Course Outline

COE768: Introduction of Computer Networks

Prerequisites
(COE 538 or ELE 538) and ELE 635

Compulsory Texts:

Reference Text:
none

Calendar Description
This is an introductory course in computer networks. In particular, it concentrates on the Internet technology. It first introduces the OSI and TCP/IP network architecture models. It then studies the implementation principles and design issues at each layer of these models. Lecture topics include: OSI and TCP/IP models, data transmission basics, data-link protocols, local area networks, wide-area networks, Internet structures, TCP/IP protocol suite, and application Layer protocols. Laboratory work focuses on the implementation of stop-and-wait protocol based on the BSD socket. In addition, students will gain practical experience by building and studying a physical network using network devices such as switches and routers.

Course Weight: 1.00
Billing Units: 1

Learning Objectives
At the end of this course, the successful student will be able to:
1. Uses the specialized core engineering knowledge in the field of computer networks to understand and design a various types of communication links and networks. (1d)
2. Uses engineering knowledge to solve real world open-ended engineering problems (1c)
3. Uses numerical and analytical models to predict, control, and design component, system, and processes behaviours (1b)
4. Designs and develops communication software to perform given networking tasks as required by the labs and project (5c)
5. Writes and revises documents using appropriate discipline specific conventions (7a)

Note: Numbers in parentheses refer to the graduate attributes required by the Canadian Engineering Accreditation Board. For more information, see:

Course Organization
3 hours of lecture per week for 13 weeks, in 1 section
2 hours of lab/tutorial per week for 12 weeks
2 Lab/tutorial sections of maximum 21 students
Course Evaluation

Midterm exam                    25%
Project reports                               12%
Lab Assignments                                          13%
Final exam                                           50%
Total                                                                      100%

Examinations

Midterm exam in Week 7, two hours, open-book (covers Weeks 1-6).
Final exam, during exam period, three hours, open-book (covers Weeks 1-13).

Course Content

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Chapter</th>
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<tbody>
<tr>
<td>1</td>
<td>Introduction</td>
<td>Chapter 1</td>
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<tr>
<td>2</td>
<td>Framing, Error Detection Coding, Error-Control Service</td>
<td>Sections 3.1.2, 3.2.2</td>
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<tr>
<td>3</td>
<td>Error Detection Protocols: Stop-and-Wait Protocol, Go-back-n Protocol</td>
<td>Sections 3.1.1, 3.1.3, 3.3.4, 3.3, 3.4</td>
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<td>4</td>
<td>Selective Repeat Protocol, HDLC, PPP</td>
<td>Sections 3.4, 3.5.1</td>
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<td>5</td>
<td>CSMA, 10Mbps Ethernet, Fast Ethernet and Gbps Ethernet</td>
<td>Sections 4.2.2, 4.3.1, 4.3.2, 4.3.5 - 4.3.7</td>
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<tr>
<td>6</td>
<td>LAN Switching, Spanning Tree Protocol, Virtual LAN</td>
<td>Sections 4.3.4, 4.8</td>
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<td>7</td>
<td>Mid-Term Test</td>
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<td>8</td>
<td>Wireless LAN</td>
<td>Section 4.4</td>
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<td>9</td>
<td>Wide-Area Networks</td>
<td>Section 5.1</td>
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<td>10</td>
<td>Internetworking and IPv4</td>
<td>Sections 5.5, 5.6.1</td>
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<td>11</td>
<td>IP addresses, Subnetting and CIDR</td>
<td>Sections 5.6.2, 5.6.3</td>
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<td>12</td>
<td>ARP, ICMP, DNS and IPv6</td>
<td>Section 5.6.4, 7.1</td>
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<tr>
<td>13</td>
<td>Transport layer</td>
<td>Section 6.1 &amp; 6.2</td>
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Laboratory/Tutorials

<table>
<thead>
<tr>
<th>Week</th>
<th>Title</th>
<th>Room</th>
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<tbody>
<tr>
<td>2</td>
<td>Study of layer architecture principles.</td>
<td>ENG412</td>
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<tr>
<td>3-6</td>
<td>Implementation of simple network applications based on the BSD socket interface.</td>
<td>ENG412</td>
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<tr>
<td>7-10</td>
<td>Project: Design and development of various network applications.</td>
<td>ENG412</td>
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Remark:
(i) All the required reports will be assessed not only on their technical or academic merit, but also on the communication skills of the author as exhibited through the reports.
(ii) All the lab assignments and project require programming in ‘C’.
(iii) Projects can be conducted by maximum a group of two students.

Important Notes
1. All of the required course-specific written reports will be assessed not only on their technical/academic merit, but also on the communication skills exhibited through these reports.
2. Should a student miss a mid-term test or equivalent (e.g. studio or presentation), with appropriate documentation, a make-up will be scheduled as soon as possible in the same semester. Make-ups should cover the same material as the original assessment but need not be of an identical format. Only if it is not possible to schedule such a make-up may the weight of the missed work be placed on the final exam, or another single assessment. This may not cause that exam or assessment to be worth more than 70% of the student’s final grade. If a student misses a scheduled make-up test or exam, the grade may be distributed over other course assessments even if that makes the grade on the final exam worth more than 70% of the final grade in the course.
3. Students who miss a final exam for a verifiable reason and who cannot be given a make-up exam prior to the submission of final course grades, must be given a grade of INC (as outlined in the Grading Promotion and Academic Standing Policy) and a make-up exam (normally within 2 weeks of the beginning of the next semester) that carries the same weight and measures the same knowledge, must be scheduled.
4. Medical or Compassionate documents for the missing of an exam must be submitted within 3 working days of the exam. Students are responsible for notifying the instructor that they will be missing an exam as soon as possible.
5. Requests for accommodation of specific religious or spiritual observance must be presented to the instructor no later than two weeks prior to the conflict in question (in the case of final examinations within two weeks of the release of the examination schedule). In extenuating circumstances this deadline may be extended. If the dates are not known well in advance because they are linked to other conditions, requests should be submitted as soon as possible in advance of the required observance. Given that timely requests will prevent difficulties with arranging constructive accommodations, students are strongly encouraged to notify the instructor of an observance accommodation issue within the first two weeks of classes.
6. The results of the first test of mid-term test will be returned to students before the dead line to drop an undergraduate course in good Academic Standing.
8. Students are required to adhere to all relevant University policies including the Student Code of Academic Conduct (www.ryerson.ca/senate/policies/pol60.pdf) and Non-Academic Conduct (www.ryerson.ca/senate/policies/pol61.pdf)
9. Students are required to obtain and maintain a Ryerson Matrix e-mail account for timely communications between the instructor and the students.
10. Any changes in the course outline, test dates, marking or evaluation will be discussed in class prior to being implemented.