

Spring 2020

BNFO 230-002: Programming for Bioinformatics II (Revised for Remote Learning)

Junilda Spirollari

Follow this and additional works at: <https://digitalcommons.njit.edu/cs-syllabi>

Recommended Citation

Spirollari, Junilda, "BNFO 230-002: Programming for Bioinformatics II (Revised for Remote Learning)" (2020). *Computer Science Syllabi*. 75.
<https://digitalcommons.njit.edu/cs-syllabi/75>

This Syllabus is brought to you for free and open access by the NJIT Syllabi at Digital Commons @ NJIT. It has been accepted for inclusion in Computer Science Syllabi by an authorized administrator of Digital Commons @ NJIT. For more information, please contact digitalcommons@njit.edu.

BNFO 236: Programming for Bioinformatics II

Course Syllabus, Spring 2020

Course Description

An introduction to programming and problem solving skills using Python, a very high level language for Bioinformatics. Topics include string processing, lists, dictionaries, & tuples files, input & output, introduction and implementation of several programs for sequence analysis, including the Needleman-Wunsch algorithm for optimal sequence alignment and UPGMA for constructing evolutionary trees.

Recommended texts

Introduction to Bioinformatics by Arthur M. Lesk

Think Python by Allen B. Downey, 2nd edition. This is an open source book. It is available without charge in HTML and PDF formats at <http://greenteapress.com/wp/think-python-2e/>.

Programming in Python 3 with zyLabs – <http://learn.zybooks.com>

Other course materials:

- Python language can be gotten at <https://www.python.org/downloads/>. This includes the IDLE development environment, help files, modules and other parts of the standard distribution. You will need to get Python and install it on your personal desktop and/or laptop computer. You can download Python for Windows, Mac or Linux environments. There is no charge for Python.
- PythonTutor, a program for stepping through and visualizing the execution of Python code at pythontutor.com

Course Policies

Canvas (<http://canvas.njit.edu/>) will be used to post lecture notes, to submit homework and for course discussion.

Homework and projects must be submitted through Canvas by the beginning of class on the due date. They will not be accepted late except for special circumstances (such as jury duty or medical problem), for which you must provide documentation. All submitted work (including exams) must include your name, course, section and student ID.

You are encouraged to study and to work on assignments together with others, but you must always disclose collaboration and not take credit for the work of others. You must understand and be able to explain all work that you submit. Plagiarism will result in zero credit for the assignment or other penalty up to an XF grade in the course.

Topics to be covered

Introduction: Python

String processing, lists

Dictionaries & tuples

Files (input/output)

Comparing DNA sequences

Sequence alignment

Functions and random traceback

Needleman-Wunsch algorithm

Smith Waterman
Phylogeny reconstruction
UPGMA algorithm
Jukes Cantor distance matrices
Neighbor joining

Grading Formula

Homework & Programming assignments 20%
Two Midterms 25% each
Final Exam 30%

Midterm 2 Weight Distribution

1. zyBooks activities - 50%
2. Online assignment - 50%

Final Exam will be administered on Canvas, May 8th, 8:30am – 11:00am.

There are no makeup exams. Exams do not require any portable electronic devices, such as a mobile phone or calculator.

You should read the University Code on Academic Integrity (njit.edu/academics/integrity.php). It describes infractions of academic integrity and penalties for violations, including, for the most serious violations, an XF grade in the course or expulsion. All work that you represent as your own must, in fact, be your own. Work done by others must be given proper credit.

If you need accommodations due to a disability please contact Chantonette Lyles, Associate Director of Disability Support Services, Fenster Hall Room 260 to discuss your specific needs. A Letter of Accommodation Eligibility from the Disability Support Services office authorizing your accommodations will be required.

Students will be informed of any modifications of the syllabus during the semester.