Welcome to CS 447!

Instructor: Dr. Hiroshi Fujinoki  
Office: EB 2034  
Email: hfujino@siue.edu  
URL: www.siue.edu/~hfujino  
Office Phone: 650-3727

Office Hours: (1) Mondays: 1:30 – 3:30 P.M.  
(2) Tuesdays: 10:00 – 11:00 A.M.  
(3) Tuesdays: 2:00 – 3:30 P.M.  
(3) Wednesdays: 1:30 – 3:30 P.M.  
(4) Thursdays: by appointment  
(4) Fridays: by appointment

Note: The above office hours will **not** be applied to the final exam week. During the final exam, please contact Dr. Fujinoki for your appointment.

Class Meeting Room: EB - 0140  
Class Meeting Days: T and R  
Class Meeting Time: 12:30- 1:45 P.M. (for both T and R lectures)

Note: item with "♣" symbol means an important item.

♣ Course Prerequisites:  
CS340 (Data Structure and Algorithms), CS286 (Computer Organization), and CS314 (Operating Systems), or the instructor’s permission. If you have not taken these courses, please talk to the instructor.

♣ Course Objectives:  
This course is an introduction to computer networks. There are three objectives in this course. The first objective is to acquire fundamental knowledge about underlying mechanisms in computer networks. The second objective is to become proficient in essential network programming techniques such as sockets using TCP/IP and HTML protocols through programming projects. The third objective is to be familiar with theoretical methods to analyze system performance of various aspects of computer
networks. Since this course is an introductory course, much emphasis will be put in the first two objectives. By the end of the semester, students are expected to be proficient in networking programming with an insight to the underlying network mechanism.

Grading Policy for Undergraduate Students:

<table>
<thead>
<tr>
<th>Activities</th>
<th>Weight:</th>
<th>Final Letter Grade:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quizzes:</td>
<td>20%</td>
<td>100-90: A</td>
</tr>
<tr>
<td>Programming projects*1:</td>
<td>20%</td>
<td>89-80: B</td>
</tr>
<tr>
<td>Midterm Exam:</td>
<td>25%</td>
<td>79-70: C</td>
</tr>
<tr>
<td>Final Exam:</td>
<td>35%</td>
<td>69-60: D</td>
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<td></td>
<td></td>
<td>Below 60: F</td>
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</tbody>
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Grading Policy for Graduate Students:

<table>
<thead>
<tr>
<th>Activities</th>
<th>Weight:</th>
<th>Final Letter Grade:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quizzes:</td>
<td>15%</td>
<td>100-92: A</td>
</tr>
<tr>
<td>Programming projects*1:</td>
<td>15%</td>
<td>91-82: B</td>
</tr>
<tr>
<td>Paper Review:</td>
<td>10%</td>
<td>81-72: C</td>
</tr>
<tr>
<td>Midterm Exam:</td>
<td>25%</td>
<td>71-60: D</td>
</tr>
<tr>
<td>Final Exam:</td>
<td>35%</td>
<td>Below 60: F</td>
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</table>

* Note *1: A total of two projects are planned in this course. The grading weight for the two projects are 40% (the first project) and 60% (the second project) of the project grade.

Exams:
- Exams will be closed textbook and closed notes.
- Absence from an exam will result in zero point for the exam.
- Makeup exam will be offered only for medical emergency (with a signed doctor's letter). Makeups for any other reasons will not be provided (no exception).
- If you need any special assistance you must contact Dr. Fujinoki at least one week before.
- A calculator is allowed in the exams (however sharing a calculator during an exam is NOT allowed – everyone needs to bring your own calculator).
Programming Projects (tentative plans):
- There will be two programming projects.
  
  **Project 1:** Develop a multi-threaded time server using C/C++ socket. We are going to use Winsock for Win32 environment.
  
  **Project 2:** Develop a multi-threaded application-level firewall using C/C++ socket. We are going to use Winsock for Win32 environment.

Quizzes:
- There will be 12 quizzes during this course. The quizzes are closed textbook, notebooks and neighbors (you are allowed to use your pens, pencils, blank papers, eraser(s) and a calculator during a quiz). A list of possible questions for each quiz will be posted in the course home page at the end of the week before each quiz. The questions will appear as posted in the list in the actual quizzes (parameters may be modified for some questions).

Paper Review (only for graduate students):
- Each graduate student is required to conduct a paper review by doing the following activities (more details about the grading policies are provided in a handout):
  1. Do paper searches for peer-reviewed “survey papers” for the topics each graduate student is interested. Find four survey papers.
  2. **E-mail the four papers (in PDF format) to Dr. Fujinoki by 12:30 P.M. on September 5th.** Dr. Fujinoki will pick one for your paper. It can happen that the four papers you selected may be rejected if the selected four papers do not have reasonable quality.
  3. Each graduate student carefully reads the chosen survey paper and summarizes it for:
     a. What are the focused problem(s) addressed by each solution in the survey paper.
     b. Summarize the primary advantage(s) and disadvantage(s) in each solution discussed in the survey paper.
     c. Identify the remaining unsolved problem(s) or issue(s) in the existing solutions.
  4. Type your findings for (3) above in a final report and submit it to Dr. Fujinoki. Your final report should satisfy the following requirements.
(a) On a U.S. standard letter-size document, standard paper margin, times-new-roman font, 11 point, single line spacing, single sided, at least three pages.

(b) Well-proof read report.

(c) Your report should describe at least three (3) existing solutions.
   - A draft version of your report is due (as an e-mail submission): 12:30 P.M., on October 31st, which contain your work for (3) above for three existing solutions.
   - The final report is due (as an e-mail submission): 12:30 P.M., on November 14th, which contain your work for (3) above for all the eight existing solutions.

Attendance Policy:

- Attendance will be taken without prior notice at the beginning of lectures (being late more than 5 minutes will be considered absence).

- For each absence after the second absence, -2 point penalty will be applied to your exam grade (each such absence before the midterm, the penalty will be applied to your midterm exam and for those after the midterm, the penalty will be applied to the final exam).

- The above penalty will not apply to medical emergency (however, you need to provide written proof of medical service to waive the penalty).

- An attendance card will be provided to each person who attends a lecture. At the end of a lecture, each of you should return your attendance card with your SIUE ID written on the card. The attendance card should be the one provided by the course instructor or the teaching assistant for this course. Returning an attendance card that is NOT provided by either the course instructor or the teaching assistant will be considered as an act of cheating. For the first time a person violates this rule, that person will receive a warning (and it will be considered as an absence). The second time the same person violates this rule, the person will receive a failing grade for this course.

- Any error regarding your class attendance status should be reported to Dr. Fujinoki within two weeks (14 calendar days) after your attendance status is posted to the course web site.

♣ Academic Dishonesty:
Following activities will be considered academic dishonesty and final letter grade of F may be given:

- Submitting work (such as homework assignments and projects) done by somebody else (this includes any human/electronic sources (such as websites)).
- Watching and copying your neighbors' solutions during quizzes and/or exams.
- Submitting program source code files (for the programming projects) that are developed by collaborations with other people.
- Using materials not allowed during quizzes and exams.
- Using materials not allowed for the programming projects.
- Submitting an attendance card that is not provided by either the teaching assistant of this course or Dr. Fujinoki.

**Required Textbook:**

Other Required Skills/Knowledge:
- Experience with C/C++ (MS .NET or MS VC++)
- Knowledge of modern operating systems

⚠️ Other Notices:
- Every student is expected to check "Class Notices" in CS447-002 home (follow the link from within "http://www.siue.edu/~hfujino") at least twice in a week. Important notices for that week will be posted on Sunday night. I assume each of you check the homepage on Sunday night.
- The instructor is NOT responsible for the consequences if you do not regularly check the CS447 home. Information regarding important activities, such as exams and projects, will be posted at least 24 hours prior to the deadline unless otherwise announced (this means if posting any important information is announced in the classroom, it can appear in the CS447 home even within 24 hours from the deadlines).
- For any grading problem, each student is expected to contact the course instructor within 14 days after the grade is posted or returned (failing to contact within 14 days may result in being unable to fix the problem).

⚠️ Disability Support:
- Students who believe they may need accommodations in this class are encouraged to contact the office of Disability Support Services as soon as possible. It is the students' responsibility to alert the instructor to SIUE sanctioned accommodations. If anyone needs assistance from SIUE Disability Support Services, please contact them.
Tentative Class Schedule (subject to change):

This schedule is tentative and subject to change.

<table>
<thead>
<tr>
<th>Week #: Day</th>
<th>Topics</th>
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<tbody>
<tr>
<td>Week 1: August 20 (T):</td>
<td>Course Introduction, circuit-switching and packet-switching networks</td>
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<tr>
<td>August 22 (R):</td>
<td>Local-area-network (LAN), Wide-Area-Network (WAN), the Internet and intra-net</td>
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<td>Network Protocols and OSI 7-layer model</td>
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<td>Week 2: August 27 (T):</td>
<td>Quiz #1, Project #1 description (1), socket programming tutorial</td>
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<td></td>
<td>Client-server architecture</td>
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<td>IP address and TCP port number</td>
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<tr>
<td>August 29 (R):</td>
<td>Project Phase 1 description (2)</td>
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<td></td>
<td>Project #1 Assigned</td>
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<tr>
<td>Week 3: September 3 (T):</td>
<td>Quiz #2, Circuit-switching and packet switching networks</td>
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<tr>
<td>September 5 (R):</td>
<td>TCP error and flow control (Stop-and-Wait ARQ)</td>
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<tr>
<td>Week 4: September 10 (T):</td>
<td>Quiz #3, TCP error and flow control (Selective-Reject &amp; GBN ARQs)</td>
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<tr>
<td>September 12 (R):</td>
<td>Internet architecture (IP address structure)</td>
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<td>Domain address, host address, CIDR-IP address</td>
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<td>Week 5: September 17 (T):</td>
<td>Quiz #4, Layer-2 and 3 switches</td>
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<td>September 19 (R):</td>
<td>Local Area Networks</td>
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<td>Bus, ring and star LAN, Repeaters, bridges and routers</td>
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<td>MAC address, IP address, and host name translation (DNS and ARP)</td>
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<td>Week 6: September 24 (T):</td>
<td>Quiz #5, Dijkstra and Bellman-ford algorithms, distance-vector routing protocol</td>
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<tr>
<td>September 26 (R):</td>
<td>Transmission Control Protocol (TCP) and TCP-slow start linear-growth flow-control</td>
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<tr>
<td>Week 7: October 1 (T):</td>
<td>Quiz #6, Ethernet Essential: CSMA/CD and binary back-off, one-persistent, and p-persistent</td>
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<tr>
<td>October 3 (R):</td>
<td>Switch architecture (TDM switch, cross-bar switch and knockout switches), concept of blocking and non-blocking switches</td>
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<tr>
<td>Week 8: October 8 (T):</td>
<td>Quiz #7, Internet routing (1)</td>
</tr>
<tr>
<td>October 10 (R):</td>
<td>Internet routing (2)</td>
</tr>
<tr>
<td>Week 9: October 15 (T):</td>
<td>Midterm Exam</td>
</tr>
<tr>
<td>October 17 (R):</td>
<td>Project #2 description</td>
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<td>Project #2 Assigned</td>
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</tbody>
</table>
Week 10: October 22 (T): Multimedia Support: QoS Control and DiffServ (1)
October 24 (R): Multimedia Support: QoS Control and DiffServ (2)

Week 11: October 29 (T): Quiz #8, Wireless and cellular networks (1)
October 31 (R): Wireless and cellular networks (2)

Week 12: November 5 (T): Quiz #9, Cloud computing: concept, implementation, and concerns
November 7 (R): Network Security (1)

Week 13: November 12 (T): Quiz #10, Network Security (2)
November 14 (R): Hardware-based error controls: bit-errors, parity and CRC error detection

Week 14: November 19 (T): Quiz #11, synchronous and asynchronous signal transmissions
Project #2 Due
November 21 (R): time-division and frequency-division multiplexing

Week 15: November 26 (T): Thanksgiving Holiday
November 28 (R): Thanksgiving Holiday

Week 16: December 3 (T): Quiz #12, Topics TBA
December 5 (R): Topics TBA

Final Exam Week
December 11 (Wednesday) at 12:00-1:40 P.M.: Final Exam (comprehensive)

- The list of the reading assignment is the minimum requirement. It is expected that each student voluntarily studies not only the required sections but other related sections or materials.
- Required reading should be done before the lecture.
- If you have any problem for the above schedule, please contact to Dr. Fujinoki as soon as possible.
- Any question regarding this syllabus should be addressed to: hfujino@siue.edu