CSE 320: System Fundamentals II (L01, Stark)
Spring 2021

Course Homepage:
https://bsd7.cs.stonybrook.edu/~cse320/

Instructor:

Prof. Eugene W. Stark
stark@cs.stonybrook.edu
New CS Building, Room 133
(631) 632-8444
Office Hours: Tuesdays, Thursdays 3:00pm – 5:00pm (online, via Zoom)

Note: All office hours held by Prof. Stark and the TA’s will take place online via Zoom. Zoom links for attending office hours are published via Google Calendar on the Course Homepage.

Lecture Time/Place: Tu/Th 1:15pm-2:35pm (online via Zoom)

Note: All lectures will be delivered online via Zoom, synchronously at the officially scheduled lecture time. Zoom links for joining the lectures are published via Google Calendar on the Course Homepage. Barring unforeseen technical difficulties, the same link will be valid for all lectures.

A best-effort attempt will be made to record the lecture sessions. If all goes well, the recorded lectures will be available for viewing asynchronously, sometime after the synchronous lecture has been given. Links for viewing the recorded lectures will be published on Piazza. Note that it is not guaranteed that a recording will be available for any particular lecture, so students should plan to attend the synchronously scheduled lecture if at all possible.

Course Description: This course will introduce programming and essential concepts of operating systems, compilers, and concurrency, focused around several cross-cutting examples, such as memory management, error handling and threaded programming.

Prerequisite(s): CSE major, and completed CSE 220 with a C or higher.
Note(s): A minimum grade of C is required in this course for the CSE major or minor.
Credit Hours: 3


Course Objectives:
At the completion of this course, students will have:

1. Developed an understanding of the layers of software that lie between an application program and the underlying hardware and how they inter-operate.
2. Developed an ability to program with operating system APIs.
3. Developed an ability to write and analyze multi-threaded programs.

Minimum Technical Requirements:
For attending the lectures, students will need to have a computer that satisfies the minimum requirements for the Zoom videoconferencing application, including a working webcam and microphone, and access to reliable high-speed internet service. For completing the homework assignments, a 64-bit computer capable of running a virtual machine using either the VirtualBox or VMWare virtualization software is required. A minimum of 8GB RAM (16GB recommended) should be installed, and there should be at least 30GB of free disk space. Exams will be administered online, via Blackboard and using the Honorlock proctoring system. This requires a computer natively running either Windows or MacOS, as well as a working webcam and microphone.

Piazza:
This term we will be using Piazza for class discussion. The system is highly catered to getting you help fast and efficiently from classmates, the TAs, and Professors. All non-personal course-related communication should be posted to the discussion board. If you have questions about assignments, technical problems that need troubleshooting, or other questions that might be of interest to other students, they must be posted to Piazza and not emailed to the instructor or TA. Find our class page at: https://piazza.com/stonybrook/fall2020/cse320/home.

Note that Piazza has recently changed to a paid business model, as opposed to the free access model they have used up until now. For the current semester, we will be operating under the “user contribution” option Piazza is offering. This means that when you access Piazza, you will be prompted with notices asking you to make a financial contribution. The contribution is optional, but the notices do not go away until you contribute. According to their web page, they are asking students for $8, which would cover access for all their classes. Instructors are also asked to contribute a somewhat larger amount. Since Piazza seems to have proved itself to be more useful than available alternatives as a platform for course discussions, we will see how it goes this semester under the user contribution model. I would be interested to receive any feedback that you might have on how you feel about the continued use of Piazza under these conditions, and what alternatives you think ought to be considered.

Course Announcements:
Course announcements will be posted to Piazza. You are expected to be aware of course announcements.
Grading Scheme: Pass/No Credit (P/NC) option is not available for this course.

Programming Assignments (5) (60%)
Midterm Exam (15%)
Cumulative Final Exam (25%)

Course Policies:

- Programming Assignments

  - A major component of the course is learning to program in C. Therefore, to pass the course with a grade of a C or higher students must satisfy the following 2 criteria: (i) can miss only 1 assignment and (ii) must demonstrate an ability to program in C.

  - The course will include 5 programming assignments, each worth 12% of the final course grade (see “Grading Scheme” above for explanation).

  Students are expected to work independently on the programming assignments. You may discuss the homework in this course with anyone you like, however each student’s submission, including written material and coding, must be their own work, and only their own work. Any evidence that written homework submissions or source code have been copied, shared, or transmitted in any way between students (this includes using source code downloaded from the Internet or written by others in previous semesters!) will be regarded as evidence of academic dishonesty. The College of Engineering and Applied Sciences regards academic dishonesty as a very serious matter, and provides for substantial penalties in such cases, such as receiving an ‘F’ grade, or expulsion from the University. For more information, obtain a copy of the CEAS guidelines on academic dishonesty from the CEAS office.

  - Programming assignments must be turned in on the day they are due. Students are urged to plan ahead to avoid problems such as congestion or failure of computer facilities at the last minute. If your assignment is incomplete or is not working by the due date, turn in whatever you have.

  - Each student will be given 3 grace days for use during the semester. A grace day is a full 24-hour grace period. You may use them as you see fit to extend the deadline of an assignment. There are no partial grace days — one second late counts as a full day.

  - Extensions or late assignments will NOT be accepted under any circumstances. No late code changes will be permitted. You are responsible for testing your code before submitting it.

  - Note due to limited resources for grading, programs that do not compile or run for testing might not be graded.

  - Grading Issues: All issues with grading must be emailed to cse320@cs.stonybrook.edu within 1 week of release of the graded assignment. Any requests/concerns after this date will not be honored. The email must include a detailed explanation of the specific grading issues and reason/correction. We believe students often learn by investigating and understanding their mistakes. Therefore, it is the responsibility of the student to determine the issues, not the grader/instructor/TA.
• Examinations
  – All examinations will be closed-notes and closed-book. Examinations will be administered online; it is currently planned to use Blackboard with the Honorlock proctoring system.
    * To take the exams using Honorlock you will need to have a computer that natively runs either Windows or MacOS, with a working webcam and microphone.
    * The only electronic devices permitted to be used during an exam are those specifically authorized by the instructor for the purpose of taking the exam. Any other use of devices, textbooks, notes or any other materials, and any unauthorized communication during the exam with persons other than the course staff, will constitute cheating.
  – No makeup exams will be given, except for PRIOR excused absences with official documentation approved by the University.

• Attendance
  – Attendance is expected and highly encouraged.
  – Students are responsible for all missed work, regardless of the reason for absence. It is also the absentee’s responsibility to obtain all missed notes or materials.

Etiquette:

• Piazza
  Students are expected to use the Piazza forum for all non-personal course-related communication. If you have questions about assignments, technical problems that need troubleshooting, or other questions that might be of interest to other students, they must be posted to Piazza and not emailed to the instructor or TA.

Piazza is a forum for additional learning and assistance. It is not the place for cyber-bullying, memes, grade complaints, concerns/comments/criticisms about the course, or in general, anything unrelated to the course material and your learning. Improper behavior will result in the deactivation of Piazza and reporting of the individual’s behavior to University Office of Community Standards.

• Email
  All course logistic and grading emails should be directed to cse320@cs.stonybrook.edu.
  Email your Professor directly in the following circumstances:
    – If you cannot attend office hours and need to set up an appointment to meet at another time; in this case you must include your availability for the upcoming week.
    – Making arrangements for disability accommodations.
    – To discuss private, personal matters that are impacting your coursework such as physical or mental illness, death in the family, etc.
    – If the instructor asks you to email them something relating to a previous conversation.

When emailing, use the following guidelines to ensure a timely response:
    – Use your official @stonybrook.edu email account
Use a descriptive subject line that includes “CSE 320”, identifies the item you are emailing about, and a brief note on the topic (eg. “CSE320: HW1 Submission error”, “CSE320: HW2 Blackboard Grade”).

Begin with a proper salutation, such as “Dear Prof. Stark”, or “Hi Prof. Stark”. (In particular, “Hey Stark” and the like are not appropriate.)

Briefly explain your question or concern or request.

End with a proper closing that includes your full name, repoid/netid, and SBU ID number.

Academic Integrity:

Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person’s work as your own is always wrong. Faculty is required to report any suspected instances of academic dishonesty to the Academic Judiciary. Faculty in the Health Sciences Center (School of Health Technology & Management, Nursing, Social Welfare, Dental Medicine) and School of Medicine are required to follow their school-specific procedures. For more comprehensive information on academic integrity, including categories of academic dishonesty please refer to the academic judiciary website at [http://www.stonybrook.edu/commcms/academic_integrity/index.html](http://www.stonybrook.edu/commcms/academic_integrity/index.html)

Be advised that any evidence of academic dishonesty will be treated with utmost seriousness. Those involved will be prosecuted to the fullest extent permitted by the University and College policies.

Student Accessibility Support Center Statement:

If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Student Accessibility Support Center, ECC (Educational Communications Center) Building, Room 128, (631)632-6748. They will determine with you what accommodations, if any, are necessary and appropriate. All information and documentation is confidential. [https://www.stonybrook.edu/commcms/studentaffairs/sasc/](https://www.stonybrook.edu/commcms/studentaffairs/sasc/)

Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and Student Accessibility Support Center. For procedures and information go to the following website: [https://ehs.stonybrook.edu/programs/fire-safety/emergency-evacuation/evacuation-guide-people-physical-disabilities](https://ehs.stonybrook.edu/programs/fire-safety/emergency-evacuation/evacuation-guide-people-physical-disabilities).

Critical Incident Management:

Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of University Community Standards any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn. Faculty in the HSC Schools and the School of Medicine are required to follow their school-specific procedures. Further information about most academic matters can be found in the Undergraduate Bulletin, the Undergraduate Class Schedule, and the Faculty-Employee Handbook.
CSE320 - Tentative Course Outline:
The weekly coverage might change as it depends on the progress of the class. However, you must keep up with the reading assignments.

<table>
<thead>
<tr>
<th>Week</th>
<th>Tentative Course Content</th>
<th>Readings</th>
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<tbody>
<tr>
<td>Week 1</td>
<td>• Introduction &amp; Overview&lt;br&gt;• C Programming</td>
<td>Chap 1, C Reference</td>
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<td>Week 2</td>
<td>• C Programming</td>
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<tr>
<td>Week 3</td>
<td>• C Programming</td>
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<tr>
<td>Week 4</td>
<td>• C Programming&lt;br&gt;• Linking and Loading</td>
<td>Chap 7, 9.9-9.11</td>
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<td>Week 5</td>
<td>• Linking and Loading&lt;br&gt;• Dynamic memory allocation (basic concepts)</td>
<td>Chap 9</td>
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<td>Week 6</td>
<td>• Dynamic memory allocation (implementation techniques)</td>
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<td>Week 7</td>
<td>• Dynamic memory allocation (example allocator)&lt;br&gt;• Exceptional control flow, processes</td>
<td>Chap 8.1-8.4</td>
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<tr>
<td>Week 8</td>
<td>• Exceptional control flow, processes&lt;br&gt;• Signals, signal handling</td>
<td>Chap 8.5-8.8</td>
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<td>Week 9</td>
<td>• Async-signal-safety, waiting for signals, nonlocal jumps&lt;br&gt;• System-level I/O: Unix I/O, Unix file system concepts</td>
<td>Chap 10</td>
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<tr>
<td>Week 10</td>
<td>• System-level I/O: file descriptors, sharing files, pipes, redirection&lt;br&gt;• Midterm Exam (tentative)</td>
<td>Chap 11.1-11.4, 12.1-12.3</td>
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<td>Week 11</td>
<td>• Concurrent programming: motivation (via network servers)&lt;br&gt;• Concurrent programming: threads overview</td>
<td>Chap 12.4-12.8</td>
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<td>Week 12</td>
<td>• Synchronization: race conditions, mutual exclusion, semaphores,&lt;br&gt;• Synchronization: bounded buffer, Readers &amp; Writers</td>
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<td>Week 13</td>
<td>• Thread safety, races, deadlocks&lt;br&gt;• Memory hierarchy, cache concepts</td>
<td>Chap 6</td>
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<tr>
<td>Week 14</td>
<td>• Cache memories&lt;br&gt;• Virtual memory: basic concepts</td>
<td>Chap 9.1-9.8</td>
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Midterm Exam (tentative): Thursday, April 8, 1:15PM – 2:35PM (online during class).
Final Exam: Monday, May 17, 11:15AM – 1:45PM (online).