

**Three Rivers Community College**  
**PHO 290 Advanced Laser Topics**  
**3 Credits**

**Prerequisites:** PHO 240 (Introduction to Lasers) This means you will also have taken two semesters of optics and math through at least Precalculus. You should also have taken at least one EET course.

**Course Objectives and Method**

You have studied many topics in optics and have had an introduction to laser physics and technology. Many of the topics you've seen probably seem to be unrelated to each other and you may not have a good idea of how (or if) they relate to current technology. The goal of Advanced Laser Topics is to fill in some of the missing information and to give you an idea of how what you've learned is related to modern optics/photonics technology. This goal will be accomplished through a combination of classroom lectures, reading (current journals, web sites or company literature), guest speakers from industry and company visits. You will also perform some laboratory investigations, also scheduled for the class time.

**Required Text:** None. However, there will be extensive use of handouts so you will need a binder to keep them in order. You will also keep an online journal at WebCT where you will do pre-labs and respond to questions about trips and speakers.

**Attendance Policy**

Since there is no textbook for this course, it is absolutely essential that you attend every class. If you must miss a class, you will have to ask a classmate for notes.

If there is a weather advisory and it is not clear if class will be held, call my office phone (885-2353) after 7:30 AM on the day of the class to find out if I will be in.

**Topics**

Because the course aims to keep up with the state of the art, topics vary from year to year. For Spring 2007, the topics will tentatively include:

- Optical Image Processing (Fourier Optics) (tentative guest speaker?)
- The elements of a DWDM system. You will study the components that make up the system (DFB lasers, multiplexers and demultiplexers, circulators, filters, etc). You will also perform several laboratory investigations, including some or all of:
  - Use of the optical spectrum analyzer to study DFB laser operation and characteristics
  - Erbium doped fiber amplifier (EDFA) characteristics
  - Creation a model WDM system from components
- Optical fabrication techniques (possibly combined with a trip to Zygo)
- Fiber lasers (IPG photonics)
- Specialty fiber manufacture and test (possible trip to OFS)
- Lens design software (OSLO)
- Laser Manufacturing

## **Assessment Policy**

The grade for this course will be based on your written reports on the course activities. Each speaker and field trip will result in a one page summary of knowledge gained. In addition, the laboratory experiments will require written reports. Homework, usually in the form of questions about the lab, trip or speaker of the week, will be posted on the WebCT course site in a private folder for your response. You will be expected to complete the pre-lab exercises before any lab experiment is done.

Field trips are a very important part of this class, since they are your opportunity to see how optics is currently applied in industry and to look at some of the places you may be working. You will be expected to attend all field trips specifically scheduled for this course. These will be scheduled during class time. Understanding that travel will make the field trips take longer than a class (up to 4 hours), you may miss one field trip with permission, and an alternate assignment will be provided.

Approximate grade breakdown:

Lab reports: 50%

Other reports: 25%

Homework: 25%