Chemistry 6155
Spectrochemical Analysis

Spring 2016 - 3 Credits
M, W, F 6th Period; Leigh Hall 242

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Office hours: any time after each class or by appointment
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Lectures: M, W, F 6th Period (12:50 pm to 1:40 pm); CBD 0224

Textbook: **Principles of Fluorescence Spectroscopy**, 3rd Edition (**optional**)
Joseph R. Lakowicz
Spinger, New York, 2006

Exams: There will be two in-class exams. Exams will be closed book/notes, except each student can bring in two pages, both sides, with any information desired. All complaints about exam grading must be submitted in writing within three weekdays after the exams are returned. If you cannot attend a scheduled exam, notify Dr. Tan in advance, if possible. There will be no make-up exam.

Midterm Exam:	A few days before Spring Break, 2016
Final Exam:	In late April, 2016

Problem based learning: Self learning practice based on problems of common interest. Details will be given later.

Grading System: Your grades will be based upon your performance on the following:

Midterm Exam	150 points
Final Exam:	150 points
Problem based learning:	200 points
Total:	500 points

Goals for Problem based learning (PBL):

Learning Issues:

Identifying the key issues in a specific problem;
Knowing the frontier research in related areas;
Getting to know the key scientists in this area;
Management issues of putting together a research team and defining each person's role;
Learn what specific aims are (and hence hypotheses from which they are defined) and how they define a research project.

Learning ability;

Acquiring knowledge quickly;
Critical thinking ability;
Communication ability;
Presentation ability;
Critical reviewing ability;
Organization ability;

Example:

Problem Based Learning (PBL)

Gene delivery and monitoring in living specimen

The Human Genome project has deepened our understanding of genes and brought new challenges and opportunities for medicine and biomedical research. Gene delivery is a crucial biotechnology in biomedical research, disease diagnosis and therapeutical treatment as we move into the era of "Molecular Medicine". Even though there are a few gene delivery technologies available, gene delivery into living specimen and gene monitoring have been very challenging. In this Problem Based Learning exercise, you are asked to develop efficient technologies for gene delivery into living specimen and also the monitoring of the delivered gene inside living specimen. The techniques will have to be efficient, reproducible and with minimal damage to the biological systems. You will have to do to following (at least):

1. Survey the current state-of-the-art technologies in this area;
2. Analyze the key issues (challenges) involved in gene delivery and gene monitoring in living specimen and possible solutions to these issues;
3. Develop (or optimize) your own most efficient technologies for gene delivery and monitoring in living specimen;
4. Design a series of experiments to test your ideas;
5. Fairly compare the existing technologies and the one you believe to be the most efficient technology;
6. Discuss the commercialization feasibility of your proposed technologies.

Each student is asked to do all above individually within the first week. The class will then be divided into a few subgroups. Each subgroup will decide its main ideas regarding the scientific approaches. Using about two weeks, each student will generate a preliminary report (2 to 5 pages with figures or sketchers). The group will then take about two weeks to discuss the proposal, write a group report and prepare a group presentation. Each sub-group will present its proposal to the class, and the presentation will be evaluated.

The grade for the Problem Based Learning is based on four issues: the individual report (30%); the group report (30%); the presentation (25%); and the critical review of other people's proposal (15%).