course syllabus

Python Programming for Biologists
BSC 2891

3 credits
delivered online, asynchronously; students can access material on their schedule
no prerequisites

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Course Description

Discoveries in biology are driven as much by computer analysis as by laboratory work. Students learn the theory and practice of computer programming with emphasis on the practical techniques and problem solving skills required to use computer programming in biological research. This course is taught completely online.

Learning Objectives

By the conclusion of this course, students will be expected to

. Demonstrate the ability to perform common UNIX command-line tasks, including - but not limited to:

1. log onto a remote UNIX server using ssh
2. create files and directories
3. compose text files using a command-line text editor
4. execute command-line programs

. Demonstrate the ability to debug programs written in Python 2.7 by identifying errors and fixing them.

. Demonstrate an understanding of basic Python 2.7 by writing simple program scripts using language constructs, including - but not limited to:

1. variable creation and assignment
2. basic arithmetic operations
3. basic string-manipulation operations
4. file input/output
5. formatted print statements
6. control-flow statements
7. loops and lists

. Demonstrate problem-solving skills using UNIX and Python 2.7 by writing program scripts to perform common bioinformatics tasks, including - but not limited to:

1. reading common data files
2. running bioinformatics programs from within Python
3. converting file formats
4. constructing simple analysis pipelines/workflows

Course Schedule

This course follows a format that is probably unusual to most students. Therefore, students are encouraged to thoroughly consult the course philosophy documentation - available through e-learning - during the first week of classes. Any questions or concerns should be raised to the instructor prior to the end of the drop/add period.

Assignments will be given roughly every week and will typically require the student to 1) consult provided materials, 2) conduct independent investigations of key topics online and 3) perform specified computer tasks for evaluation. Approximately 1 week will be provided to complete each assignment.

Assignments are expected to be completed using the course UNIX server, which can be accessed via the command-line by ssh protocol. Instructions for accessing the course server are provided through e-learning. Students are highly encouraged to confirm access to the course server during the first week of classes to prevent potential access problems from interfering with assignments.

In addition to weekly assignments, grades will be based on a final project, details of which will be provided at mid-term through e-learning.

The following is an approximate list of topics, by week. Expect each week to include an assignment (50pts). The final project is expected to be worth 500pts. However, be advised that the course schedule, including assignments, may change; consult the course e-learning site for up-to-date information.

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week 01 (Jan06-Jan10): motivation, UNIX introduction, log into course server
week 02 (Jan13-Jan17): basic UNIX operations and the directory hierarchy
week 03 (Jan21-Jan24): composing text files by command-line
week 04 (Jan27-Jan31): running programs by command-line
week 05 (Feb03-Feb07): introduction to Python 2.7, "hello world"
week 06 (Feb10-Feb14): variables, arithmetic, formatted print statements
week 07 (Feb17-Feb21): file input and output
week 08 (Feb24-Feb28): loops and control flow statements
week 09 (Mar03-Mar07): - spring break, no classes -
week 10 (Mar10-Mar14): introduction to debugging
week 11 (Mar17-Mar21): debugging exercises
week 12 (Mar24-Mar28): string manipulation and regular expressions
week 13 (Mar31-Apr04): introduction to workflows
week 14 (Apr07-Apr11): workflow exercises
week 15 (Apr14-Apr18): workflow exercises
week 16 (Apr21-Apr23): problem solving (no assignment)
week 17 (Apr28)      : final project due
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Critical Dates

For a complete list of critical dates, consult the current UF academic calendar, available at
        https://catalog.ufl.edu/ugrad/current/Pages/adspring1314.aspx

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Jan 6     - classes begin
Jan 10    - last day to drop/add (11:59pm)
Jan 20    - Martin Luther King Jr. day, no classes
Mar 1-8   - spring break, no classes
Apr 24-25 - reading days, no classes
Apr 28    - final project due
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Required and Recommended Textbooks

This course has no required or recommended textbooks. Throughout the course and in association with assignments, links will be provided to freely-available online materials. Students are expected to thoroughly review all assigned online readings.

Student Assessment and Grading

Grades will be assigned based on percentage of total points possible on all assignments and final project, rounded to the nearest percent.

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98-100% A+    88-89% B+    78-79% C+    68-69% D+    <60% E
93-97%  A     83-87% B     73-77% C     63-67% D
90-92%  A-    80-82% B-    70-72% C-    60-62% D-
```

Grades and Grade Points

For information on current UF policies for assigning grade points, see
https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

Attendance and Make-Up Work

Requirements for class attendance and make-up exams, assignments and other work are consistent with university policies that can be found at
https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx

Online Course Evaluation Process

Student assessment of instruction is an important part of efforts to improve 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

Academic Honesty

As a student at the University of Florida, you have committed yourself to uphold the Honor Code, which includes the following 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." You are expected to exhibit behavior consistent with this commitment to the UF academic community, and on all work submitted for credit 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."

It is assumed that you will complete all work independently in each course unless the instructor provides explicit permission for you to collaborate on course tasks (e.g. assignments, papers, quizzes, exams). Furthermore, as part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct to appropriate personnel. It is your individual responsibility to know and comply with all university policies and procedures regarding academic integrity and the Student Honor Code. Violations of the Honor Code at the University of Florida will not be tolerated. Violations will be reported to the Dean of Students Office for consideration of disciplinary action. For more information regarding the Student Honor Code, please see
http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code

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.

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. 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/

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
> Wellness Coaching

. Career Resource Center, First Floor JWRU, 392-1601, www.crc.ufl.edu/

Student Complaints

Each online distance learning program has a process for, and will make every attempt to resolve, student complaints within its academic and administrative departments at the program level. See http://distance.ufl.edu/student-complaints for more details.