

# INTRODUCTION TO PLANT MOLECULAR BIOLOGY

## SYLLABUS

### I. Course and Instructor Information.

Course:	HOS 3305
Class Number:	14584
Credit Hours:	3
Period 2-3:	Tu 8:30 - 9:20 am & 9:35 - 10:25 am Th 8:30 - 9:20 am
Room:	2318 Fifield Hall
Pre-requisites:	BSC 2007, BOT 2010, or BSC 2010
Instructor:	C. Eduardo Vallejos
Office:	2243 Fifield Hall
Phone:	273-4845
e-mail:	<a href="mailto:vallejos@ufl.edu">vallejos@ufl.edu</a> (Subject must be "HOS 3305")
Office hours:	M 1:00 - 2:00 pm, Th 9:30 - 10:30 am, or by appointment

### II. Course Description.

Molecular Biology is the branch of biology that studies the structure and function of macro molecules that encode and regulate the flow of genetic information used by living organisms. This course will focus on the structure and content of the three genomes found in plant cells, gene structure, expression, and regulation. Other topics addressed in this class are transposable elements, and plant transformation procedures. A brief introduction to bioinformatics is also included.

### III. Course Goals. This course aims to:

- Provide students with a solid understanding of the relationship between structure and function of macromolecules that carry and express genetic information.
- Foster the development of critical thinking as it applies to methods of scientific inquiry and assessment of results.
- Familiarize students with the utilization of bioinformatics resources.

### IV. Learning Objectives. After taking this course students should be able to:

- Identify the different components of the cell machinery that maintain and express the genetic information stored in cells of living organisms.
- Identify the basic methods and approaches used in molecular biology.
- Explain the role played by the molecular components of the genetic machinery.
- Use their knowledge of structure and function of macromolecules to interpret biological phenomena such as growth, development and responses to biotic and abiotic stimuli.

**V. Reading Material.**

Weaver, RF. *Molecular Biology*. New York, NY. McGraw-Hill publisher. 5<sup>th</sup> edition, 892 pp.

*Additional References*

Krebs, JE, ES Goldstein, ST Kilpatrick. 2018. *Lewin's Genes XII*. Jones & Bartlett Learning. Sudbury, MA.

Buchanan, BB, W Gruissem, RL Jones. 2015. *Biochemistry and Molecular Biology of Plants*. 2<sup>nd</sup> Edition. John Wiley & Sons, Somerset NJ.

Weaver's book covers most of the topics I cover in this class, albeit in greater detail than I do. I will provide an "Outline" for each section to delimit the areas that will be covered. When appropriate, I will address specific articles dealing with plant-specific features. I will make copies of these articles available to the class.

**VI. Class Schedule.**

Wk	Lecture	Date	Topic
1	1	Aug-20, T	Introduction, History of Molecular Biology
	2	Aug-20, T	History of Molecular Biology, Molecular Biology Tools – I
	3	Aug-22, R	Molecular Biology Tools – I, Molecular Biology Primer
2	4	Aug-27, T	Molecular Biology Primer
	5	Aug-27, T	Molecular Biology Primer
	6	Sep-29, R	Molecular Biology Primer
3	7	Sep-3, T	DNA Characterization
	8	Sep-3, T	DNA Characterization
	9	Sep-5, R	Cell Cycle
4	10	Sep-10, T	Molecular Biology Tools – II, DNA Replication
	11	Sep-10, T	DNA Replication
		Sep-12, R	<b>First Midterm</b>
5	12	Sep-17, T	DNA Repair
	13	Sep-17, T	DNA Repair
	14	Sep-19, R	DNA Recombination
6	15	Sep-24, T	DNA Recombination
	16	Sep-24, T	Plant Genome
	17	Sep-26, R	Ribosomal DNA, satDNA

7	18	Ocr-1, T	Centromeres, Transposons
	19	Oct-1, T	Transposons
	20	Oct-3, R	Cytoplasmic Genomes
8	21	Oct-8, T	Transcription, mRNA
	22	Oct-8, T	Transcription, Gene Structure
		Oct-10, R	<b>Second Midterm</b>
9	23	Oct-15, T	RNA Polymerases
	24	Oct-15, T	Transcription, Activators
	25	Oct-17, R	RNA Processing
10	26	Oct-22, T	RNA Processing
	27	Oct-22, T	RNA Processing
	28	Oct-24, R	Transcriptional Regulation
11	29	Oct-29, T	Translation
	30	Oct-29, T	Translation
	31	Oct-31, R	Translation
12	32	Nov-5, T	Translation
	33	Nov-5, T	Translation
		Nov-7, R	<b>Third Midterm</b>
13	34	Nov-12, T	Genome Sequencing
	35	Nov-12, T	Transformation
	36	Nov-14, R	Transformation
14	37	Nov-19, T	Transformation
	38	Nov-19, T	Bioinformatics
	39	Nov-21, R	Bioinformatics
15		Nov-26, T	<b>Oral Presentations</b>
		Nov-26, T	<b>Oral Presentations</b>
		Nov-28 R	<b>Thanksgiving</b>
16		Dec-3 T	<b>Fourth Midterm</b>

**VII. Student Evaluation.** Students will be evaluated according to their knowledge of the topics, level of comprehension, and ability to analyze and interpret information presented in class and in reading assignments. Exams will be closed book and closed notes. No phones will be allowed either. Exams will focus on the material covered since the previous test.

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<b>Homework.</b>	10%
<b>Oral Presentation</b>	10%
<b>First Mid-Term.</b>	20%
<b>Second Mid-Term.</b>	20%
<b>Third Mid-Term.</b>	20%
<b>Final Exam.</b>	20%

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*Make-up exams.*

Students who are unable to take scheduled exams due to scheduling conflicts with other courses, or with religious holidays, should contact the instructor ahead of time to arrange for alternate time and place.

The final grade will be calculated according to a weighted average of the points accumulated throughout the semester. UF grading policies can be found at:

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

*Grading Scale*

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100 ≥ <b>A</b> > 90	86 ≥ <b>B+</b> > 82	74 ≥ <b>C+</b> > 70	62 ≥ <b>D+</b> > 58	<b>E</b> ≤ 50
90 ≥ <b>A-</b> > 86	82 ≥ <b>B</b> > 78	70 ≥ <b>C</b> > 66	58 ≥ <b>D</b> > 54	
	78 ≥ <b>B-</b> > 74	66 ≥ <b>C-</b> > 62	54 ≥ <b>D-</b> > 50	

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**VIII. Course evaluations – GatorEvals.**

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

## IX. University Policies.

### *Attendance Policy*

The requirement for class attendance for this class follows UF policy. However, students must be aware that the class is not designed as a tutorial course. Students with poor attendance records tend to have lower performance levels than those who attend regularly. Most of the PowerPoint presentations serve as aids during lectures and may not mean much unless students attend class, or read the textbook on their own. UF attendance policy can be found at:

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

### *Academic Honesty*

The Honor Code (<http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, students are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor in this class. Every student has signed the following statement after completion of the registration form at the University of Florida:

*“We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.”*

### *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.

### *Students with Disabilities.*

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, [www.dso.ufl.edu/drc/](http://www.dso.ufl.edu/drc/)) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

## X. Student Services.

The University and Gainesville Community offer a number of personal counseling services for students at the University of Florida. Contact the appropriate agency listed below:

- Student Health Services 392- 1161  
 Student Health Care Center (1 Fletcher Driver)  
 Monday - Friday, 8:00am - 4:30pm  
<http://www.shcc.ufl.edu>

- University Counseling & Wellness Center 392-1575  
A counselor is available to assist students to work through personal issues.  
P301 Peabody Hall  
Monday - Friday, 8:00am - 5:00pm  
<http://www.counseling.ufl.edu>
  
- International Student Services 392-5323  
Assistance is provided for International students at the University.  
123 Grinter Hall  
Monday - Friday, 8:00am - 4:30pm  
<http://www.ufic.ufl.edu>
  
- Career Development Assistance and Counseling 392-1601  
Career Resource Center M-F; 8:00am - 4:30pm  
<http://www.career.ufl.edu>
  
- Dean of Students Office, 392-1261  
A staff member is available to assist students.  
P202 Peabody Hall  
Monday - Friday, 8:00am - 4:30pm  
<http://www.dso.ufl.edu>