Chemistry of Optical Organic Materials

6484- Spring 2012

Tuesdays and Thursdays: 9:35-10:55 am
Lecture Hall 1201A, MoSE Building

Dr. Seth Marder:
Office – MoSE Building – Room 1100M
Phone – 404-385-6048
e-mail – seth.marder@chemistry.gatech.edu
Assistant: veronique.bredas@chemistry.gatech.edu

Dr. Jean-Luc Brédas:
Office – MoSE Building – Room 2100M
Phone – 404-385-4986
e-mail – jean-luc.bredas@chemistry.gatech.edu
Assistant: dawn.franklin@chemistry.gatech.edu

The goal of this course is to provide a broad description of the basic chemical and physical concepts that determine the properties of optically active materials. Examples of organic materials will be used to illustrate these key concepts. The discussion will include aspects of synthesis, electronic structure, physico-chemical characterization, and device applications.
There are no specific prerequisites.

Assignments will take the form of reading papers, which will be part of the mid-term and final exams. There will be two mid-term exams on February 21 and March 27 and a final exam on May 03.

Grading (the exams will include as well questions on review articles):

1st Mid-term	100
2nd Mid-term	150
Final	250
Total	500

	Date	Topic
1	Jan. 10	Electronic Structure of Organic Materials JLB
2	Jan. 12	Electronic Structure of Organic Materials JLB
3	Jan. 17	Donors and Acceptors SRM
4	Jan. 19	Electronic Structure of Organic Materials JLB
5	Jan. 24	NO CLASS
6	Jan. 26	Concepts of Polarization SRM
7	Jan. 31	Light Absorption SRM
8	Feb. 02	Light Absorption and Applications of Dyes SRM
9	Feb. 07	Light Propagation in Materials JLB
10	Feb. 09	Light Propagation in Materials and Optical Fibers JLB
11	Feb. 14	Second-order Processes SRM
12	Feb. 16	Optical Fibers JLB
13	Feb. 21	First Mid-term
14	Feb. 23	Intro to Quantum Mech. Approaches and EM radiation JLB
15	Feb. 28	Quantum Mech. and Perturbation Theory of Polarizability to 3^{rd} order JLB
16	Mar. 01	Quantum Mech. and Perturbation Theory of Polarizability to 3^{rd} order JLB
17	Mar. 06	Photochromism and Optical Limiting SRM
18	Mar. 08	Structure-Property Relationships for NLO SRM
19	Mar. 13	Calculation of NLO Properties JLB
20	Mar. 15	Structure-Property Relationships for NLO SRM
21	Mar. 20	Spring Break - No class
22	Mar. 22	Spring Break - No class
23	Mar. 27	Second Mid-term
24	Mar. 29	Second-order NLO materials SRM
25	Apr. 3	Lasers JLB
26	Apr. 5	Lasers JLB
27	Apr. 10	Liquid Crystals SRM
28	Apr. 12	Lasers JLB
29	Apr. 18 Note unusual day!	Third-order Processes and Materials SRM
30	Apr. 19	Two-Photon Absorption SRM
31	Apr. 24	Review – JLB
32	Apr. 26	Review – SRM
33	May 03	Final Exam 8:00 am - 10:50 am