Wireless Communication and Mobile Applications are recent paradigms in communications and computer science. This course will provide an introduction and overview of communication alternatives for mobile data applications, focusing on mobility-related aspects of higher-level protocols, and examines in depth the infrastructure, available services, and application paradigms for mobile applications.

Resources: There is no single textbook that adequately covers the diverse range of topics (and buying multiple textbooks is clearly not very appealing financially). Here are two reasonably complete books, though:


Also, in particular as a starting point for the course project, you may want to look at the following books (in addition to the references provided in the Appendix section on the website).


I will post my slides, plus other reference material, on the course webpage, http://kunz-pc.sce.carleton.ca/sysc5306/. I will also post marks, etc. on this webpage.

Prerequisites: EACJ 5607 (ELG 5374) or SYSC 5201 (ELG 6121) or permission of the Department.

Marking Scheme: There will be a final exam worth 20%, two assignments during the term worth 15% each, and a course project, which is worth 50%. The final exam is for evaluation purposes only and will not be returned to students. All documents have to be submitted as a hardcopy and softcopy, and follow certain formatting guidelines (in particular length and font size limitations). See below for a discussion of these requirements.

Plagiarism and Cheating: Plagiarism and cheating at the graduate level are viewed as being particularly serious and the sanctions imposed are accordingly severe. Students are expected to familiarize themselves with and follow the Carleton University Student Academic Integrity Policy. The Policy is strictly enforced and is binding on all students. Plagiarism and cheating – presenting another’s ideas, arguments, words or images as your own, using unauthorized material, misrepresentation, fabricating or misrepresenting research data, unauthorized co-operation or collaboration or completing work for another student – weaken the quality of the graduate degree. Academic dishonesty in any form will not be tolerated. Students who infringe the Policy may be subject to one of several penalties including: expulsion; suspension from all studies at Carleton; suspension from full-time studies; and/or a reprimand; a refusal of permission to continue or to register in a specific degree program; academic probation; or a grade of F in the course.
Due Dates: The final exam will be in class on Thursday, April 6 and the course project report is due April 13. A project proposal is due in class on Tuesday, February 28 (i.e., first class after the winter break). The first assignment will be handed out in class on Tuesday, January 24, due Monday, February 6 (submit via e-mail BEFORE midnight). The second assignment will be handed out Tuesday, February 28 and is due Monday, March 13 (again, submitted via e-mail BEFORE midnight). Depending on final enrollment numbers, you may work on the assignments and projects as group projects, we will discuss this further after the deadline for registering in courses for the Winter term (January 18). The assignments will ask you to explore a topic related to the course using either NS2, a popular network simulator, or Contiki/Cooja, a simulator for wireless sensor networks. We will discuss this tool in class in some detail, the course website also has some information on how to install it on your PC.

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<thead>
<tr>
<th>Assignment</th>
<th>Due Date</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Assignment 1</td>
<td>February 6</td>
<td>15 %</td>
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<tr>
<td>Project Proposal</td>
<td>February 28</td>
<td>10 %</td>
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<tr>
<td>Assignment 2</td>
<td>March 13</td>
<td>15 %</td>
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<tr>
<td>Final Project Presentation</td>
<td>Late March</td>
<td>10 %</td>
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<tr>
<td>Final Exam</td>
<td>April 6</td>
<td>20 %</td>
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<tr>
<td>Final Project Report</td>
<td>April 13</td>
<td>30 %</td>
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You will be asked to give an in-class presentation about your project in March, schedule to be determined after the Winter break. The hardcopy of the final project report is due Thursday, April 13, in my office, by noon, the softcopy (submitted via e-mail to tkunz@sce.carleton.ca) is due the same time.

Project: 50% of your mark will be determined by a course project. The goal of the project is to explore a technical concept related to the course, present the results in a cohesive format, and suggest research that would extend the reviewed state-of-the-art. To ensure that students are on the right track, I require a 2-page proposal (submitted by e-mail) by February 28 the latest. This proposal should outline the suggested topic and why it is relevant to the course, provide the suggested structure of the final report, and list references to be used in the research. Also, all students will give brief presentations on their projects towards the end of the course, these presentations will be scheduled after the Winter study break. The purpose of the presentations is to outline the research problem, the proposed solutions, and to solicit feedback from the class on the work done to-date.

The final report is limited to at most 15 pages (counting everything). The following points should be kept in mind when researching project topics:

- Use publicly available references, academic journals, conference proceedings (I expect each final report to be based on at least 8 articles that appeared in traditional academic venues, plus references derived from the WWW and other sources), the majority of which were published within the last two years (i.e., 2015 or more recent).
- Projects should not “rehash” course content: assume that everything discussed in the course, as demonstrated by the course notes, is known to a reader of the report.
- Reports and suggested research should focus on technical issues, not marketing hype/business case.

The submissions have to use 11pt fonts or larger, printed single-sided with 1in margins all around. The text may be typeset single-spaced. Some other formatting requirements are:

- Cover page, table of content, abstract, and reference list are mandatory for the final report.
- The review of the related work should not exceed 10 pages, with the rest reserved for the introduction and motivation, the research proposal, suggested solutions, etc.

Failure to adhere to these requirements will result in a loss of up to 30% of the project mark.
Students with Disabilities:
Students with disabilities requiring academic accommodations in this course are encouraged to contact a coordinator at the Paul Menton Centre for Students with Disabilities to complete the necessary letters of accommodation. After registering with the PMC, make an appointment to meet and discuss your needs with me at least two weeks prior to the final exam. This is necessary in order to ensure sufficient time to make the necessary arrangements. Please note the following deadlines for submitting completed forms to the Paul Menton Centre: March 10, 2017 for the Winter Term.

Course Outline:
• Introduction and History
  • Overview of technologies for wireless communication
  • Marketplace (growth, dominant technologies)
• Data in Wireless Cellular Systems
• Introduction to NS2 and Experimental Research using Simulators
• Data in Wireless Local Area Networks
  • Wireless LANs: IEEE 802.11
  • Personal Area Networks: Bluetooth
  • High-Speed Wireless Networks: HiperLan
• Internet Protocols, Mobile IP
• TCP over Wireless Links
• Ad-Hoc Networks
• Wireless Sensor Networks