Texas A&M-Commerce Fall 2012

CHEM 597-Advanced Research Techniques and Design II

CLASS TIME AND LOCATION: Class: M/T/W/R/F flexible; SCI # 313/309/354.
INSTRUCTOR: Dr. Laurence Angel, SCI 341
Phone: 5391, Laurence.Angel@tamuc.edu
OFFICE HOUR: Mon-Fri: 5:00-6:00pm or by appointment.

COURSE DESCRIPTION: The course will provide students with the knowledge and skills needed to conduct laboratory research and design experiments. Data analysis and report writing skills will also be developed which are needed to interpret laboratory research and produce technical scientific reports. Over the course we will cover a range of instrumental and data analysis techniques. You will become familiar with MassLynx, Driftscope and SigmaPlot for data analysis, Web of Knowledge and Endnote for searching scientific literature and developing a bibliography. You will also be required to develop critical reading skills of research papers and develop your technical writing skills. The class will be assessed by weekly written reports and research presentations. The class is 3 semester hours.

STUDENT LEARNING OUTCOMES: Students will gain the necessary skills involved in conducting instrumental scientific research. The skills will include mass spectrometry, ion mobility, high performance liquid chromatography, UV-Vis spectrophotometry, computational modeling, oral presentations, report writing, critical reading, chemical database searching and review of the chemistry literature. During the course you will develop the skills and material needed for a technical research report. The database searching portion of the course will familiarize you with the software tools of Web of Science and Endnote. The instrumental analysis portion of the course will cover ion mobility (IM) and quadrupole and time-of-flight mass spectrometry (Q-TOF MS), and may include advanced high performance liquid chromatography (HPLC), peptide synthesis, infrared spectroscopy (IR), atomic absorption spectroscopy (AAS), gas chromatography (GC), and ultra-violet and visible (UV-VIS) spectroscopy. The computational portion of the course will use the new Gaussian computational suite of programs on the computer cluster for exploring a range of chemical properties such as molecular geometries and metal ion binding affinities. Students will be required to complete weekly assignments, present their research results to the group and develop weekly research progress reports.

COURSE REQUIREMENTS, ASSIGNMENTS AND GRADING:

Research assignments:
Weekly research assignments: introduction to a scientific problem, literature review report, mass spectrometry, ion mobility, HPLC, UV-Vis, and computational modeling research. (50%)
Midterm research report: based on research results, literature review and bibliography (10%)
Final research report: based on research results, literature review and bibliography (20%)
Oral presentation: based on your lab and literature research (20%)

A: >85.0; B: 75.0 ~ 84.9; C: 65.0 ~ 74.9; D: 55.0 ~64.9; F: <55.0
**Students with Disabilities:** The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you have a disability requiring an accommodation, please contact: **Office of Student Disability Resources and Services, Texas A&M University-Commerce, Halladay Student Services Building, Room 303 A/D, Phone (903) 886-5150 or (903) 886-5835, Fax (903) 468-8148. StudentDisabilityServices@tamu-commerce.edu**

**ATTENDANCE POLICY:**

All students are expected to attend lab and classes on a regular basis. The Department of Chemistry adheres to the attendance policy set by the University as stated in the most current Undergraduate Catalog. The attendance record is kept by roll check. Being more than 5 minutes late to class is equivalent to missing a class. Excessive absence is defined as missing more than 10% of the classes or more than 10% of the laboratory sessions without excusable reasons. Excessive absence will be reported to the Dean of the College and the Dean of Students. In addition, **according to the TAMU-Commerce Procedure A13.02, if a student has excessive absences, the instructor may drop the student from the course.** The instructor will only excuse an absence if the student provides, with appropriate documents an excusable reason allowed by the TAMU-Commerce Procedure A13.02. Regular class attendance is necessary in order to pass this course.

**DISHONESTY:**

The reports must be written by the student. Any instance of cheating will result in a grade of “F” for and could result in dismissal from the course. Freedom to discuss problems and your research does not mean that you can copy other peoples work. You must develop your reports on your own. Blatant plagiarism will result in a grade of “F” for the assignment. Proven offenders will be dismissed from this course with a grade of “F” assigned. The offender will be reported to the Dean of the College and the Dean of Students.