BMI 540: Computer Science and Programming for Clinical Informatics
Fall 2018

Overview
BMI540 provides an introduction to computer science and programming demonstrated through the Python programming language. In addition, the course includes the presentation of computer science principles, including spreadsheets, representation and storage of data, architecture, operating systems, and algorithms. The goal of this class is to expose clinical informatics students to programming in Python for common data manipulation and analysis tasks.

Prerequisites
Students should have knowledge of basic structured programming techniques prior to admission to the class; students should have completed at least one prior college level course in computer programming, such as Python, C, PERL, Visual Basic, C++, or Java. In addition, students must pass a pretest before enrolling in the course OR have completed the Intro to Programming online course at OHSU.

General Information

Dates:
September 24, 2018 – December 14, 2018

Instructor:
Michelle Hribar, PhD
Email: hribarm@ohsu.edu

Office hours:
By appointment

Required text:

Recommended texts:
Goals of the Course
The main goal of BMI 540 is to introduce students to the fundamentals of computer science and programming in Python. Specific topics for BMI 540 include:

- The history of computing
- Representation and manipulation of data
- Operating systems
- Algorithms, iterative and recursive structures, efficiency and correctness
- Fundamental data types, such as strings, integers, floats, etc.
- Control structures, such as if-then, while, etc.
- Functions
- Simple I/O from files.
- Data manipulations such as filtering and sorting
- Data visualization

Computing Environment
Students will be using their own computers to develop code in Python. Instructions will be given installing and using Python.

Instructions for turning in your work will be provided with each exercise and must be followed exactly for full credit.

Grading
The class will require completion of weekly homework assignments and two examinations. There will be discussions in the forums as well. The final grade will be determined with an approximate weighting of

- Participation 10%
- Homework 40%
- Quizzes 20%
- Final Exam 30%

Participation is defined as contributing to the discussion forums. Homework assignments must be turned in by the due date. Only assignments that are correct and complete upon submission by the original due date will receive full credit.

Learning to program can be very time consuming and frustrating, but the only way to learn is by doing. It is in your best interests to keep up with the homework assignments and the reading, as it is easy to get hopelessly behind. To encourage everyone to keep up, assignments that are not submitted on time will be penalized. Late assignments will be downgraded up to 10% per day. Assignments that are more than 10 days late will not be accepted.

Final grades are determined at the end of the quarter and usually are assigned as follows:
Graduate Studies in the OHSU School of Medicine is committed to providing grades to students in a timely manner. Course instructors will provide students with information in writing at the beginning of each course that describes the grading policies and procedures including but not limited to evaluation criteria, expected time needed to grade individual student examinations and type of feedback they will provide.

Class grades are due to the Registrar by the Friday following the week of finals. However, on those occasions when a grade has not been submitted by the deadline, the following procedure shall be followed:

1. The Department¹/Program Coordinator² will immediately contact the Instructor requesting the missing grade, with a copy to the Program Director and Registrar.
2. If the grade is still overdue by the end of next week, the Department¹/ Program Coordinator² will email the Department Chair directly, with a copy to the Instructor and Program Director requesting resolution of the missing grade.
3. If, after an additional week the grade is still outstanding, the student or Department¹/ Program Coordinator² may petition the Office of Graduate students for final resolution.

¹For courses that are run by a specific department.
²For the conjoined courses (course number is preceded by CON_ that are run by Graduate Studies.

**Academic Honesty**

Academic honesty is required in order to pass this course. Students are encouraged to help each other; nevertheless, all quizzes, written assignments and presentations must be the work of the individual student. Literature and resources (including Internet resources) employed in fulfilling
assignments must be cited. Likewise, students are expected not to collaborate on the answers
to homework problems that do not require programming, although discussion of the concepts
involved and working of similar problems together is permitted.

See http://www.ohsu.edu/xd/education/library/researchassistance/plagiarism.cfm?WT_rank=1 for
information on code of conduct for OHSU and http://www.ohsu.edu/xd/education/teaching-
and-learning-center/for-students/index.cfm for more information on citing sources and
recognizing plagiarism.

In an effort to uphold the principles and practice of academic honesty, faculty members at OHSU
may use originality checking systems such as Turnitin to compare a student's submitted work
against multiple sources.

To protect student privacy in this process, it will be necessary to remove all personal information,
i.e. student name, email address, student u-number, or any other personal information, from
documents BEFORE submission.

Commitment to Equity and Inclusion
Oregon Health & Science University is committed to creating and fostering a learning and
working environment based on open communication and mutual respect. If you encounter
sexual harassment, sexual misconduct, sexual assault, or discrimination based on race, color,
religion, age, national origin or ancestry, veteran or military status, sex, marital status,
pregnancy or parenting status, sexual orientation, gender identity, disability or any other
protected status please contact the Affirmative Action and Equal Opportunity Department at
503-494-5148 or aaeo@ohsu.edu. Inquiries about Title IX compliance or sex/gender
discrimination and harassment may be directed to the OHSU Title IX Coordinator at 503-494 -
0258 or titleix@ohsu.edu

Downloading course content
Students are encouraged to download and save course content (excluding videos) from
each class in Sakai while you are taking the class if you think you will want to refer to it
later. This is especially important for PhD students who will need to review content prior
to taking the qualifying exam. Save the course content to a local drive, not in Sakai.

Copyright Information
Every reasonable effort has been made to protect the copyright requirements of materials used
in this course. Class participants are warned not to copy, audio, or videotape in violation of
copyright laws. Journal articles will be kept on reserve at the library or online for student access.
Copyright law does allow for making one personal copy of each article from the original article. This limit also applies to electronic sources.

To comply with the fair use doctrine of the US copyright law, Sakai course sites close three weeks after grades are posted with the Registrar. Please be sure to download all course material you wish to keep before this time as you will have no further access to your courses.

**Use of Sakai**

This course will have an online component, which can be accessed through Sakai, OHSU’s online course management system. For any technical questions or if you need help logging in, please contact the Sakai Help Desk.

**Hours:** Sakai Help Desk is available Mon – Fri, 8 am – 10 pm and weekends and holidays 12 pm – 5 pm

**Contact Information:**

(Toll-free) 877-972-5249

(Web) http://atech.ohsu.edu/help

(Email) sakai@ohsu.edu

**Student Access**

OHSU is committed to providing equal access to qualified students with disabilities. Student Access determines and facilitates reasonable accommodations, including academic adjustments and auxiliary aids, for students with documented disabilities. A qualified student with a disability is a person who meets the academic and technical standards requisite to admission or participation in a particular program of study. As defined by the Americans with Disability Act (ADA), a person with a disability has a physical or mental impairment that substantially limits one or more major life activities of the individual. This may include, but is not limited to, physical conditions, chronic health issues, sensory impairments, mental health conditions, learning disabilities and ADHD. Student Access works with students with disabilities from all of OHSU’s educational programs and at each campus.

Each school has an assigned Program Accommodation Liaison (PAL), who acts as an “in-house” resource for students and faculty concerning access issues for students with disabilities. The PAL works in collaboration with Student Access to implement recommended accommodations for students with disabilities.

It is recommended that you contact Student Access to consult about possible accommodations if you a) received disability accommodations in the past, b) begin experiencing academic difficulties, and/or c) are given a new diagnosis from your healthcare provider.
Learn more about Student Access:

Phone: 503-494-0082

(Web) http://www.ohsu.edu/student-access

(Email) studentaccess@ohsu.edu

DMICE Communication Policy

1. If the syllabus directs the student to contact the TA before contacting the instructor, the student should do so. Otherwise, the student should contact the instructor and allow 2 business days (not including weekends) for a response.

2. If the student does not receive a response from the instructor within 2 business days, s/he should contact the TA (if there is one). When contacting the TA s/he should cc the instructor and Diane Doctor at doctord@ohsu.edu.

3. If a student does not receive a response from the TA within 1 business day (not including weekends), s/he should contact Diane Doctor at doctord@ohsu.edu and cc the instructor and the TA.

4. If Diane does not reply within 1 business day (not including weekends), the student should contact Andrea Ilg at ilgan@ohsu.edu.

5. Students having difficulties with Sakai should contact the Sakai Help Desk at sakai@ohsu.edu or at (877) 972-5249. Sakai help is available M-F from 8am to 10-pm and weekends from Noon to 5pm. Do not contact the instructor.

6. Please use professional etiquette when communicating with peers and the instructor. This means avoiding aggressive or offensive language, showing respect for others’ opinions and positions, and conducting yourself as if you were face to face with them. Please pay special attention to etiquette in class forums and when using email. If you notice someone violating this policy, please make the instructor and TA aware of the problem.
## Schedule of Topics (tentative)

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Readings</th>
<th>Homework</th>
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| 1    | The History of Computing  
      | Computer Basics  
      | Data storage & memory | Recommended: Brookshear, Ch. 0, 1 | Binary conversion |
| 2    | Manipulating data with spreadsheets | Online readings | Deidentify data |
| 3    | Graphing Data  
      | Computer Architecture | Recommended: Brookshear, Ch. 2 | Graphs |
| 4    | Python Overview  
      | Quiz #1 | Required: Downey, Chs. 1-3 |
| 5    | Conditional expressions, Iteration, Lists  
      | Algorithms | Required: Downey, Chs. 5, 7, 10  
      | Recommended: Brookshear, Ch. 5 | Searching/sorting program & algorithm analysis |
| 6    | Dictionaries, Tuples, Files  
      | Operating Systems | Required: Downey, Chs. 11, 12, 14  
      | Recommended: Brookshear, Ch. 3 | Storing data program |
| 7    | Networking  
      | Quiz #2 | Recommended: Brookshear, Ch. 4 |
| 8    | Pandas for data manipulation | | Recommended: Chen, Ch. 1 | De-identify data, pt. 2 |
| 9    | Graphing in Pandas  
      | Thanksgiving holiday | Recommended: Chen, Ch. 2 | Graphing data |
| 10   | Visualization using Tableau | Online readings | Pulling it all together |
| 11   | Final Examination | | |