CHEM 497- Research Techniques and Design I

LAB TIME AND LOCATION: Mon-Fri; SCI # 313/309/354.
INSTRUCTOR: Dr. Laurence Angel, SCI 341
Phone: 5391, Laurence.Angel@tamuc.edu
OFFICE HOURS: Mon-Fri: 4:00-5:00pm.

COURSE DESCRIPTION: The course will provide students with the knowledge and skills needed to conduct laboratory research, analyze research data, and write research reports. Data analysis and report writing skills are important aspects for interpreting the laboratory research and producing technically concise scientific reports. Over the duration of the course you will apply a range of instrumental, computational and data analysis techniques. You will be expected to become familiar with the software MassLynx, Driftscope, Excel and/or SigmaPlot for data analysis, and the software of Web of Knowledge and Endnote for searching and collecting scientific literature related to your project. 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 the completion of weekly research assignments, the submission of midterm and end of semester research reports, and a research presentation. The class is 3 semester hours.

STUDENT LEARNING OUTCOMES: Students will gain the necessary skills involved in conducting instrumental and/or computational scientific research. The skills may include mass spectrometry (MS), ion mobility (IM), high performance liquid chromatography (HPLC), ultraviolet-visible (UV-Vis) spectrophotometry, computational modeling, chemical database searching, critical reading, report writing, and review of the chemistry literature. During the course you will develop the skills and collect the materials necessary 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 and quadrupole and time-of-flight mass spectrometry (Q-TOF MS), and may include high performance liquid chromatography (HPLC), circular dichroism (CD), fluorescence, and ultra-violet and visible (UV-VIS) spectroscopy. The computational portion of the course will use the Gaussian computational suite of programs on the computer cluster for exploring a range of chemical properties of molecules such as molecular geometries and metal ion binding affinities. Students will be required to complete weekly research assignments and present their research results to the professor through the submission of a midterm and final report.

COURSE REQUIREMENTS, ASSIGNMENTS AND GRADING:

Oral presentation: based on your lab and literature research (20%)
Lab conduct and productivity: based on your performance in the lab (20%)
Midterm and Final research report: based on literature review, research results, and bibliography (30% each)

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

LABOROTORY ATTENDANCE POLICY:

All students are expected to attend lab sessions at the agreed time schedule. Students who are not present in lab during their assigned time will be issued a warning. Continued absence will result with a removal of the student from the course with a grade of "F". The student is also required to complete lab assignments on a weekly basis. The attendance record is also kept by the completion of assignments and on a weekly basis and the submission of the weekly lab report. Being more than 10 minutes late to lab is equivalent to missing the lab. Excessive absence is defined as missing more than 10% the laboratory sessions without excusable reasons. A final lab report and research presentation is also required for the course.

DISHONESTY:

The reports must be written by the student. Any instance of cheating will result in a grade of "F" for and 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 individual reports of your own. Blatant plagiarism will result in a grade of "F" for the course. Proven offenders will be dismissed from the research group.