Introduction to Computer Science I

University at Buffalo
Department of Computer Science & Engineering
338 Davis Hall – (716) 645-3180

Syllabus

Please read this sheet carefully, and save it for future reference.

Instructor

<table>
<thead>
<tr>
<th>Name</th>
<th>Office</th>
<th>Email</th>
<th>Office Hours</th>
</tr>
</thead>
</table>
| Dr. Matthew Hertz | 352 Davis| mhertz@buffalo.edu | Mon. 1:00 – 1:55PM
|               |          |                    | Wed. 1:00 – 1:55PM & 4:00 – 4:50PM
|               |          |                    | Fri. 4:00 – 4:50PM           |

Teaching Assistants

See course website.

Course Information

Credit hours: 4 credits
Website: [https://cse.buffalo.edu/~mhertz/courses/cse115/](https://cse.buffalo.edu/~mhertz/courses/cse115/)

Course Description

Provides the fundamentals of computer science with an emphasis on applying programming skills to solve problems and increase human efficiency. Topics include variables, data types, expressions, control flow, functions, input/output, data storage, networking, security, selection, sorting, iteration and the use of aggregate data structures such as lists and more general collections. No previous programming experience required.

The course website contains a detailed, day-by-day schedule of topics to be covered.

Learning Outcomes

Course Learning Outcomes

Students who successfully complete this course will be able to:

1. Describe how course topics are used to solve real-world problems
2. Describe computational solutions to a problem they are given
3. Read and trace code
4. Translate an algorithm to a working computational solution in two or more programming languages
5. Relate a new problem to prior examples and adapt the extant solution
6. Describe the source of a bug or failure in code
7. Explain the security impacts of course topics

Program Outcomes and Competencies

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 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-4) an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
This course introduces students to the following CAC student outcomes, for which graduating students must demonstrate:

(CAC-1) Analyze a complex computing problem and to 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-4) Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
(CAC-6) Apply computer science theory and software development fundamentals to produce computing-based solutions.

### Student Learning Outcomes mapping

<table>
<thead>
<tr>
<th>Course Learning Outcome</th>
<th>EAC 1</th>
<th>EAC 4</th>
<th>CAC 1</th>
<th>CAC 2</th>
<th>CAC 4</th>
<th>CAC 6</th>
<th>Sample Assessment Method</th>
<th>Assessment types</th>
</tr>
</thead>
<tbody>
<tr>
<td>Describe how course topics are used to solve real-world problems</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Give students real-world problems that have a clear programming solution and ask them to describe a solution to the problem.</td>
<td>Programming Assignments Lab Activities Recitation Activities Exams</td>
</tr>
<tr>
<td>Describe computational solutions to a problem they are given</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td>Assess the students’ ability to provide functioning software that solves a given problem.</td>
<td>Programming Assignments Recitation Activities Lab Activities</td>
</tr>
<tr>
<td>Read and trace code</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>Provide the students with coding samples and ask them about the result after running the code.</td>
<td>Exams</td>
</tr>
<tr>
<td>Translate an algorithm to a working computational solution in two or more programming languages</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
<td>Give the students an algorithm and test the functionality of the code they provide after implementing the algorithm in code.</td>
<td>Programming Assignments Recitation Activities Lab Activities</td>
</tr>
<tr>
<td>Relate a new problem to prior examples and adapt the extant solution</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>Provide students with problems that are very similar to ones covered previously in the course.</td>
<td>Lab Activities Recitation Activities Exams</td>
</tr>
<tr>
<td>Describe the source of a bug or failure in code</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>Provide students with code containing an error and ask them to identify the cause of the error.</td>
<td>Exams</td>
</tr>
<tr>
<td>Explain the security impacts of course topics</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>Provide examples of secure and insecure code. Ask the students to identify the causes of insecurity and explain the impact.</td>
<td>Lab Activities Exams</td>
</tr>
</tbody>
</table>

### Prerequisites

Pre-calculus (MTH 115 or ULC 148) or appropriate math placement test scores or co-requisite of Calculus 1 (MTH 121 or MTH 131 or MTH 141). **If you are currently taking ULC147, ULC148 or MTH115 you have NOT satisfied this prerequisite!**

### Textbook

There is no textbook for the course. All needed materials will be provided on the course website. All sections will use the TopHat student response system during lecture.
Computing Resources
You will be provided with a CSE undergraduate computing account. You may use the undergraduate lab facilities in Baldy 21. These facilities are available for use as listed on the course website. They are on card-access - use your UB card to open the door. For your own safety, and to protect the equipment in the lab, do not open or hold the door open in order to allow other people to gain entry to the lab. All students authorized to use the lab have card access.

Information about the CSE computing environment can be found at, https://wiki.cse.buffalo.edu/services/

You are expected to use your UB e-mail account for all communications with course staff. Always include your full and an informative subject line for your e-mail. Any communications with course staff (professors and teaching assistants) are expected to be professional.

Course Requirements
The course has both a lecture, a lab, and a recitation component. If you do not participate fully in all you should not expect to do well in the course. Outside of the scheduled course times, both office hours and your own study times are critical components of the course.

Lectures
The conceptual and theoretical course content will be delivered primarily in the lectures. You are expected to use your notes from each lecture to prepare for later assessments. You must attend your assigned section unless previous arrangements have been made with the instructor.

Attendance in all lectures is required because it is critical to your success. If you must miss a lecture, slides showing the key points will be posted on the course webpage and a video of the lecture will be posted to UBLearns. If you are out of class for an extended period of time because of sickness, notify your instructor as soon as possible, and see your instructor immediately upon your return in order to determine how to catch up. If you have missed a significant portion of the semester it is recommended that you resign from the course.

Recitations
The recitations provide an initial chance to test your understanding of the material under the care of a TA. Each recitation will have you work in a group answering questions about the material from the prior week. Attendance in all recitations is critical to your success in the course. Your recitation work is assessed, and contributes to your overall course grade. You must attend only your assigned section unless previous arrangements have been made with the instructor.

Labs
The labs are an integral part of the course. Attendance in all labs is critical to your success in the course. In each lab section, the TAs will cover material pertinent to the current assignment. Your lab activities and lab exams must be performed entirely on the lab's machines and will be assessed. These assessments contribute to your overall course grade and you cannot use any outside resources unless they have been explicitly authorized for that assignment. You must attend only your assigned section unless previous arrangements have been made with the instructor.

Time outside of class
Office hours offer you the opportunity to ask more individual questions about the course material than can typically be addressed in lecture. Both the instructors and the teaching assistants have scheduled office hours. Office hours are first-come first-served and no appointment is needed. To make the most of office hours, please plan ahead. Office hours will be very busy around course deadlines and exams.

Individual appointments with the instructor may be arranged, if needed, as schedules allow.

In this course, as in any course, you are expected to put in additional study time beyond the scheduled class times. Professors generally expect that for each credit hour a class carries a typical student will put in 2 – 3 hours of time each week outside of class. Since this is a 4-credit course that translates into 8 – 12 hours of time outside of lecture, lab, and recitation times, each week. As a rough guide, you should expect to spend at least the following time working on this course, each week: lectures (3 hours) – lab (2 hours) – recitation (1 hour) – programming assignments, programming practice, and individual study (8 hours).
Course Requirements and Grading Policy
The following indicates the grade breakdown which will be used in assigning grades in the course. If adjustments are needed during the term, changes will be communicated via e-mail to each student’s UB e-mail account in accordance with policy.

The course is graded out of 1000 possible points, distributed as follows:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Quantity</th>
<th>Total points</th>
<th>Details</th>
<th>Date(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lab activities</td>
<td>6</td>
<td>90</td>
<td>Lab activities allow students to put into practice knowledge and skills presented in lecture.</td>
<td>Weeks 3, 4, 6, 7, 9, 10, and 12.</td>
</tr>
<tr>
<td>Lab exams</td>
<td>4</td>
<td>320</td>
<td>Lab exams are used to assess student mastery of hands-on software development knowledge and skills.</td>
<td>Weeks 5, 8, 11, and 14</td>
</tr>
<tr>
<td>Recitation activities</td>
<td>9</td>
<td>90</td>
<td>Recitation activities are used to provide practice with the material in a team-based environment with plenty of TA support. Most topics will be covered in recitations the week before students will use them in labs.</td>
<td>Weeks 3, 4, 5, 6, 7, 8, 9, 10, 11, and 12</td>
</tr>
<tr>
<td>Student response questions</td>
<td>Varies per lecture</td>
<td>50</td>
<td>Students will be asked questions throughout the lecture. A student response system (TopHat) is used to provide immediate feedback on students’ understanding of lecture content.</td>
<td>Most lectures will include 1 or more questions</td>
</tr>
<tr>
<td>Attendance</td>
<td>30</td>
<td>10</td>
<td>At the start of each lecture, the student response system (TopHat) will provide a code that students must enter. To receive credit, students must enter that code from within the lecture hall within the first 10 minutes of class.</td>
<td>Every lecture after add/drop EXCEPT classes on Mar. 11, Mar. 13, and Apr. 3</td>
</tr>
<tr>
<td>Programming project</td>
<td>2</td>
<td>120</td>
<td>The two-part project gives students an opportunity to work on a substantial piece of code.</td>
<td>Weeks 10 and 14</td>
</tr>
<tr>
<td>Written exams</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Midterm exam &amp; Final exam</td>
<td>2</td>
<td>320</td>
<td>A 60-minute written exam.</td>
<td>Thursday, April 2 9:00 – 10:00 pm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Check HUB for the final exam date &amp; time</td>
</tr>
</tbody>
</table>
Making up missed work
Missed work is handled in different ways.

Recitations
Course grades will only use students’ 9 highest recitation activities. This means students can miss one recitation without penalty. No make-up will be offered for that first absence: the missing grade is simply dropped from course grade calculations. For students with no recitation absences their lowest recitation grade will be dropped from calculations.

Any additional absence must be properly documented. For documented absences meeting the university's excused absence standards (see https://catalog.buffalo.edu/policies/attendance.html), arrangements will be made to make up the missed work.

Lab activities
Course grades will only use students’ 6 highest lab activities. This means students can miss one lab activity without penalty. No make-up will be offered for that first absence: the missing grade is simply dropped from course grade calculations. For students with no lab activity absences their lowest recitation grade will be dropped from calculations.

Any additional absence must be properly documented. For documented absences meeting the university's excused absence standards (see https://catalog.buffalo.edu/policies/attendance.html), arrangements will be made to make up the missed work.

Lab exams
Each lab exam is paired with a make-up later in the semester. If a student misses the lab exam they may attend the make-up exam. No documentation is required.

Documentation is needed if a student's misses a make-up exam. If that absence meets the university's excused absence standards (see https://catalog.buffalo.edu/policies/attendance.html), arrangements will be made to make up the missed make-up exam.

Attendance
No make-ups for attendance points are provided; instead students will be forgiven up to 5 missed attendance opportunities when calculating course grades. This covers approximately 80% of the class. A student missing more than 5 of these opportunities needs to speak to their instructor and should also speak with an academic advisor.

Student Response questions
No make-ups for student response questions are provided; instead only the best 80% of the student response questions are incorporated into course grade calculations. This covers approximately two weeks' worth of absences. A student who misses more than two weeks of classes should speak to their instructor and also an academic advisor.

Midterm/Final exam
A missed exam can be made up only if the absence is legitimate and documented (see https://catalog.buffalo.edu/policies/attendance.html). In the case of illness, you MUST visit a physician and obtain a note detailing the period during which you were medically incapable of taking the exam. Notify your instructor as early as possible in writing (email is acceptable) if you miss an exam, before the exam takes place unless medically impossible.

If you miss an examination without a valid excuse, you will receive a zero grade for that examination. No make-up examinations will be available without a valid excuse.

Lab Activity, Lab Exam, and Project grading
Some project pieces and all lab activities and lab exams are submitted for automated grading. When grading is automated, only your LAST submission counts towards your grade, NOT your highest-scoring submission. Submissions that do not comply with course policies will be scored as 0 retroactively.
**Lab Exam requirement**

Your lab exam grade must be \( \geq 160 \) points (out of a possible 320 points) to pass this course. The lab exam score for each course module is the greater of your total lab exam score and your total lab exam make-up score from that module.

**Written Exam requirement**

Your written exam grade must be \( \geq 160 \) points (out of a possible 320 points) to pass this course.

The written exam component consists of one midterm examination, given during the semester, and one final examination, given during the final exam period. You must bring a valid form of picture ID with you to each examination (a UB Card is preferred).

The midterm exam will be held on Thursday, April 2nd 9:00-10:00 PM. Room assignments will be announced in the week prior to each exam. The comprehensive final examination will be given during the final exam period. The university schedules final examinations. It is YOUR RESPONSIBILITY to check the HUB for the date, time and place of the final exam. See [http://blogs.advising.buffalo.edu/beadvised/posts/have-you-checked-your-final-exam-schedule-4](http://blogs.advising.buffalo.edu/beadvised/posts/have-you-checked-your-final-exam-schedule-4)

Since the exam schedule can change, do not make plans to travel during the examination period.

The course content is divided into four modules. The midterm exam will assess your mastery of modules 1 and 2. The final exam will assess your mastery of all four modules. The written exam component of your course grade will be calculated as follows:

<table>
<thead>
<tr>
<th>COURSE MODULE</th>
<th>MIDTERM</th>
<th>FINAL</th>
<th>WRITTEN EXAM SCORE CALCULATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>80 points</td>
<td>80 points</td>
<td>Greater of midterm &amp; final exam module score</td>
</tr>
<tr>
<td>2</td>
<td>80 points</td>
<td>80 points</td>
<td>Greater of midterm &amp; final exam module score</td>
</tr>
<tr>
<td>3</td>
<td>n/a</td>
<td>80 points</td>
<td>Final exam module score</td>
</tr>
<tr>
<td>4</td>
<td>n/a</td>
<td>80 points</td>
<td>Final exam module score</td>
</tr>
</tbody>
</table>

**Overall course grade**

If you **fail either** the lab exam or the written exam component of the course, you automatically receive a letter grade of F for this course.

If you **pass both** the written exam and the lab exam components of the course, then your course grade will be determined by the total number of points you earned in the course (see table below).

The table below shows the mapping from course points to letter grade mapping. We reserve the right to adjust the cut-offs lower (e.g., the cut-off for an A may be moved from 900 to 899, but will never adjust the cut-offs higher.

<table>
<thead>
<tr>
<th>Points earned</th>
<th>Letter grade</th>
<th>Points earned</th>
<th>Letter grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>900-1000</td>
<td>A</td>
<td>700-739</td>
<td>C+</td>
</tr>
<tr>
<td>860-899</td>
<td>A-</td>
<td>660-699</td>
<td>C</td>
</tr>
<tr>
<td>820-859</td>
<td>B+</td>
<td>620-659</td>
<td>C-</td>
</tr>
<tr>
<td>780-819</td>
<td>B</td>
<td>600-619</td>
<td>D</td>
</tr>
<tr>
<td>740-779</td>
<td>B-</td>
<td>0-599</td>
<td>F</td>
</tr>
</tbody>
</table>

**Regrading**

If you have a question about the grading of any piece of work, first consult with the teaching assistant who graded your work. If you cannot resolve your questions with the teaching assistant, ask the course instructor. Any questions about the grading of a piece of work **must be raised within one week of the date that the work was**. Active learning responses cannot be regarded.
Incomplete (I) grades
A grade of incomplete (“I”) indicates that additional course work is required to fulfill the requirements of a given course. Students may only be given an “I” grade if they have a passing average in coursework that has been completed and have well-defined parameters to complete the course requirements that could result in a grade better than the default grade. An “I” grade may not be assigned to a student who did not attend the course or chose not to complete a portion of the work.

Prior to the end of the semester, students must initiate the request for an “I” grade and receive the instructor’s approval. Assignment of an “I” grade is at the discretion of the instructor.

The instructor must specify a default letter grade at the time the “I” grade is submitted. A default grade is the letter grade the student will receive if no additional coursework is completed and/or a grade change form is not filed by the instructor. “I” grades must be completed within 12 months. Individual instructors may set shorter time limits for removing an incomplete than the 12month time limit. Upon assigning an “I” grade, the instructor shall provide the student specification, in writing or by electronic mail, of the requirements to be fulfilled, and shall file a copy with the appropriate departmental office.

Students must not re-register for courses for which they have received an “I” grade.

The last day to resign the course is Friday, April 17, 2020.

Course Schedule
You are required to attend your assigned sections unless advanced arrangements have been made with the instructors.

<table>
<thead>
<tr>
<th>Lectures: Section A – MWF 12 - 12:50 am in Knox 104</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section B – MWF 5 - 5:50 pm in Cooke 121</td>
</tr>
<tr>
<td>Labs: All labs are held in Baldy 21; please check HUB for the lab times associated with your lecture section</td>
</tr>
<tr>
<td>Recitations: Recitations are held throughout the week and in various rooms; please check HUB for the recitations available</td>
</tr>
</tbody>
</table>

Diversity
The UB School of Engineering and Applied Sciences considers the diversity of its students, faculty, and staff to be a strength, critical to our success. We are committed to providing a safe space and a culture of mutual respect and inclusiveness for all. We believe a community of faculty, students, and staff who bring diverse life experiences and perspectives leads to a superior working environment, and we welcome differences in race, ethnicity, gender, age, religion, language, intellectual and physical ability, sexual orientation, gender identity, socioeconomic status, and veteran status.

Classroom Decorum
To prevent and respond to distracting behavior faculty should clarify standards for the conduct of class, either in the syllabus, or by referencing the expectations cited in the Student Conduct Regulations. Classroom "etiquette" expectations should include:

- Attending classes and paying attention. Do not ask an instructor in class to go over material you missed by skipping a class or not concentrating.
- Not coming to class late or leaving early. If you must enter a class late, do so quietly and do not disrupt the class by walking between the class and the instructor. Do not leave class unless it is an absolute necessity.
- Not talking with other classmates while the instructor or another student is speaking.
- If you have a question or a comment, please raise your hand, rather than starting a conversation about it with your neighbor.
- Showing respect and concern for others by not monopolizing class discussion. Allow others time to give their input and ask questions. Do not stray from the topic of class discussion.
- Not eating and drinking during class time. Avoiding audible and visible signs of restlessness. These are both rude and disruptive to the rest of the class.
- Turning off the electronics: cell phones, pagers, and beeper watches. Avoiding audible and visible signs of restlessness. These are both rude and disruptive to the rest of the class.
- Focusing on class material during class time. Sleeping, talking to others, doing work for another class, reading the newspaper, checking email, and exploring the internet are unacceptable and can be disruptive.
- Not packing bookbags or backpacks to leave until the instructor has dismissed class.
Accessibility Resources
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 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.

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.

Mental Health
As a student you may experience a range of issues that can cause barriers to learning or reduce your 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 issues you may experience. You can learn more about these programs and services by contacting:

Counseling Services:
- 120 Richmond Quad (North Campus), 716-645-2720
- 202 Michael Hall (South Campus), 716-829-5800

Health Services:
- Michael Hall (South Campus), 716-829-3316

Health Promotion:
- 114 Student Union (North Campus), 716-645-2837

Academic Integrity

Academic integrity is a fundamental university value. Through the honest completion of academic work, students sustain the integrity of the university while facilitating the university's imperative for the transmission of knowledge and culture based upon the generation of new and innovative ideas. Please refer to the university Undergraduate Academic Integrity Policy (https://catalog.buffalo.edu/policies/academic_integrity_2019-20.html) for additional information.

As an engineer or computer scientist, you have special ethical obligations. As per the NSPE Code of Ethics, “engineers shall avoid deceptive acts” and “shall conduct themselves honorably, responsibly, ethically, and lawfully so as to enhance the honor, reputation, and usefulness of the profession (https://www.nspe.org/resources/ethics/code-ethics). Similar sentiments of honesty, integrity, fairness, and responsibility are fundamental to the ACM Code of Ethics (https://www.acm.org/code-of-ethics).

A violation in this class generally results in an F for the entire course. The Computer Science and Engineering department's policy on academic integrity can be found here:

https://engineering.buffalo.edu/computer-science-engineering/information-for-students/policies/academic-integrity.html

The syllabus is subject to change based on the needs of the course and will be communicated with you as appropriate.