ECE 7440 – Optoelectronics

COURSE OUTLINE – FALL 2017

COURSE OBJECTIVE:

The course starts with an introduction to light and optics. Light sources of different types are discussed, including lasers and Light Emitting Diodes (LEDs). Light modulation and detection methods are also discussed. Finally the course covers fiberoptic systems including fiber optic communications and introduces elements of nonlinear optics and nanophotonics.

CONTACT HOURS:

3 lecture hours per week, 3 credit hours

PRE-REQUISITES:

Undergraduate courses in physics and optics; ECE 3600 Physical Electronics (ECE students)

COURSE CONTENT:

1. Light: Properties, Vision, Radiometry and Photometry
2. Optics: Mirrors, Lenses, Ray Tracing and Imaging
3. Radiation Sources: Radiation Profiles, Gas Discharge, LEDs
4. Lasers: Principles of Operation, Types of Lasers, Modes of Operation
5. Laser Diodes: Principles of Operation, Structures, Main Characteristics
6. Detectors: Thermal Detectors, Photodiodes, Sources of Noise
7. Light Modulators: Electro-optics, Acousto-optics, Liquid Crystals
8. Fiber Optics: Theory of Operation, Characteristics of Fibers
9. Fiber Optic Communications
10. Nonlinear optics

HOMEWORK:

Assignments on material covered in class

TEXTBOOK:

Notes available from instructor

REFERENCE TEXTBOOK:

B. E. A. Saleh and M. C. Teich, “Fundamentals of Photonics”, 2nd Ed., Wiley, 2007

EVALUATION:

Your final course grade is determined by your performance in assignments, term test, and a final examination. The weighting of each of these components is as follows:

COMPONENT	VALUE	DETAILS
Laboratory	0%	No labs
Seminars	10%	
Project	10%	
Assignments	10%	
Term Test	20%	In class
Final Examination	50%	

INSTRUCTOR INFO:

Name A. Major

Office: E3-559
Tel: 474-7541
Email: a.major@umanitoba.ca

Office Hours:

Tu and Th, 9-11 am

VOLUNTARY WITHDRAWAL:

Nov. 17, 2017

REQUIREMENTS/REGULATIONS

- Student Responsibilities: It is the responsibility of each student to contact the instructor if he or she is uncertain about his or her standing in the course and about his or her potential for receiving a failing grade. Students should also familiarize themselves with Sections 4 and 6 of the Regulations dealing with incomplete term work, deferred examinations, and attendance and withdrawal.
- Lectures: Attendance at lectures is essential for successful completion of this course. Students must satisfy each evaluation component in the course.

ACADEMIC INTEGRITY:

Students are expected to conduct themselves in accordance with the highest ethical standards of the Profession of Engineering and evince academic integrity in all their pursuits and activities at the university. As such, in accordance with the General Academic Regulations and Requirements of the University of Manitoba, Section 7.1, students are reminded that plagiarism* or any other form of cheating in examinations, assignments, laboratory reports or term tests is subject to serious academic penalty (e.g. suspension or expulsion from the faculty or university). A student found guilty of contributing to cheating in examinations or term assignments is also subject to serious academic penalty

*Plagiarism: to steal and pass off (the ideas or words of another) as one's own : use (another's production) without crediting the source