

Omics in Entomology/Nematology Research
ENY 6934, 1 credit (seminar course)
Summer 2019

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Class period: Thursday, periods 4-5 (12:30 – 3:15pm)

Room: 1027 Steinmetz Hall and by Zoom

Office hours: Immediately after class and by appointment

What is omics?

Omics refers to the study of organisms utilizing a range of high throughput technologies that measure molecular features at a large scale, e.g. genomics, proteomics or metabolomics (all genes, proteins or metabolites and their relationships). It involves extensive use of bioinformatics and statistical tools to analyze the data. The rise of omics technologies is a science revolution as it greatly accelerates research discoveries and inventions.

Course Description:

This course is intended for students who are interested in omics but have limited experience, or students who want to refresh their knowledge in omics technologies, experimental design and big data management. The classes will be largely interactive small group discussion along with lectures from guest speakers who are experts in conducting different omics experiments. During the course, students will have the opportunity to give oral presentations on specific omics topics.

Learning Objectives:

- Define the different terms used in omics.
- Describe the working principles of high throughput sequencing and other omics techniques (proteomics, metabolomics).
- Explain the advantages and limitations of different high throughput sequencing platforms.
- Execute basic multivariate statistics on omics data.
- Analyze big data using different online tools.
- Discuss the impacts of microbiome on insect and nematode physiology.
- Critique different research methods used in omics studies.
- Practice delivering 25-minute science presentations.

Course structure

Lectures (7 in total): Each class will comprise a 30-minute seminar by the instructor or guest speakers on relevant literature, followed by 15-minute Q&A and group discussions.

Student presentation (5 in total). Students will deliver a 25-minute PowerPoint presentation on an omics topic, followed by a 5-minute Q&A. Each student-led discussion and presentation class will have up to two students presenting. The exercise will be peer-assessed. After each student presents, all students in the audience will fill in the evaluation form and turn it in before the end of class.

Schedules (tentative)

May 16	Introduction to Omics: terminology and general concepts - Icebreaking: self-introduction and sharing of recent omics news.
May 23	Using omics to study microbiome in insect and nematodes
May 30	Guest speaker: Metagenomics 1
June 6	Overview of multivariate statistics in omics data analysis
June 13	Guest speaker: Metagenomics 2
June 20	Student-led discussion and presentation
June 27	Student-led discussion and presentation
July 4	No class (Independence Day)
July 11	Guest speaker: Transcriptomics
July 18	Student-led discussion and presentation
July 25	Student-led discussion and presentation
Aug 1	Guest speaker: Proteomics
Aug 8	Student-led discussion and presentation

Recommended Readings

Specific readings to supplement the lectures will be posted online in Canvas (<https://lss.at.ufl.edu/>) - click on e-Learning in Canvas. Below are some general readings worth going through:

1. Engel P and Moran NA. 2013. The gut microbiota of insects - diversity in structure and function. *FEMS Microbiol Rev.* 37(5):699-735.
2. Chaston J. 2012. Making the most of "omics" for symbiosis research. *Biol Bull.* 223(1):21-9.
3. Preidis G and Hotez P. 2015. The Newest "Omics"—Metagenomics and Metabolomics—Enter the Battle against the Neglected Tropical Diseases. *PLOS Negl. Trop. Dis.* 9 (2), e0003382.
4. Paliy, O. and Shankar, V. (2016), Application of multivariate statistical techniques in microbial ecology. *Mol Ecol*, 25: 1032-1057.

Prerequisites: Any 2000 or above introductory course in biology or entomology.

Assignments and Grading policies:

Final grade of the course will be determined as: 40% in attendance; 30% in participation in class discussion and 30% in the 25-minute presentation, Grading scale will be as:

A	93-100
A-	90-92
B+	87-89
B	83-86
B-	80-82
C+	77-79
C	73-76
C-	70-72
D	60-69
E	<60

More details can be found from the UF policies:

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

Absences and Make-Up Work

Attendance is required. If you miss class, you are responsible for getting notes from other classmates.

Missed presentations cannot be made up but if a student is absent in the case of exceptional circumstances, s/he can submit a powerpoint instead of in-person presentation.

University policy for class attendance and make-up exams, assignments and other work can be found at:

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

Academic Courtesy / Class Rules:

- Respect the instructors and guest lecturer; call them by their title (e.g. Dr Wong).
- Keep cell phones on silence mode during lectures and discussions.

Online course evaluation:

Student assessment of instruction is critical to improve our teaching and learning. At the end of the semester, students are expected to provide feedback on the quality of instruction in this course using a standard set of university and college criteria. These evaluations are conducted online at <https://evaluations.ufl.edu>. Evaluations are typically open for students to complete during the last two or three weeks of the semester; students will be notified of the specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results>.

Additional General Information:

Each student in the course is expected to abide by the UF Code of Academic Integrity.

<https://sccr.dso.ufl.edu/students/student-conduct-code/>

The following information applies to all courses at the University of Florida.

We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standard of honesty and integrity.

Academic Integrity and Plagiarism: As a result of completing the registration form at the University of Florida, every student has signed the following statement: "I understand that the University of Florida expects its students to be honest in all their academic work. I agree to adhere to this commitment to

academic honesty and understand that my failure to comply with this commitment may result in disciplinary action up to and including expulsion from the University."

Copyrighted Materials and Software Use: All students are required and expected to obey the laws and legal agreements governing copyrighted material and 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.

Accommodations for Students with Disabilities: Students requesting classroom accommodation must first register with the Dean of Students Office. The Dean of Students Office will provide documentation to the student who must then provide this documentation to the Instructor when requesting accommodation. 0001 Reid Hall, 352-392-8565, www.dso.ufl.edu/drc/. 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.

University Counseling Services: Resources are available on-campus for students having personal problems or lacking clear career and academic goals which interfere with their academic performance. These resources include:

1. University Counseling Center, 301 Peabody Hall, 392-1575, personal and career counseling.
2. Student Mental Health, Student Health Care Center, 392-1171, personal counseling;
3. Sexual Assault Recovery Services (SARS), Student Health Care Center, 392-1161, sexual counseling.
4. U Matter We Care, www.umatter.ufl.edu/Links to an external site.
5. Career Resource Center, Reitz Union, 392-1601, career development assistance and counseling.

Student Complaints:

1. Residential Course: https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdfLinks to an external site.
2. Online Course: <http://www.distance.ufl.edu/student-complaint-process>Links to an external site.

Evaluation of Oral Presentations

Student names _____

Title _____

Category	Scoring Criteria	Total Points
Content (30%)	Interesting subject matter; informative introduction.	/10
	Well developed lay out of the problem/question.	/10
	Strong ending and conclusions; good timing.	/10
Organization (20%)	No redundancy.	/10
	Logical and smooth transitions and flow.	/10
Delivery (20%)	Good eye contact with the audience and good body language	/5
	Speaker uses a clear, audible voice.	/5
	Delivery is poised, controlled, and smooth.	/5
	Good language skills and pronunciation are used.	/5
Visual aids (15%)	Visual aids are well prepared, informative, effective, and not distracting.	/5
	Effective slide layout; font adequate size; well proofed.	/10
Handling questions (15%)	Repeat question.	/5
	Friendly and professional response.	/5
	Answers shows a clear understanding on the subject matter.	/5
Total Points (out of 100)		