportunity to take the bonus quizzes. If you are absent or late for class, you will not be able to make up a quiz or get extra time to complete the quiz. If you miss a class it is YOUR RESPONSIBILITY to speak with another student to discuss what was covered in class.

Grading

Final grades will be given based on five homework assignments (100 points in total) and two exams (100 points in total) (10 bonus points are additional).

A	90% (\geq 180 points)
B+	85% to 89.99% (170 – 179 points)
B	80% to 84.99% (160 – 169 points)
C+	75% to 79.99% (150 – 159 points)
C	70% to 74.99% (140 – 149 points)
D+	65% to 69.99% (130 – 139 points)
D	60% to 64.99% (120 – 129 points)
E	< 60% (\leq 129 points)

Note: no minus grades will be given

For more information on grades and grading policies, please visit:

<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

Homework assignments

We will have five individual homework assignments. Each assignment is worth 20 points. All assignments with due dates and point allocations will be posted on the Canvas website under the assignment tab. Students are expected to finish the homework independently. The assignment must be submitted to the instructor on the due date by the due time. Late homework is acceptable. However, 5 points will be deducted for the late homework (even on the same day). I encourage students to make a copy of the homework assignment before submission.

Exam

Two exams will be given during the semester with each worth 50 points. An optional comprehensive exam will be given during the final week and is worth 50 points as well.

If you miss one of the in-class exams due to any reason or would like to replace the lowest score of any mid-term exam, you can take the final comprehensive exam as a makeup.

Bonus pop quiz

Five pop quizzes will be given randomly during the semester. Each pop quiz is worth one bonus point. To encourage class attendance, quizzes with incorrect answers will earn 0.5 bonus points. The bonus points will be added to a student's total points for final grades at the end of the semester.

Paper presentation and discussion

We have 7-9 periods after 10th week of the semester for student to present literature papers and to participate in the paper discussions. 5 bonus points will be given to the students who present a paper and participate in the discussion. The literature paper should be searched and selected by the students. The papers should be published in the last 5 years with a topic aligning with our lecture topics, which need to be approved by the instructor before preparing the presentation. The presentations are held in class for 25 minutes. Presentation should include a 20 min PowerPoint slides show, leaving 5 min for questions from the students and instructors.

Make-Up Policy

Late assignments are accepted but points will be deducted. Missed pop quizzes cannot be made up at a later date. Two mid-term exams cannot be taken after the scheduled date. However, if due to any reason including serious illness, bereavement or activities that fall under the Twelve –Day Rule, you are not able to make one of the mid-term exams, you can take the optional final comprehensive exam as a make-up.

General Class Demeanor

- Students arrive to class on time
- Students convey superior work ethic and perform to high standards
- Students share questions and ideas in and out of the class
- Students keep an open mind
- Students respect one another
- Students turn off all electronic devices
- Computers are allowed only for note-taking and accessing the class activities. Abuse of this policy will result in not allowing in-class computer use for that particular student

Academic Honesty

In 1995 the UF student body enacted an [honor code](#) and voluntarily committed itself to the highest standards of honesty and integrity. When students enroll at the university, they commit themselves to the standard drafted and enacted by students.

The Honor Pledge: We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.

On all work submitted for credit by students at the university, the following pledge is either required or implied: **"On my honor, I have neither given nor received unauthorized aid in doing this assignment."**

Students should report any condition that facilitates dishonesty to the instructor, department chair, college dean, Student Honor Council, or Student Conduct and Conflict Resolution in the Dean of Students Office. (Source: 2012-2013 Undergraduate Catalog)

It is assumed all work will be completed independently unless the assignment is defined as a group project, in writing by the instructor.

This policy will be vigorously upheld at all times in this course.

Software Use

All faculty, staff and students of the university are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against university policies and rules, disciplinary action will be taken as appropriate.

Campus Helping Resources

Students experiencing crises or personal problems that interfere with their general well-being are encouraged to utilize the university's counseling resources. The Counseling & Wellness Center provides confidential counseling services at no cost for currently enrolled students. Resources are available on campus for students having personal problems or lacking clear career or academic goals, which interfere with their academic performance.

- *University Counseling & Wellness Center, 3190 Radio Road, 352-392-1575, www.counseling.ufl.edu/cwc/*
 - Counseling Services
 - Groups and Workshops
 - Outreach and Consultation
 - Self-Help Library
 - Training Programs
 - Community Provider Database
- *Career Resource Center, First Floor JWRU, 392-1601, www.crc.ufl.edu/*

Services for Students with Disabilities

The Disability Resource Center coordinates the needed accommodations of students with disabilities. This includes registering disabilities, recommending academic accommodations within the classroom, accessing special adaptive computer equipment, providing interpretation services and mediating faculty-student disability related issues.

0001 Reid Hall, 352-392-8565, www.dso.ufl.edu/drc/

Course Schedule/Topics

Date	Lectures	Topics
Jan. 5	Lecture 1	Course introduction and concepts review
Jan. 5	Lecture 2	Chromosome structure and DNA organization
Jan. 7	Lecture 3*	Karyotypes
Jan. 12	Lecture 4*	Meiosis analysis and genetic control of meiosis
Jan. 12	Lecture 5*	Autopolyploid genetics
Jan. 14	Lecture x	Gene structure and gene prediction
Jan. 19	Lecture 6*	Allopolyploid genetics
Jan. 19	Lecture 7*	Cytogenetic techniques: Flow Cytometry
Jan. 21	Lecture 8*	Cytogenetic techniques: GISH and FISH (HW1 due)
Jan. 26	Lecture 9*	2n gametes
Jan. 26	Lecture 9+*	Apomixis
Jan. 28	Lecture 10	Genomes – an introduction
Feb. 2	Lecture 11	DNA sequencing technologies
Feb. 2	Lecture 12	DNA sequencing technologies
Feb. 4		Tour to ICBR (HW2 due)
Feb. 9	Lecture 13	Sequence assembly
Feb. 9	Lecture 14	Sequence assembly
Feb. 11	Lecture 15	Sequence assembly
Feb. 16		Exam I (In class close note exam)
Feb. 18	Lecture 16	Genome organization and features
Feb. 23	Lecture 17	Genome organization and features
Feb. 23	Lecture 18	BLAST
Feb. 25	Lecture 19	BLAST
Week 9		Spring break (No class)
Mar. 8	Lecture 20	Gene structure and gene prediction (HW3 due)
Mar. 8	Lecture 21	Promoter and regulatory element prediction
Mar. 10	Lecture 22	Transcriptome and RNAseq
Mar. 15	Lecture 23	Transcriptome and RNAseq
Mar. 15	Lecture 24	Transcriptome and RNAseq
Mar. 17	Lecture 25	Development of genetic markers from genome sequences (HW4 due)
Mar. 22	Lecture 26	Development of genetic markers from genome sequences
Mar. 22	Lecture 27	Development of genetic markers from genome sequences
Mar. 24	Lecture 28	Genotyping by sequencing
Mar. 29	Lecture 29	Exome sequencing
Mar. 29		2 paper presentations
Mar. 31	Lecture 30	GenBank
Apr. 5,7		6 paper presentations (HW5 due)
Apr. 5		Exam II (take home)
Apr. 12-14		6 paper presentations

Apr. 19		Review for final exam
Week 17		Optional Final Exam (take home)

*To be given by Dr. Quesenberry.

The instructor reserves the right to make changes in the assignments and syllabus as needed. Notification will be via E-Learning, e-mail or class announcements.