

Syllabus

CSE 220: Systems Programming

University at Buffalo, Computer Science and Engineering

Spring 2026

Carl Alphonc

All students are expected to read and understand this syllabus. Failure to adhere to the policies in this syllabus may have consequences, including a negative impact on student grades, failure in the course, or administrative action against the student. It is your responsibility to ask questions if anything in this document is unclear to you.

This course is in-person and real-time. Students are expected to attend their assigned lecture unless they have a University-approved reason to miss.

Instructor

| | Office Hours | | |
|-------------------------------------|--------------|-------------|-----------|
| | | | |
| Carl Alphonc alphonc@buffalo.edu | Tue | 12:30–01:45 | Davis 343 |

Student Assistants

SA names and their office hours can be found on the SA office hours calendar on Piazza.

Sections

| Section | Course ID | Lecture Time | Location |
|---------------|-----------|-----------------|----------|
| CSE 220 LLB B | 19332 | MWF 08:00–08:50 | NSC 215 |
| CSE 220 LLB D | 21124 | MWF 09:00–09:50 | NSC 215 |

Course Website

<https://www.cse.buffalo.edu/courses/cse220/>

Locations, times, information regarding instructor and SA office hours, assignment deadlines, and other information can be found on the course web site.

1. Lectures

Lectures will be delivered on campus in their assigned locations. Students are expected to attend their assigned lecture unless they have a University-approved reason to miss. Attendance will not be regularly taken, but may be taken at any time at the instructor's discretion (and may affect grade outcomes per the quiz policy in Section 9. Lecture recordings will be provided after the fact for review, or for asynchronous viewing in the event that a student must miss lecture for a University-approved absence, on a best-effort basis.

2. Course Description

CSE 220 is a 4 credit course.

"This course is an introductory course on computer systems. It introduces computer systems from a programmer's perspective, rather than a system implementer's perspective, which prepares students for more advanced topics that discuss the internals of a computer system (e.g., operating systems or computer architecture). As a result, the focus of the course is teaching programmable interfaces of a computer system as well as how to use them correctly and effectively when writing a program. The topics mainly include hardware/software interfaces (e.g., data representation in memory) and OS/application interfaces (e.g., syscalls). In discussing these topics, the course gives an overview of a complete computer system, the hardware, operating system, compiler, and network, in order to guide students through various components that modern programs rely on to accomplish their intended purposes."

3. Prerequisites

- CSE 116
- Computer Science, Computer Engineering, Bioinformatics/CS, or Computational Linguistics major

Students are expected to have a firm understanding of the material from CSE 116 at the University at Buffalo and its prerequisites.

4. Course Materials

There are three required texts and one optional text for this course. Students are expected to have immediate access to the required texts throughout the semester.

| Title | Authors | ISBN | Required? |
|--|--|--------------------|-----------|
| The C Programming Language (Second Edition) | Kernighan and Ritchie | 978-0-13-110362-7 | Required |
| Computer Science from the Bottom Up | Ian Weinand | Online Publication | Required |
| Operating Systems: Three Easy Pieces | Arpaci-Dusseau, Arpaci-Dusseau, and Reiher | Online Publication | Required |

| Title | Authors | ISBN | Required? |
|--|-----------------------|-------------------|------------------|
| Computer Systems: A Programmer's Perspective (Third Edition) | Bryant and O'Hallaron | 978-0-13-409266-9 | Optional |

Students will be required to use TopHat for interaction during lecture, and will use the TopHat account associated with their UB credentials.

Lecture slides will be provided electronically throughout the semester.

Various readings from external sources may be assigned, in which case they will be provided or will be available through University resources (*e.g.*, the library or periodical subscriptions).

References to materials not required or assigned may be made, and students are encouraged to follow up on these references, but this will not be required for successful completion of the course.

5. Communication

All electronic communication from students to course staff regarding this course must occur in one of two ways:

- Messages on the course Piazza instance, or
- Email using your *official UB email account*.

For topics of a sensitive nature, please email your lecture instructor directly from your University-supplied email address. Emails from non-University addresses will be disregarded due to privacy concerns and FERPA regulation. For *all other contacts*, please do **NOT** email the course instructor directly; instead, make a private or public post to Piazza, as appropriate. Private posts of non-sensitive nature should be sent to *all course staff*. This will ensure the most timely possible response. For matters regarding a specific lab section, contact the lab assistants first, as they may be able to help resolve your issue without involving the rest of the course staff.

Students are expected to monitor the course Piazza instance and UBlerns classroom on a daily basis, checking it on every day that the University is open, as important course announcements will be posted to Piazza. Schedule changes, lab and assignment handouts, homeworks, required readings, and other materials may be posted to Piazza, and it is the student's responsibility to keep track of these things. Failure to read Piazza messages will not be accepted as an excuse for missed projects, labs, exams, or other course requirements.

Students will be added to the Piazza instance by the course instructor. If you are not, please contact the instructor by email to rectify this.

6. Course Requirements

The following items are required of every student, and failure to complete them may affect student grades as described in Section 9, *Grading Policy*, below.

6.1. General

Students must attend every lecture, and must attend the lecture section for which they are officially registered. Lecture activities (primarily in the form of lecture quizzes) will be used to evaluate progress in understanding lectures, but completing the activities without thoroughly understanding the lecture material and assigned readings will not be sufficient to ensure success on projects and exams.

Videos containing course content will generally be released for each lab session. Students must watch these videos prior to their lab. Lab section attendance is required, and students must show up for their assigned lab section unless prior arrangements have been made. Students are expected to work on the assigned lab during their assigned lab section, and the intention is that most students will complete their lab assignments during the lab section.

It will be assumed that students are familiar with all material presented in class, and any material presented in lecture or lab may appear on any test, quiz, assignment, or other evaluation. *Attendance and attention to lecture and lab materials are critical to success in this course.*

A quiz evaluating students' understanding of the University and Department academic integrity policies must be completed by all students, and all students must achieve 100% accuracy on this quiz.

6.2. Attendance

Lecture attendance will be tracked via participation in lecture activities. Lab attendance will be tracked via sign-in sheets. Students must participate in lecture activities *in person during their assigned lecture* for at least 60% of the lecture periods in which lecture activities are assigned. Attendance in lecture periods other than the student's assigned lecture will not be tracked and will not be counted toward attendance. Lectures missed for intermittent excused reasons will not be excused from this calculation; a student who can make fewer than 60% of the course lectures for health or other structural reasons should contact Accessibility Resources and the course instructor for accommodations.

6.3. Assignments

Several programming assignments will be required of all students.

Lab activities are activities intended to be completed during the weekly lab sessions. They may range from small programming exercises to written activities to group discussions and beyond. Students are expected to participate fully in lab and will be evaluated accordingly. Course staff will be available in labs to assist students, guide tasks, and present additional course material.

Programming assignments are significant programming tasks intended to improve student understanding of the course material as well as demonstrate student mastery of certain core concepts. Programming assignments are to be done outside of lab time.

Programming assignments and lab activities, unless otherwise explicitly specified, are *individual activities*, and collaboration between students or use of unauthorized resources, tools, or websites to complete any such assignment is a violation of the course academic integrity policy.

Readings will be assigned regularly, and students are expected to complete these readings in a timely fashion (no later than one week after they are assigned). Readings are selected to improve student

understanding of the course material and/or present auxiliary material that the instructor believes is relevant and important. Material from readings may appear directly or indirectly in assignments, on quizzes, or on exams.

6.4. Lecture Activities

There will be regular graded activities (primarily quizzes) during lectures. These activities will cover past and current lecture content, material related to labs and assignments, and assigned readings. Activities will be used but not evaluated for points in the first week of classes, in order to allow time for students to get the appropriate tools set up. At the conclusion of the semester, the scores for the lowest six days of each student's lecture activities will be dropped from the score calculation. This is to account for unavoidable absences due to illness or other University-approved reasons, and occasional technology failures. There will be no make-up for lecture activities, and activities from a lecture section other than a student's assigned lecture will not be recorded; a missed activity is simply missed.

6.5. Exams

There will be one midterm and one final exam. The midterm exam will cover all material presented in the course to date, including: lectures, labs, programming assignments, written homework assignments, and assigned readings. The (cumulative) final exam will cover all material covered in the course for the duration of the semester, including: lectures, labs, programming assignments, written homework assignments, and assigned readings.

There will be three practical lab exams administered during scheduled lab time. Each lab exam will cover material that has previously been demonstrated in labs and programming assignments. Lab exams will require students to develop a program or portion of a program during lab time, and must be completed and submitted in lab under the supervision of course staff. A single make-up lab exam will be offered after the last day of classes for students who need to make up an earlier exam (see Section 7.2, *Make-up Policy*, below).

6.6. Submission Policy

Programming assignments will be assigned with a deadline. All assignments are to be submitted by this deadline. In the event of any ambiguity in the deadline, times are assumed to be in the *current local time zone of the University*. Penalties for missing this deadline are as follows.

- Projects submitted before the deadline will incur no penalty.
- Projects submitted after the deadline, but within 24 hours of the deadline (Saturday, Sunday, and University holidays do not count toward these 24 hours) will incur a penalty of 20% of the possible score.
- Projects submitted more than 24 hours after the deadline as described above will not be accepted and will receive no credit.

Neither the instructor nor the student assistants are obligated to provide assistance for programming assignments after the assigned deadline.

Lab activities are due on the Friday following their assignment at 23:59. No late submissions for lab activities will be accepted.

7. Programming Assignment Re-grading Policy

If you believe that a programming assignment has been graded incorrectly, you may submit it for re-grading. A request for a re-grade must be submitted within *one calendar week* of receiving the grade for a project, and must include:

- The original score achieved on the assignment
- A description of the specific error in grading that is being contested
- Relevant code demonstrating the submitted code's correctness or the grading script's incorrectness, if available

Re-grading of programming assignments is intended *only* to address errors in grading. No grades will be improved for any other reason, although they may be reduced; in particular, note that *your grade on any part of the assignment, not just the portion being re-graded, may be reduced* if re-grading discovers additional errors. This includes automated evaluations that passed because they did not trigger bugs that were discovered in manual evaluation for the re-grade, or bugs that show up only intermittently that happen to be encountered on the re-grade.

7.1. Exam Re-grading Policy

If you believe that an exam has been graded incorrectly, you may submit it for re-grading. A request for a re-grade must be submitted within *one calendar week* of the exam being returned to you, must be submitted in writing (email is acceptable) to the instructor, and must include:

- The original, unmodified, exam answer
- A clear statement of the error

Re-grading of exams is intended *only* to address errors in grading. No grades will be improved for any other reason, although they may be reduced if *errors are found in any portion of the assignment, not just the portion being re-graded*. Using re-grading as a bargaining tool to increase your score is likely to result in a lower grade, as the exam will be scrutinized in detail for errors that may have been missed the first time.

7.2. Make-up Policy

No deadline extensions or make-up work will be permitted except for approved University absences. Please see the University attendance policy for more information.

There will be no make-up for lecture activities even for approved absences. Instead, each student's lowest six lecture activity days will be dropped.

No make-up exams will be given whatsoever except for **documented extreme circumstances**. *24 hours of advance notice via e-mail must be provided if at all possible* before missing an exam session. If advance notice is not possible, documentation supporting this must be provided. Absence from an exam session due to illness **must** be supported by a note from a physician specifying that the student was too ill and/or contagious to attend on the exam date.

You are responsible for remembering and attending exam sessions. Please use extra assistance to remind yourself if necessary.

8. Course schedule

The order of course topics, and important dates (including exam dates and times), is provided here for convenience. Note that course staff do not schedule some of the following items, including final exam time and location. *You are responsible for verifying your final exam time and location on HUB.* Inclement weather, local emergencies, unsafe building and/or campus environments, or other circumstances may cause the University to change this schedule. Course progress and pedagogical concerns may cause rescheduling of lectures, exams, and activities, or changes to required readings. You will be notified via Piazza or UB email of changes within the control of course staff. Course staff will attempt to keep you apprised of changes outside of staff control, but you are responsible for monitoring University communications to this effect.

8.1. Due Dates

You are responsible for monitoring any changes to this schedule, according to communications from course staff or the University. Failure to be aware of schedule changes is not sufficient reason for extended deadlines, make-up exams, or other accommodations.

| Date | Description |
|--------------------|---|
| 2026-02-03 | Programming Assignment 0 is due 23:59 |
| Week of 2026-02-16 | Lab Exam 1 (in lab) |
| 2026-02-17 | Programming Assignment 1 is due 23:59 |
| 2026-02-25 | Programming Assignment 2 part 1 is due 23:59 |
| 2026-03-03 | Programming Assignment 2 part 2 is due 23:59 |
| 2026-03-11 | Midterm Exam (in lecture) |
| Week of 2026-03-16 | Spring Break |
| Week of 2026-03-23 | Lab Exam 2 (in lab) |
| 2026-03-31 | Programming Assignment 3 is due 23:59 |
| 2026-04-21 | Programming Assignment 4 is due 23:59 |
| Week of 2026-04-20 | Lab Exam 3 (in lab) |
| 2026-05-04 | Final Review (in lecture) |
| 2026-05-05 | Programming Assignment 5 is due 23:59 |
| 2026-05-06 | Lab Exam Make-up |
| 2026-05-12 | Final Examination - tentative - verify in HUB |

8.2. Topic Coverage

The topics to be covered in the course are provided in the following table, and are subject to revision. Readings are indicated as:

- K&R: *The C Programming Language* by Kernighan and Ritchie
- CS:APP: *Computer Systems: A Programmer's Perspective* by Bryant and O'Hallaron

- OSTEP: *Operating Systems: Three Easy Pieces* by Arpaci-Dusseau, Arpaci-Dusseau, and Reiher (online)
- CSBU: *Computer Science from the Bottom Up* by Weinand (online)

Readings from CS:APP are optional. There may be additional required readings to be determined, but those readings will be available to registered students free of charge.

| Topic Description | Reading |
|-------------------------------------|--|
| Introduction to CSE 220 | This syllabus; Academic Integrity policy |
| Introduction to C | K&R Introduction, Ch. 1, Ch 2: Intro, 2.1–2.4, 2.6, Ch. 3: 3.1–3.7 |
| A Tour of Computer Systems | CS:APP Ch. 1: 1.1–1.7 |
| Memory Allocation | K&R Ch. 5: Intro, 5.1–5.4 |
| Structs and Allocation | K&R: Ch. 2: 2.7; Ch. 6: Intro, 6.1–6.7 |
| Alignment, Padding, and Packing | K&R Ch. 5: Intro, 5.1–5.7; Ch. 6: Intro, 6.1–6.7; CS:APP Ch. 3: 3.8.1–3.8.3, 3.9.1, 3.9.3 |
| Process Anatomy | K&R Ch. 4; CS:APP Ch. 3: 3.1, 3.7 |
| Integers and Integer Representation | CSBU Ch. 2: through 1.1.3, 1.2, part 2 except 2.3.2; CS:APP Ch. 2: Intro, 2.1–2.1.3, 2.2 |
| Bitwise Operations | K&R Ch. 2: 2.9; Appendix A: A7.4.6, A7.8, A7.11–A7.13; CSBU Ch. 2: 1.1.4, 1.1.5, 1.3; CS:APP Ch. 2: 2.1.6 and 2.1.7 |
| Dynamic Memory Allocation | |
| Virtual Memory | CSBU Ch. 6: 1–4, 7, 8.1, 8.2; CS:APP Ch. 1: 1.7.3; Ch. 9: Intro, 9.1–9.4 |
| Processes, Threads, and Concurrency | OSTEP Ch. 26: Intro, 26.1; CS:APP Ch. 8: 8.2; Ch. 12: Intro, 12.1, 12.3 |
| Races and Synchronization | OSTEP Ch. 26: 26.2–26.6; CS:APP Ch. 12: 12.4–12.7 |
| POSIX Threads and Synchronization | OSTEP Ch. 26, Ch. 27; CS:APP Ch. 12: 12.3, 12.5–12.7 |
| The Kernel and User Mode | CSBU Ch. 4; CS:APP Ch. 8: 8.1, 8.2 |
| Input and Output | CS:APP Ch. 10: 10.1–10.4, 10.10–10.12 |
| Caching and Locality | CSBU Ch. 2: all except 2.2.1; CS:APP Ch. 6: Intro, 6.1–6.3, 6.5–6.7 |

9. Grading Policy

No "I" (Incomplete) grades will be given for this course except for **documented extreme circumstances** or situations required by University policy. *Failure to complete work on time does not constitute an extreme circumstance.*

Grades will not be changed at the end of the semester for any reason other than a documented error in grading according to the policies outlined in Section 7 and Section 7.1. No grade negotiation will be permitted. In particular, no grades will be changed to preserve scholarships, fellowships, University

positions, immigration status, internship or job offers, or any other outside factor. Grades reflect student performance and mastery of course material.

The credit breakdown for the course will be as follows:

| Course Requirement | Course Grade | Percent |
|--|--------------|---------|
| Less than 100% on Academic Integrity quiz | F | N/A |
| Less than 100% on Lab 01 | F | N/A |
| Attendance at < 60% of days with lecture questions | F | N/A |
| Weighted exam average of < 60% | F | N/A |
| Programming Assignment 0 | | 5% |
| Programming Assignment 1 | | 5% |
| Programming Assignment 2 | | 5% |
| Programming Assignment 3 | | 5% |
| Programming Assignment 4 | | 10% |
| Programming Assignment 5 | | 5% |
| Lab Activities | | 10% |
| Lecture Activities | | 10% |
| Lab Exams | | 15% |
| Midterm Exam | | 15% |
| Final Exam | | 20% |

Note that this adds to 105%. This means that students who do all of their assigned, graded work have the opportunity to receive up to 5% extra credit in the course.

Lecture activities will be counted on a *per-day* basis, and each day of participation will be weighted equally. The number of points and number of activities during each individual lecture may vary, and the day's average will be computed out of the total possible points for that day. Each student's six lowest daily scores will be dropped, and the resulting average used as the course component.

Final grades will be assigned from the above percentages as follows, although individual component scores may be adjusted or a curve of the instructor's choice may be applied if the instructor deems it warranted. Lower percentages are inclusive, upper percentages (excepting 100%) are not; that is, a 90.0% would be an A-, not a B+.

| | | | | | | | | |
|----|--------|--------|--------|--------|--------|--------|--------|----------|
| | B+ | 87–90% | C+ | 77–80% | D+ | 67–70% | | |
| A | 95+% | B | 83–87% | C | 73–77% | D | 63–67% | F 0 –63% |
| A- | 90–95% | B- | 80–83% | C- | 70–73% | | | |

10. Behavioral Expectations

Students are expected to behave in a way that is respectful to their fellow students and the course staff, and uphold the CSE values.

In addition, the University at Buffalo has a list of behavioral expectations.

In summary, avoid disrupting the classroom via late arrivals or early departures; distracting behaviors such as talking, watching videos, playing games, or viewing non-course content; eating and drinking; *etc.*

11. Academic Integrity

Students will abide by the CSE Academic Integrity Policy, the University Academic Integrity Policy, and the Undergraduate or Graduate amendments thereof, as appropriate.

The Academic Integrity policy for this course can be found on Prof. Blanton's web site, under Policies. You should read it for additional information and clarifications not found here.

All resources used in completing assignments for this class *must be given appropriate attribution*, and the *only resources allowed for the completion of programming assignments, activities, and exams without specific permission* are as follows.

- The specific required and optional textbooks listed in Section 4, *Course Materials*
- Lecture material from this course
- Required or recommended readings from lecture material
- Man and info pages on `emon.cse.buffalo.edu`

In particular, Stack Exchange, code from other students in the course or students who have completed this course or related courses at other universities in previous semesters, GitHub repositories, code or algorithms from other web sites or books, and other resources are not allowed without explicit permission from the instructor.

Generative artificial intelligence (AI) or large language models (LLM) are not permitted resources for this course. This includes sites and technologies such as ChatGPT, Bard, the conversational interfaces on search engines like Bing or Google, and GitHub Copilot, as well as *all other* AI assistants. Usage of these AI technologies to produce material to be turned in for this course, to assist with producing or understanding material in this course, to debug programs for this course, or any other purpose related to this course, is a violation of the course academic integrity policy.

If there is any question about whether a resource is acceptable for use in completing a course assignment, students are encouraged to ask the instructor or a SA *before* making use of it. Asking about a resource is **not** a violation of academic integrity, even if the resource is not allowed for the course.

Quizzes and exams may have further restrictions on allowable resources; for example, a student's own work from previous assignments may not be an allowable resource on an exam.

Participating in in-person activities from a remote location (eg, answering TopHat questions) for credit is a violation of academic integrity. Misrepresenting attendance records in lecture, lab, or lab exams is a violation of academic integrity.

Violation of these policies will result in a failing grade for the course and referral upward for additional sanctions according to University policy.

11.1. Sharing Course Materials After Completion

Sharing of course materials *after* completing this course is also a violation of the academic integrity policy for this course, as discussed in the University AI policies under “Improper Distribution of Course Materials.” Materials used in this course, including project handouts *and your own project implementations* remain a part of this course after you complete it. Sharing those materials after completing this course may still constitute an academic integrity violation. Academic integrity proceedings may be started **even after you have passed this course**.

In particular, be aware that if you post your course project materials in a public place after completing the course, **you may be subject to academic integrity proceedings**. This can result in a **retroactive failure** in this course, which will render you ineligible for enrollment in any courses that require CSE 220 or for graduation until you retake this course..

11.2. Amnesty for Violations of Academic Integrity

A student who has committed a violation of this academic integrity policy may receive limited amnesty for the violation by *notifying the instructor, in writing, of the violation before assessment of the violating assignment has begun*. This notification must include the student’s name, person number, UBIDname, and state the assignment in question and the nature of the violation. Upon submitting such a statement, the student will receive no credit for the violating assignment, but *no further sanctions will be taken, and the violation will not be reported*. Once I have begun assessing the assignment in question, no such statements will be permitted. Since it may not be obvious to students when assessment begins, such statements should be submitted as soon as possible after the violation occurs. While assessment may begin at any time, in general I will not look at student submissions until a project deadline has passed.

See Prof. Blanton’s online Academic Integrity Policy for an example scenario and more information.

12. Program Outcomes and Competencies

This course is designed to fulfill a specific role in your education here at the University at Buffalo, as part of a larger curriculum to provide you with the foundations to propel you into a successful career as a computer scientist or engineer. As a 200-level course, CSE 220 provides less structure and requires more personal responsibility than 100-level courses, but in turn provides more structure and guidance than 300- and 400-level courses. You will learn not only technical details and skills, but also apply personal time management and study skills in ways that may be new to you.

12.1. Learning Objectives

Students who pass CSE 220 with an A or B will have demonstrated, through examination or practical implementation, substantial mastery of the topics listed here. Students who pass CSE 220 with a passing but lesser grade will have demonstrated competence appropriate for moving on to future courses at UB in the topics listed here.

Numeric Representations: Students will translate decimal integers to and from their binary representation.

Memory Organization: Students demonstrate an ability to manipulate user-space memory in a Unix process via address calculation and direct manipulation by pointer casting. They will show the ability to identify the relevant sections of a statically-linked Unix process (text, data, BSS, stack, and heap).

Computer Architecture: Students identify the various logical elements of a modern computer, including CPU, cache, main memory, secondary storage, and data and address busses. They demonstrate an understanding of the various levels of memory in the storage hierarchy, including CPU registers, various levels of cache, main memory, and secondary local or remote storage. They will demonstrate the ability to calculate memory alignments and identify certain caching effects.

Operating Systems: Students will explain the basic duties of an operating system, including: the process abstraction, isolation of user-space processes, management and sharing of hardware resources, memory protection and virtual memory management, and the system call interface.

Concurrency: Students will implement simple multi-threaded data structures. They will demonstrate the ability to use mutual exclusion to protect critical sections and enable the safe sharing of memory between threads in an application.

12.2. ABET Accreditation Outcomes

This course is required in both the BS Computer Engineering program, accredited by the Engineering Accreditation Commission (EAC) of ABET, and the BS Computer Science program, accredited by the Computing Accreditation Commission (CAC) of ABET.

The course introduces students to the following CAC student outcomes, for which graduating students must demonstrate:

- (CAC-1)** Analyze a complex computing problem and apply principles of computing and other relevant disciplines to identify solutions.
- (CAC-2)** Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.
- (CAC-6)** Apply computer science theory and software development fundamentals to produce computing-based solutions.

The course introduces students to the following EAC student outcomes, for which graduating students must demonstrate:

- (EAC-1)** an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
- (EAC-7)** an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

Student outcomes will be evaluated as follows.

| CAC 1 | CAC 2 | CAC 6 | EAC 1 | EAC 7 | Assessment Types |
|-------|-------|-------|-------|-------|-------------------------|
| ✓ | ✓ | ✓ | ✓ | ✓ | Programming Assignments |
| ✓ | ✓ | ✓ | ✓ | ✓ | Lab Activities |
| ✓ | ✓ | ✓ | ✓ | | Lab Exams |
| ✓ | | | ✓ | | Exams |

13. Accessibility Resources

From the UB Reasonable Accommodation Policy:

"The University at Buffalo is committed to providing equal access to individuals with disabilities, including physical access to programs and reasonable accommodations for members of the university community."

If you have any disability which requires reasonable accommodations to enable you to participate in this course, please contact the Office of Accessibility Resources in 60 Capen Hall, 716-645-2608, and also the instructor of this course during the first week of class. The Office of Accessibility Resources will provide you with information and review appropriate arrangements for reasonable accommodations, which can be found on the web at: <http://www.buffalo.edu/studentlife/who-we-are/departments/accessibility.html>.

14. Critical Campus Resources

Sexual Violence UB is committed to providing a safe learning environment free of all forms of discrimination and sexual harassment, including sexual assault, domestic and dating violence and stalking. If you have experienced gender-based violence (intimate partner violence, attempted or completed sexual assault, harassment, coercion, stalking, etc.), UB has resources to help. This includes academic accommodations, health and counseling services, housing accommodations, helping with legal protective orders, and assistance with reporting the incident to police or other UB officials if you so choose. Please contact UB's Title IX Coordinator at 716-645-2266 for more information. For confidential assistance, you may also contact a Crisis Services Campus Advocate at 716-796-4399.

Counseling Services Students may experience a range of issues that can cause barriers to learning or reduce their ability to participate in daily activities. These might include strained relationships, anxiety, high levels of stress, alcohol/drug problems, feeling down, health concerns or unwanted sexual experiences. Counseling, Health Services, and Health Promotion are here to help with these or other concerns. Students can learn more about these programs and services by contacting:

- Counseling Services:
 - 120 Richmond Quad (North Campus), 716-645-2720
 - First Floor Michael Hall (South Campus), 716-829-5800
- Student Health Services:
 - 4350 Maple Road (at Sweet Home), 716-829-3316
- Health Promotion:
 - 114 Student Union (North Campus), 716-645-2837

Acknowledgments

This syllabus was developed by Ethan Blanton, Carl Alphonse, and Erik Mikida.

Some language in this syllabus is drawn from University policies (as noted), the UB Course Syllabi Requirements document, department guidelines, and other University resources. Some language

and structure in this syllabus is drawn from Steve Ko's CSE 486/586 syllabus from Spring 2017 and from Matthew Hertz's CSE 115/503 syllabus from Spring 2019. Additional improvements were made by Karthik Dantu in 2019.