Instructor: Professor Halim Yanikomeroglu  
Office: MC 7032  
Phone: 613-520-5734  
Email: halim@sce.carleton.ca  
URL: http://www.sce.carleton.ca/faculty/yanikomeroglu.html

Lectures: Wednesdays and Fridays, 11:35 am – 12:55 pm, Loeb B243

Office Hours: Wednesdays after the lecture and by appointment

TA: Hossein Khoshnevis, khoshnevis@sce.carleton.ca, 7035 MC

Course Description (from Calendar): Introduction to information theory, source coding and data compression, Error control coding, Trellis coded modulation, advanced topics of current interest: spread spectrum; digital wireless communications.

Learning Outcomes: Learning
- the fundamental principles and building blocks,
- the design and performance analysis principles,
- the design trade-offs, and
- the contemporary examples of digital communication systems.

Prerequisite: SYSC 3503 Communication Theory II (strictly enforced)
(precludes additional credit for SYSC 4600 Digital Communications)


References:
- Many other excellent textbooks.
- Internet and Wikipedia.

Laboratory Sessions: Even Tuesdays, 2:35 am – 5:25 pm, 4233 ME (Mackenzie). There will be four software (MATLAB-based) labs each worth 5% of the total mark plus two problem analysis sessions (PASs).

Grading Scheme: To pass the course, a student must obtain at least 50% in the final exam. Composition of final mark:

Assignments: Will not be collected
Quizzes: 10% (3 in total; dates TBD, in-class, 20 mins each)
Term Exam: 20% (Wednesday, October 18, in-class, 80 mins)
Labs: 20% (4 in total)
Final Exam: 50% (will be scheduled by exam services, 3 hours)
### Important Dates:

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<th>Week</th>
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<td>Oct 16 (Lab/PAS 03)</td>
<td>Term Exam Oct 18 (L13)</td>
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Please be advised that classes on Friday, December 8th will follow a Monday schedule.

- A student who misses the term exam or a quiz must submit formal documentation (such as a physician’s report) to prevent a penalty.
- The students must be present in the lab during the lab period.
- Students are expected to attend all lectures (recommended) and lab periods (mandatory) as required. The Faculty of Engineering and Design requires students to have a conflict-free timetable, so requests to accommodate missed exams, assignment due dates, project milestones, etc., because of conflicts with other courses, jobs or vacation plans will not be considered.
Academic Accommodation: “The Paul Menton Centre for Students with Disabilities (PMC) provides services to students with Learning Disabilities (LD), psychiatric/mental health disabilities, Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorders (ASD), chronic medical conditions, and impairments in mobility, hearing, and vision. If you have a disability requiring academic accommodations in this course, please contact PMC at 613-520-6608 or pmc@carleton.ca for a formal evaluation. If you are already registered with the PMC, contact your PMC coordinator to send me your Letter of Accommodation at the beginning of the term, and no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). Requests made within two weeks will be reviewed on a case-by-case basis. After requesting accommodation from PMC, meet with me to ensure accommodation arrangements are made. Please consult the PMC website (www.carleton.ca/pmc) for the deadline to request accommodations for the formally-scheduled exam (if applicable).”

Academic Integrity and Plagiarism: Plagiarism (copying and handing in for credit someone else's work) is a serious instructional offense that will not be tolerated. Please refer to the section on instructional offenses in the Undergraduate Calendar for additional information.

Laboratory Health and Safety Manual: 

Course Sharing Websites: Classroom teaching and learning activities, including lectures, discussions, presentations, etc., by both instructors and students, are copy protected and remain the intellectual property of their respective author(s). All course materials, including PowerPoint presentations, outlines, and other materials, are also protected by copyright and remain the intellectual property of their respective author(s). Students registered in the course may take notes and make copies of course materials for their own educational use only. Students are not permitted to reproduce or distribute lecture notes and course materials publicly for commercial or non-commercial purposes without express written consent from the copyright holder(s).
Week-By-Week Outline (may be modified)

W0: Fundamental principles of digital communications and information theory
   Digital transmission, bandwidth, signal representation, modulation, bandwidth-efficient
   modulation, signal-space analysis and geometrical representation of signals, detection,
   maximum likelihood decoding, probability of error, noise, AWGN channel, entropy,
   Shannon limit, channel capacity theorem, …

W01: Fundamental principles of digital communications and information theory

W02: Source coding
W03: Source coding

W04: Introduction to error control coding; block codes
   Syndrome decoding, Hamming distance, error detecting and correcting capabilities of
   block codes, cyclic codes, examples of linear block codes, CRC, ARQ, …

W05: Block codes

W06: Convolutional codes
   Distance properties, systematic and nonsystematic codes, decoding of convolutional
   codes, Viterbi algorithm, …

W07: Convolutional codes
W08: Trellis-coded modulation (TCM)

W09: Spread-spectrum and CDMA (code-division multiple access)
W10: Spread-spectrum and CDMA

W11: Fading channels and digital wireless communications
W12: Fading channels and digital wireless communications

W13: Overview and wrap-up