

PCB4575-19Fall 0001

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PCB 4575 – WILDLIFE GENOMICS

Department of Biology, College of Sciences

3 credits; Fall 2019

Instructor Information

- **Instructor:** Dr. Robert (Bob) Fitak
- **Office Location:** BIO 137A
- **Office Hours:** Tuesday/Thursday 10:30 am – 12:00 pm or by appointment
- **Phone:** 407-823-2141
- **Digital Contact:** Robert.Fitak@ucf.edu or via Webcourses@UCF messaging

Course Information

- **Class Meeting Days:** Tuesday/Thursday
- **Class Meeting Time:** 9:00 am - 10:15 am
- **Class Location:** BIO 415 (lectures/discussions) or BIO 414 (computer lab)
- **Course Modality:** P - Face-To-Face Instruction – P courses have required classroom attendance and meet on a regularly scheduled basis. Students may encounter online, video, or adaptive elements as part of the instruction, thus requiring a computer.
- **Course Prerequisites:** 'B' or better in PCB 4683, or CI
- **Other Enrollment Requirements:** This course will rely upon fundamental concepts in biology, genetics, ecology, and evolution. Familiarity with these topics will likely improve your understanding and success in the course.
- **Required Materials:** None
- **Computer Labs:** For everyone's safety, long pants and closed-toe shoes are required for computer lab sessions. The computer labs are held in BIO 414 (Genomics Core Facility), which is an active research lab. You will not be allowed to enter without the minimum safety attire.

Course Description

The advent of genomics has allowed new scientific questions to emerge and existing questions to be answered in ways not previously considered. The nascent field of wildlife genomics utilizes genetic and genomic approaches to address consequential questions about the ecology, genetics, genomics, conservation, and evolutionary biology of animal species and populations. The field is becoming increasingly important as rapid advances in genomics and genomic technologies provide new tools with which to

evaluate, monitor, and predict the impacts of environmental changes on natural and managed wildlife populations. This course is intended to provide graduate and advanced undergraduate students with an understanding of how genomic methods are applied to problems in wildlife biology, with an emphasis on vertebrate animal species in terrestrial and marine ecosystems. The course includes a mix of lectures, discussions of relevant research articles, and computer-based training and exercises. As such, students should be prepared to read current wildlife genomics literature, lead and participate in discussions, and analyze genomic data using publicly available datasets and analysis pipelines.

Student Learning Outcomes

- Understand the various next-generation DNA sequencing technologies their role in facilitating modern genomic analysis of wildlife population
- Learn how to find, manipulate and analyze genomes and genome-scale datasets using public repositories
- Characterize the types of research and analyses that can be categorized as wildlife genomics, including data generation, manipulation, and analysis
- Understand the application of genomic tools from established ecological and evolutionary disciplines commonly applied to wildlife, including conservation genetics, molecular ecology, disease biology, molecular evolution, and systematics
- Practice scientific communication skills by participating in discussions of primary scientific literature and presenting a case study from the wildlife genomics literature.

Course Activities and Assignments

- **Quizzes**
 - Two quizzes (1% each) will be administered at the beginning and end of the course. Quizzes must be completed on [Webcourses@UCF \(mailto:Webcourses@UCF\)](mailto:Webcourses@UCF) by the deadline indicated.
- **Computer lab reports**
 - There will be five computer labs during the course. Each computer lab will have an associated handout/electronic guide containing a series of questions to demonstrate completion of the lab and interpretation of the findings (4% each). Although the labs will often be performed in small groups, each student must submit their own report through [Webcourses@UCF \(mailto:Webcourses@UCF\)](mailto:Webcourses@UCF)
- **Participation**
 - Because participation and communication are integral components of science and learning, all students must actively participate in the course (18% of grade). This means:
 - Attendance is required (see below for a description of acceptable absences and assignment make-up policies)
 - You may be called upon at times for your ideas, thoughts, and comments on a topic
 - All paper reading assignments require a ≤1 page summary of the study submitted through [Webcourses@UCF \(mailto:Webcourses@UCF\)](mailto:Webcourses@UCF).
These summaries must address the four fundamental components of a scientific study (unless otherwise directed by the instructor):

1. What was the authors' question(s)?
2. What did they do?
3. What did they find?
4. What does this mean (why is it important)?

- Participation includes attending the final exam presentations

- **Exams**

- Two exams will be given in class on the dates indicated on the schedule (25% each; 50% total).
- They will consist of multiple choice, short answer and essay questions based on lecture material.

- **Final Case Study Presentation**

- Each student will prepare a 5 minute presentation of a topic of interest in wildlife genomics (10%). The content must go beyond a simple powerpoint of a single study (e.g., video clips, animations, additional research, etc). Be creative!
- The student must review their selection with the instructor at least 2 weeks prior to presenting.

Attendance

- Attendance is not strictly required, but many studies have shown that student performance is positively correlated with attendance. In addition, a large portion of the grading for this course will be based on participation in computer labs and paper discussions, therefore success in this class requires attendance.
- Reasons for acceptable absences may include illness, serious family emergencies, special curricular requirements (e.g., judging trips, field trips, professional conferences), authorized university-sponsored activities, military obligations, severe weather conditions, legal obligations (e.g., jury duty) and religious holidays. If this participation conflicts with your course assignments, I will offer a reasonable opportunity for you to complete missed assignments and/or exams. The make-up assignment and grading scale will be equivalent to the missed assignment and its grading scale. In the case of an authorized university activity, it is your responsibility to show me a signed copy of the Program Verification Form for which you will be absent, prior to the class in which the absence occurs. In any of these cases, please contact me ahead of time to notify me of upcoming needs.

Assessment and Grading Procedures

Assignment	Percentage of Grade
Quizzes	2%
Computer lab reports	20%
Participation	18%
Exams	50%

Final case study presentation	10%
Total	100%

Letter Grade	Points
A	90-100
B	80-89
C	70-79
D	60-69
F	59 or below

Consult the latest Undergraduate or Graduate [catalog \(http://catalog.ucf.edu/\)](http://catalog.ucf.edu/) for regulations and procedures regarding grading such as Incomplete grades, grade changes, and grade forgiveness.

Course Schedule

Week	Dates	Topic	Assignments	Due Dates
Week 1	Aug 27	What is wildlife genomics?	Syllabus Quiz	8/31 at 11:59pm
	Aug 29	Introduction to Genomics and Databases	Reading assignment	9/3 at 8:59am
Week 2	Sep 3	Introduction to NGS		
	Sep 5	Computer Lab 1 (Rm 414): Geneious and Genomic Databases	Reading Assignment	9/10 at 8:59am

Week 3	Sep 10	Sequence Quality Control, Mapping, and Assembly		
	Sep 12	Computer Lab 2 (Rm 414): Command line tutorial	Reading Assignment	9/17 at 8:59am
Week 4	Sep 17	Adaptation and Population Genomics		
	Sep 19	Computer Lab 3 (Rm 414): Mapping and Assembly	Reading Assignment	9/24 at 8:59am
Week 5	Sep 24	Phylogenomics		
	Sep 26	Computer Lab 4 (Rm 414): Population Genomics	Reading Assignment	10/1 at 8:59am
Week 6	Oct 1	Transcriptomics		
	Oct 3	Computer Lab 5 (Rm 414): Transcriptomics	Reading Assignment	10/8 at 8:59am
Week 7	Oct 8	Ecological Genomics		
	Oct 10	Computer Lab Catchup (Rm 414) or Review	Reading Assignment	10/17 at 8:59am
Week 8	Oct 15	Exam 1		
	Oct 17	Paper Discussion/Presentation 1	Reading Assignment	10/24 at 8:59am
Week 9	Oct 22	Conservation Genomics		
	Oct 24	Paper Discussion/Presentation 2	Reading Assignment	10/31 at 8:59am
Week 10	Oct 29	Epigenomics		

	Oct 31	Paper Discussion/Presentation 3	Reading Assignment	11/7 at 8:59am
Week 11	Nov 5	Functional genomics & CRISPR/Cas9		
	Nov 7	Paper Discussion/Presentation 4	Reading Assignment	11/14 at 8:59am
Week 12	Nov 12	Genomics of wildlife disease		
	Nov 14	Paper Discussion/Presentation 5	Reading Assignment	11/21 at 8:59am
Week 13	Nov 19	De-extinction and the future of wildlife genomics		
	Nov 21	Paper Discussion/Presentation 6	Reading Assignment	11/26 at 8:59am
Week 14	Nov 26	Paper Discussion/Presentation 7		
	Nov 28	** THANKSGIVING - NO CLASS **	** THANKSGIVING - NO CLASS **	NONE
Week 15	Dec 3	Exam 2		
	Dec 5	FINAL EXAM 7:00-9:50		

Policy Statements

Academic Integrity

As reflected in the UCF creed, integrity and scholarship are core values that should guide our conduct and decisions as members of the UCF community. Plagiarism and cheating contradict these values, and so are very serious academic offenses. Penalties can include a failing grade in an assignment or in the course, or suspension or expulsion from the university. Students should familiarize themselves with [UCF's Rules of](#)

Conduct (<http://osc.sdes.ucf.edu/process/roc>). According to Section 1, "Academic Misconduct," students are prohibited from engaging in:

- *Unauthorized assistance*: Using or attempting to use unauthorized materials, information or study aids in any academic exercise unless specifically authorized by the instructor of record. The unauthorized possession of examination or course-related material also constitutes cheating.
- *Communication to another through written, visual, electronic, or oral means*: The presentation of material which has not been studied or learned, but rather was obtained through someone else's efforts and used as part of an examination, course assignment, or project.
- *Commercial Use of Academic Material*: Selling of course material to another person, student, and/or uploading course material to a third-party vendor without authorization or without the express written permission of the university and the instructor. Course materials include but are not limited to class notes, Instructor's PowerPoints, course syllabi, tests, quizzes, labs, instruction sheets, homework, study guides, handouts, etc.
- *Falsifying or misrepresenting* the student's own academic work.
- *Plagiarism*: Using or appropriating another's work without any indication of the source, thereby attempting to convey the impression that such work is the student's own.
- *Multiple Submissions*: Submitting the same academic work for credit more than once without the express written permission of the instructor.
- *Helping another violate* academic behavior standards.

For more information about Academic Integrity, students may consult [The Center for Academic Integrity](https://academicintegrity.org/) (<https://academicintegrity.org/>).

For more information about plagiarism and misuse of sources, see "[Defining and Avoiding Plagiarism: The WPA Statement on Best Practices](http://wpacouncil.org/node/9) (<http://wpacouncil.org/node/9>)".

Turnitin.com

In this course the instructor may utilize turnitin.com, an automated system which can quickly and easily compare each student's assignment with billions of web sites, as well as an enormous database of student papers that grows with each submission. After the assignment is processed, as an instructor I receive a report from turnitin.com that states if and how another author's work was used in the assignment. For a more detailed look at this process, visit <http://www.turnitin.com>.

Responses to Academic Dishonesty, Plagiarism, or Cheating

Students should also familiarize themselves with the procedures for academic misconduct in UCF's student handbook, [The Golden Rule](http://goldenrule.sdes.ucf.edu/docs/goldenrule.pdf). (<http://goldenrule.sdes.ucf.edu/docs/goldenrule.pdf>) UCF faculty members have a responsibility for students' education and the value of a UCF degree, and so seek to prevent unethical behavior and when necessary respond to academic misconduct. Penalties can include a failing grade in an assignment or in the course, suspension or expulsion from the university, and/or a "Z Designation" on a

student's official transcript indicating academic dishonesty, where the final grade for this course will be preceded by the letter Z. For more information about the Z Designation, see

<http://goldenrule.sdes.ucf.edu/zgrade> (<http://goldenrule.sdes.ucf.edu/zgrade>).

Course Accessibility Statement

Myself and the University of Central Florida are committed to providing an accessible and welcoming environment to all students, including efforts to make reasonable accommodations for all persons with disabilities. If requested, this syllabus can be made available in alternate formats. Students who require accommodations in this course must contact the instructor at the beginning of the semester to discuss necessary accommodations. No accommodations will be provided until the student has met with the instructor. Students who need accommodations are highly encouraged to register with [Student Accessibility Services](#) (<http://sas.sdes.ucf.edu/>) (Ferrell Commons 185, sas@ucf.edu (<mailto:sas@ucf.edu>)), phone (407) 823-2371). Through Student Accessibility Services, a Course Accessibility Letter may be created and sent to professors, which informs faculty of potential access and accommodations that might be reasonable. Determining reasonable access and accommodations requires consideration of the course design, course learning objectives and the individual academic and course barriers experienced by the student.

Campus Safety Statement

Emergencies on campus are rare, but if one should arise in our class, everyone needs to work together. Students should be aware of the surroundings and familiar with some basic safety and security concepts.

- In case of an emergency, dial 911 for assistance.
- Every UCF classroom contains an emergency procedure guide posted on a wall near the door. Please make a note of the guide's physical location and consider reviewing the online version at http://emergency.ucf.edu/emergency_guide.html (http://emergency.ucf.edu/emergency_guide.html).
- Students should know the evacuation routes from each of their classrooms and have a plan for finding safety in case of an emergency.
- If there is a medical emergency during class, we may need to access a first aid kit or AED (Automated External Defibrillator). To learn where those items are located in this building, see <http://www.ehs.ucf.edu/workplacesafety.html> (<http://www.ehs.ucf.edu/Workplacesafety>) (click on link from menu on left).
- To stay informed about emergency situations, sign up to receive UCF text alerts by going to my.ucf.edu (<http://my.ucf.edu>) and logging in. Click on "Student Self Service" located on the left side of the screen in the tool bar, scroll down to the blue "Personal Information" heading on your Student Center screen, click on "UCF Alert," fill out the information, including your e-mail address, cell phone number, and cell phone provider, click "Apply" to save the changes, and then click "OK."
- Students with special needs related to emergency situations should speak with their instructors outside of class.

- To learn about how to manage an active-shooter situation on campus or elsewhere, consider viewing this video. [You CAN Survive an Active Shooter \(https://youtu.be/NIKYajEx4pk\)](https://youtu.be/NIKYajEx4pk)

Deployed Active Duty Military Students

If you are a deployed active duty military student and feel that you may need a special accommodation due to that unique status, please contact the instructor to discuss your circumstances.

Internet Usage

You will be expected to have daily access to the internet and email, since I will be emailing you constantly about assignment updates, additions and changes. All students at UCF are required to obtain a [Knight's Email account \(http://www.knightmail.ucf.edu/\)](http://www.knightmail.ucf.edu/) and check it regularly for official university communications.

If you do not own a computer, there are computers accessible to you in all UCF's computer labs, and most computer labs have computers connected to the internet. For further information on computer labs, please see the following website: <http://guides.ucf.edu/c.php?g=78577&p=517810> (<http://guides.ucf.edu/c.php?g=78577&p=517810>).

Communication Protocols and/or "Netiquette"

- In this class the official mode of communication is through email located inside [Webcourses@UCF \(mailto:Webcourses@UCF\)](mailto:Webcourses@UCF). All communication between student and instructor and between student and student should be respectful and professional. It is the student's responsibility to check the "coursemail" tool frequently. You may also wish to create a Knight's Email account at [knightsemail.ucf.edu \(http://www.knightsemail.ucf.edu/\)](http://www.knightsemail.ucf.edu/) for separate official communication from the university.
- If you would like to send me email, please add the following to the subject line: "<course prefix>: <Student's last name, first name>". Since I get a variety of email each day, I do not read all emails I receive. By having this heading in the subject line, I will read your email immediately.
- Before posting in a forum, always make sure your posting has minimal grammar, punctuation or spelling errors. You may do this by copying and pasting the text into Microsoft Word, using the "Spelling and Grammar" editor, and pasting it back to the posting area.
- Please avoid shorthand notation or acronyms (such as "TTYL", "LOL", or "IMO") in communications. These notations may not be understood equally among all those receiving the communication. Emoji's are OK as long as a corresponding text description is included.

Learning Groups

This course often relies on teamwork and cooperation throughout the semester. Early on, you will be assigned into groups at random and will be asked to accomplish various tasks in a group effort. Since a portion of your final grade is mostly composed of grades on team projects, teamwork skills are essential for this class. If you are having difficulties with working in groups, please feel free to discuss this with me.

Religious Observances



Students must notify their instructor in advance if they intend to miss class for a religious observance. For more information, see the UCF policy at

<http://regulations.ucf.edu/chapter5/documents/5.020ReligiousObservancesFINALJan19.pdf>
(<http://regulations.ucf.edu/chapter5/documents/5.020ReligiousObservancesFINALJan19.pdf>).

Additional Information, Services, and Resources

- **Academic Services and Resources:** A list of available academic support and learning services is available at [UCF Student Services \(https://www.ucf.edu/services/\)](https://www.ucf.edu/services/). Click on "Academic Support and Learning Services" on the right-hand side to filter.
- **Non-Academic Services and Resources:** A list of non-academic support and services is also available at [UCF Student Services \(https://www.ucf.edu/services/\)](https://www.ucf.edu/services/). Click on "Support" on the right-hand side to filter.
- If you are a UCF Online student, please consult the [UCF Online Student Guidelines \(https://www.ucf.edu/online/resources/guidelines/\)](https://www.ucf.edu/online/resources/guidelines/) for more information about your access to non-academic services.

Course Summary:

Date	Details
Wed Aug 28, 2019	 Quiz 1: Attendance, Syllabus, and Background Knowledge (https://webcourses.ucf.edu/courses/1338071/assignments/6344771) due by 11:59pm
	 Roll Call Attendance (https://webcourses.ucf.edu/courses/1338071/assignments/6350044)