Physics 6012 Course Syllabus
(Winter Semester 2005, January 10 – April 22, 2005)

Course:	Advanced Photonics	
Instructor:	Dr. Qiying Chen, C-3027, 737-8878, qchen@physics.mun.ca	
Class Schedule:	Twice per week, 75 min for each, date to be decided	
Marking Policy:	Assignments	30 %
	Midterm	30 %
	Final	40 %

Advanced Photonics will provide a basic understanding of the principles of photonic materials, devices, and systems and their applications in optical signal processing, optical data storage, and optical communication. The course will be carried out with 2.5 hours of lecture per week. Prerequisites: preferably Physics 3600 – Optics and Photonics I.

Reference books:

Bahaa E. A. Saleh and Malvin Carl Teich, *Fundamentals of Photonics*, John Wiley & Sons, Inc., 1991.

Keigo Iizuka, *Elements of Photonics* Vol. II, Wiley-Interscience, 2002.

Topics & schedule:

- Overview
- Review of ray optics and wave optics
- (S&T Ch. 1&2)
- Resonant optics
  (S&T Ch. 9)
- Lasers
  (2 lectures, S&T Ch. 13&14)
- Optical properties of photonic materials
- Electro-optics and devices
  (S&T Ch. 18)
- Nonlinear optics & devices
  (2 lectures, S&T Ch. 19)
- Photonic switching & computing
  (S&T Ch. 21)
- Tutorial & mid-term review
- Mid-term exam
- Guide-wave optics
  (S&T Ch.7; I Ch. 9)

- Optical waveguide & devices
  (I Ch. 10)
- Modes and dispersion in optical fibers
  (I Ch. 11)
- Light detection
  (I Ch. 12)
- Optical amplifier
  (I Ch. 13)
- Transmitter
  (I Ch. 14)
- Fiber-optic communications
  (I Ch. 16; S&T Ch. 22)
- Light-emiting devices
- Optical data storage
- Optical sensors
- Tutorial & Final review

Assignments: There will be five assignments during the semester.
Exams: There will be one mid-term exam and one final exam. Both are close book.