

# **BSC4932: Software Applications for Biologists**

Department of Biology, College of Sciences

3 Credit Hours

## **Instructor Information**

- Instructor: Dr. Eric Goolsby
- Office Location: Biological Sciences 402D
- Office Hours: By appointment
- Digital Contact: [Webcourses@UCF](mailto:Webcourses@UCF) messaging

Written communication with the instructor should be sent via [Webcourses@UCF](mailto:Webcourses@UCF). Note that I will not be able to respond to course inquiries sent from third-party email addresses (e.g. Gmail) where student identity cannot be confirmed, in order to comply with FERPA regulations.

## **Course Information**

- Term: Fall 2018
- Course Number: BSC4932
- Course Name: Software Applications for Biologists
- Credit Hours: 3
- Class Meeting Days: Tuesday/Thursday
- Class Meeting Time: 2:00pm-3:15pm
- Class Location: 305
- Course Modality: P

## **Enrollment Requirements**

Permission of instructor.

## **Course Description**

This course covers basic concepts in software applications for biologists with little or no programming background. We will be working with the programming languages C++, R, and Python, and topics will include operating in a command line interface, basic coding techniques, and finding and using external software libraries for applications in biology. We will cover applied topics in areas that may include population genetics, diversification analysis, selection analysis, phylogenetic reconstruction, and general concepts including regression and mixed models, data visualization, and plotting publication-quality figures.

## Student Learning Outcomes

- Perform basic tasks using a command line (UNIX-based) interface.
- Automate repetitive tasks by writing custom scripts and programs.
- Understand basic programming syntax.
- Identify and implement functions from external software packages for specific biological applications.
- Solve unfamiliar biological computing problems using a combination of covered course materials and external resources (e.g., Stack Overflow, etc.).
- Self-teach more advanced programming methods.

## Course Activities

- Three **exams** (10% each, 30% total), given during lecture on the dates indicated on the schedule. Exams will be performed on laboratory computers, in which students will be given specific programming tasks reflecting skills covered during the course. Exams are closed-book, closed-internet, closed-notes, and will be cumulative, building on programming concepts covered throughout the semester.
- **In-class assignments and homework** (40% total). The lowest two grades will be dropped.
- Three **mini-projects** (30% total).

## Attendance/Participation

Attendance is extremely important for success in this course. Additionally, most class meetings will involve graded in-class activities, which cannot be made up without a valid excuse. Make-up exams and assignments will be given only with valid documentation of illness, serious family emergencies, mandatory religious observance, or required participation at an authorized university activity. If you know in advance you are going to miss class or a graded assignment for an approved reason, let me know as soon as possible so we can make appropriate arrangements.

Students are highly encouraged to discuss any and all portions of this course with me. **If you are struggling, please do not wait until you fall behind to meet with me.** I am available for office hours by appointment and will always be happy to discuss the course.

## Make-up Exams and Assignments

Per university policy, you are allowed to submit make-up work (or an equivalent, alternate assignment) for university-sponsored events, religious observances, or legal obligations (such as jury duty). 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. Please contact me ahead of time to notify me of upcoming needs.

## Grading Procedures

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

## Course Schedule

TBD.

## Policy Statements

### Academic Integrity

Students should familiarize themselves with [UCF's Rules of Conduct](#). 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](#).

For more information about plagiarism and misuse of sources, see “[Defining and Avoiding Plagiarism: The WPA Statement on Best Practices](#)”.

## **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](#). 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>.

## **Course Accessibility Statement**

The University of Central Florida is committed to providing access and inclusion for all persons with disabilities. Students with disabilities who need disability-related access in this course should contact the professor as soon as possible. Students should also connect with [Student Accessibility Services](#) (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> (click on link from menu on left).  
**AED: Near 2nd floor elevator. First aid kit: by restrooms and main elevator.**
- 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](#)

## **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 your instructor to discuss your circumstances.

## **Copyright**

This course may contain copyright protected materials such as audio or video clips, images, text materials, etc. These items are being used with regard to the Fair Use doctrine in order to enhance the learning environment. Please do not copy, duplicate, download or distribute these items. The use of these materials is strictly reserved for this online classroom environment and your use only. All copyright materials are credited to the copyright holder.

## **Third-Party Software and FERPA**

During this course you might have the opportunity to use public online services and/or software applications sometimes called third-party software such as a blog or wiki. While some of these could be required assignments, you need not make any personally identifying information on a public site. Do not post or provide any private information about yourself or your classmates. Where appropriate you may use a pseudonym or nickname. Some written assignments posted publicly may require personal reflection/comments, but the assignments will not require you to disclose any personally identity-sensitive information. If you have any concerns about this, please contact your instructor.