



Introduction to Bioinformatic Computation

The University of Toledo

BRIM Program in Bioinformatics & Proteomics/Genomics BIPG8100 Intro to Bioinformatic Computation, Section 001, CRN #15301

Instructor:	Alexei Fedorov, PhD	Class Location:	127 HEB
Email:	Alexei.fedorov@utoledo.edu	Class Day/Time:	Mon/Wed, 3:15-6:15pm
Office Hours:	Mon, 8-9pm, or via Skype (Afedorov_lab), 8-9pm	Lab Location:	127 HEB
Office Location:	308 BHS Building	Lab Day/Time:	Mon/Wed, 3:15-6:15pm
Instructor Phone:	419-383-5270	Credit Hours:	3
Offered:	Spring		
Course Website:	Blackboard Learn (if applicable)		

CATALOG/COURSE DESCRIPTION

Use, design, understand strengths and limitations of bioinformatics programs run on desktop computers. Programming in PERL to acquire and analyze biological sequences. Construction and management of databases. Introduction to LINUX, C++, Python, and Java. Includes computer laboratory sessions.

COURSE OVERVIEW

Several programming languages are used in bioinformatics, but PERL still plays a central role due to its relative flexibility and ease of use. Students will learn the basics of working in the Linux environment and writing Perl programs relevant to bioinformatics. The strengths and limitations of bioinformatic analysis on desktop computers will also be discussed, along with the advantages and complications of using supercomputers. The course includes multiple computer laboratory sessions. The last portion of the course is devoted to a group project – in the past, some of these group projects have resulted in peer reviewed publications with the most-active students as co-authors.

STUDENT LEARNING OUTCOMES

- L1. Demonstrate basic familiarity with the Linux/Unix environment
- L2. Create basic PERL programs for extracting information from, or creating, databases
- L3. Describe the basic tasks needed to interface with supercomputers
- L4. Communicate competently with fellow team members in projects

TEACHING METHODOLOGY

There will be five introductory lectures at the beginning of this course, followed by work in the computer laboratory. Students will design Perl programs under the guidance of the Course Director. All classes will be in the face-to-face format. At the end of the course there will be a final project and exam (or take-home exam).

PREREQUISITES AND COREQUISITES

None. However, previous completion of BIPG5100 (Fundamentals of BPG) is recommended.

TEXTS AND ANCILLARY MATERIALS

No textbooks are required. Students will work with the information/instructions provided online



TECHNOLOGY REQUIREMENTS

None. Computers will be provided in the computer lab

ACADEMIC POLICIES

[Graduate Policies: http://www.utoledo.edu/policies/academic/graduate/](http://www.utoledo.edu/policies/academic/graduate/)

COURSE EXPECTATIONS

Homework time policy: There are ~15 homework assignments (one per week). Each homework assignment must be returned in seven calendar days by noon. (For example, for a Wednesday class this homework must be returned via email by the following Wednesday at 12pm).

OVERVIEW OF COURSE GRADE ASSIGNMENT

Grading principles:

Homework/project: 40%

Labs + activities: 20%

Mid-term exam 15%

Final Exam 25%

UNIVERSITY POLICIES

Policy Statement on Non-Discrimination on the Basis of Disability (ADA)

The University is an equal opportunity educational institution. Please read [The University's Policy Statement on Nondiscrimination on the Basis of Disability Americans with Disability Act Compliance.](#)

Students can find this policy along with other university policies listed by audience on the [University Policy webpage](#) (<http://www.utoledo.edu/policies/audience.html/#students>).

<https://www.utoledo.edu/title-ix/policies.html>

https://www.utoledo.edu/policies/administration/diversity/pdfs/3364_50_01.pdf

https://www.utoledo.edu/policies/main_campus/student_life/pdfs/3364_30_04_Student_code_of_conduct.pdf

Academic Accommodations

(Include the following, verbatim; please refer to the face-to-face syllabus guidelines for more guidance/details.)

The University of Toledo embraces the inclusion of students with disabilities. We are committed to ensuring equal opportunity and seamless access for full participation in all courses. For students who have an accommodations memo from Student Disability Services, I invite you to correspond with me as soon as possible so that we can communicate confidentially about implementing accommodations in this course. For students who have not established affiliation with Student Disability Services and are experiencing disability access barriers or are interested in a referral to healthcare resources for a potential disability or would like information regarding eligibility for academic accommodations, please contact the [Student Disability Services Office](#) (<http://www.utoledo.edu/offices/student-disability-services/>) by calling 419.530.4981 or sending an email to StudentDisability@utoledo.edu.

ACADEMIC AND SUPPORT SERVICES

Please follow this link to view a comprehensive list of [Student Academic and Support Services](#)

SAFETY AND HEALTH SERVICES FOR UT STUDENTS

Please use the following link to view a comprehensive list [Campus Health and Safety Services](#) available to you as a student.



COURSE SCHEDULE

- The first two weeks focus on the Linux environment. Students must learn a designated list of 30 commands with their main options. After one month, there is an exam on Linux use.
- Beginning in the second week of the course, and continuing until Spring break, the focus shifts to programming in PERL:
- In the second half of the course, students begin a real bioinformatics project, working as a single team. The goal is to attack one of the important problems/challenges in genomics and collect sufficient data for a publication. The most active students will be among the co-authors.

WEEK	DATES	TOPIC	LEARNING OUTCOME(S)	ASSIGNMENTS DUE
1	Jan 22	Linux	L1	TBD
2	Jan 27/29	Linux	L1	TBD
3	Feb 03/05	PERL	L2	TBD
4	Feb 10/12	PERL	L2	TBD
5	Feb 17/19	PERL	L2	TBD
6	Feb 24/26	PERL	L2	TBD
7	Mar 02/04	PERL	L2-3	TBD
8	Mar 16/18	PERL	L2-3	TBD
9	Mar 23/25	Project	L2-4	TBD
10	Mar 30	Project	L2-4	TBD
11	Apr 01	Project	L2-4	TBD
12	Apr 06/08	Project	L2-4	TBD
13	Apr 13/15	Project	L2-4	TBD
14	Apr 20/22	Project	L2-4	TBD
15	Apr 27/29	Project	L2-4	TBD

[Final exam week of May 4]