CARLETON UNIVERSITY
Department of Systems and Computer Engineering

94.565	**Advanced Digital Communications**	**Winter 1999**

- **Lecturer:** Professor H. Yanıkömeroğlu
- **Locators:** Mackenzie 4252, 520-5734, `halim@sce.carleton.ca`,
  `http://www.sce.carleton.ca/faculty/yanikomeroglu.html`

- **Class Schedule:** Monday & Wednesday, 5:30–7:00 pm, 4236 ME

COURSE OUTLINE

0) Review of Fundamental Concepts in Digital Communications (1 week)

signal space representation, optimum receivers for the AWGN channel, maximum likelihood criterion

1) Error Control Coding (ch. 8, 3.5 weeks)

linear block codes, cyclic codes, convolutional codes, Viterbi algorithm, trellis-coded modulation

2) Band-Limited Channels and Equalization (ch. 9–11, 4 weeks)

signal design for band-limited channels, Nyquist criterion, partial-response signals, maximum likelihood sequence estimation (MLSE), linear equalization, decision-feedback equalization (DFE), peak distortion criterion, mean square error (MSE) criterion, adaptive equalization, least mean square (LMS) algorithm, least-squares (LS) algorithm, blind equalization

3) Spread Spectrum, Fading Channels, and Diversity Techniques (ch. 13–14, 4.5 weeks)

direct sequence SS, frequency-hopped SS, pseudo-noise (PN) sequences, code-division multiple access (CDMA), characterization of multipath channels, diversity techniques, multi-antenna systems, Rake receiver

- **Text:** John G. Proakis, *Digital Communications*, 3rd ed., McGraw-Hill, 1995
  ISBN: 0-07-051726-6 + course notes on selected topics

- **Final Grade Decomposition:**

Midterm exam (closed-book):	30%
Final exam (closed-book):	50%
Assignments:	20%