

ECE756
Design of Lightwave
Communication Systems and
Networks



Objectives

- To provide fundamental principles of lasers, pulse propagation in fibers and photo-detection.
- To design a fiber-optic communication system consisting of lasers, optical fibers, amplifiers and photo-detectors.

Text Books/Reference Books

- **Text book:**
 - “Fiber Optic Communications: Fundamentals and Applications”, S. Kumar and M. J. Deen, John Wiley and Sons, 2014.
- **Reference:**
 - “Fiber-Optic Communication Systems”, Govind P. Agrawal, 4th edition, John Wiley and Sons, 2010, ISBN 0-471-17540-4
- Course notes will be placed on the course website.

Course Outline

- Review of Electromagnetic Theory - 1 lecture
- Optical Fibers - 3 lectures
- Lasers - 3 lectures
- Optical modulators - 1 lecture
- Receiver design - 1 lecture
- Optical Transmission System Design – 2 lectures
- Coherent communication systems – 1 lecture

Evaluations

- Final Exam 40%
- Project 40%
- Matlab Assignments 20%

Project

- Choose a project from the suggested projects on the course website or any project related to photonics is acceptable.
- The report should be around 15 to 30 pages consisting of
 - Literature survey (you should learn to read research journals)
 - Problem identification
 - Solution (usually matlab simulations)
 - Results and discussion
 - Conclusions

Course Website Password

- Login: ee4em4_kumar
- Password: ee4em4_2048
- Course website:
http://www.ece.mcmaster.ca/~kumars/Lightwave_course.htm

Teaching Format

- Thursdays at 2:30 pm – synchronous – roughly 1 to 1 and half hours
- Monday or Tuesday – recorded lecture will be posted on the course website.
- Please make sure that you study the recorded lecture before attending the lecture on Thursdays.

Contact Info

- **Instructor: Dr. S. Kumar**
- **E-mail: kumars@mail.ece.mcmaster.ca**
- **Office hours: Mondays and Wednesdays mornings.**
- **Office: ITBA-322, Extn: 26008**