Course Syllabus
Spring 2018
Chemistry 476 100
Chemical Research

Course Description: Individual study and/or laboratory research.

Number of Credit Hours: 1 – 4 semester hours

Course Prerequisites and Corequisites: Prerequisite: CHE 275 and consent of the instructor. Pass-Fail grading.

Program Learning Outcomes:
3. The student will perform qualitative/quantitative chemical analyses/syntheses using modern instrumentation.
4. The student will articulate scientific information through oral communication. (depending on instructor or project)
5. The student will articulate scientific information through written communication.
6. The student will demonstrate ability to integrate knowledge content, laboratory skill, critical thinking and problem solving, and communication skills via participation in research projects.

General Education Core Curriculum Objectives: There are no specific general education core curriculum objectives in this course. This course is not a general education core curriculum course.

Course Objective: The student should demonstrate their ability to conduct independent research.

Student Learning Outcomes: Upon completion of this course, students will be able to:
• apply the chemistry knowledge obtained during the college career. (PLO 3, 6)
• analyze experimental results based upon trends in data. (PLO 5)
• practice the safe use/handling of chemicals and their proper storage. (PLO 3)

Outline of Topics (approximate course time):
Variable: dependent on instructor and selected course content.
Name: Dr. Darrell R. Fry
Department: Chemistry & Biochemistry
Email: frydr@sfasu.edu
Phone: (936) 468-1406
Office: M-120
Office Hours: MWF 11-12; TR 9:30-11 and by appointment
Class meeting time and place: TBA, C-306

Text and Materials:
Lab notebook and literature pertaining to research topic.

COURSE CALENDAR:
Student will conduct an independent research project under the guidance of the professor. The student will adhere to an agreed timeline between the student and professor.

GRADING POLICY:

Final Report: This report should cover the background material for the project, data, and interpretation of the results. This report should be written following the guidelines of the department. Report is due 11/10/2017. (50%)

Lab Notebook: The student will develop and maintain a research notebook. (50%)

Method of Evaluation: Grading scale will be pass/fail and will consist of the following:
- Final Report - 250 pts (50%)
- Friday Seminar - 250pts (50%)
- Grading scale - Pass=500 - 348; Fail=347 and below

ATTENDANCE POLICY:
The student will work at the student's own pace, but instructor must be informed of the student's hours that he/she will work.

Students will meet weekly with the faculty member for at least 2 hours and 50 minutes. Students may miss only three weeks before their grade will be lowered (50 points per absence).

ACADEMIC INTEGRITY (A-9.1):
Academic integrity is a responsibility of all university faculty and students. Faculty members promote academic integrity in multiple ways including instruction on the components of academic honesty, as well as abiding by university policy on penalties for cheating and plagiarism.

Definition of Academic Dishonesty
Academic dishonesty includes both cheating and plagiarism. Cheating includes but is not limited to (1) using or attempting to use unauthorized materials to aid in achieving a better grade on a component of a class; (2) the falsification or invention of any information, including citations, on an assigned exercise; and/or (3) helping or attempting to help another in an act of cheating or
plagiarism. Plagiarism is presenting the words or ideas of another person as if they were your own. Examples of plagiarism are (1) submitting an assignment as if it were one's own work when, in fact, it is at least partly the work of another; (2) submitting a work that has been purchased or otherwise obtained from an Internet source or another source; and (3) incorporating the words or ideas of an author into one's paper without giving the author due credit.

Please read the complete policy at http://www.sfasu.edu/policies/academic_integrity.asp

Any student found cheating will be subject to the penalties as stated in the Student Code of Conduct handbook; including but not limited to a score of zero on exam, expulsion from the class or expulsion from the University.

WITHHELD GRADES SEMESTER GRADES POLICY (A-54):
Ordinarily, at the discretion of the instructor of record and with the approval of the academic chair/director, a grade of WH will be assigned only if the student cannot complete the course work because of unavoidable circumstances. Students must complete the work within one calendar year from the end of the semester in which they receive a WH, or the grade automatically becomes an F. If students register for the same course in future terms the WH will automatically become an F and will be counted as a repeated course for the purpose of computing the grade point average.

The circumstances precipitating the request must have occurred after the last day in which a student could withdraw from a course. Students requesting a WH must be passing the course with a minimum projected grade of C.

STUDENTS WITH DISABILITIES:
To obtain disability related accommodations, alternate formats and/or auxiliary aids, students with disabilities must contact the Office of Disability Services (ODS), Human Services Building, and Room 325, 468-3004 / 468-1004 (TDD) as early as possible in the semester. Once verified, ODS will notify the course instructor and outline the accommodation and/or auxiliary aids to be provided. Failure to request services in a timely manner may delay your accommodations. For additional information, go to http://www.sfasu.edu/disabilityservices/.

CHEMISTRY - UNDERGRADUATE RESEARCH REPORT
Overall Structure-Students will produce a high quality word processed document (in Microsoft Word).

- The report will be double spaced—using 12 point font and 1” margins
- Each page will be numbered in the center bottom of the page.
- Students will use subscripts, italics and Greek symbols as appropriate. Do not use shorthand notation, computer notation or slang. For example, use $\alpha$ instead of alpha, 1.5x $10^{-5}$ not 1.5E-5, $K_a$ not Ka, $x^{2}$ not x^2. Do not write special characters by hand. Learn to create the necessary symbols and notation using computer software. All equations must be generated with an equation editor (e.g. Microsoft equation).

- All tables should contain a caption and should be numbered sequentially (do not use Roman numerals). Tables should be generated with an appropriate software (word, excel, etc).

- All figures should contain a caption and should be numbered sequentially. Graphs should be generated with appropriate software.
• Tables and figures may be included with text or may be placed on a separate page.

• All sources should be cited using the format employed in the Analytical Chemistry Journal.

1.) **Title Page** on the title page please include

   *This is a living document which was updated _____________. I plan to present my findings in the spring of ______.*

2.) **Abstract**

   This is a short, quantitative discussion of the main purpose and findings of the experiment. It should be stated clearly and briefly. What was done and what results were obtained.

3.) **Introduction/Literature Review**

   In general, the section will consist of a brief review of the major field, and a more intensive coverage of the specific topic at hand. You want to give the background of the project which will help define your purpose.

4.) **Experimental**

   Should begin with a listing of where the chemicals used were obtained, what the purity was, and any prior purification of the starting material. The manufacturer and model number of all major equipment should be listed. The manner in which spectra were obtained should be included. The experimental equipment and glassware should be described, with a diagram if necessary. All diagrams should be labeled and numbered. All steps performed in the experimental procedure should be listed in the order that they were performed, in exactly the manner in which you performed them. Observations as to physical and chemical changes should be included.

5.) **Results**

   List all data obtained with information provided as to how the data was obtained, as well as the experimental accuracy of all measurements. The data should be compiled into tables or graphs if appropriate. All figures, spectra, and tables should be labeled, contain important parameters, and numbered. Only significant results should be presented.

6.) **Discussion**

   Data should be discussed and evaluated, both positively and negatively. Do not try to twist the data to fit the results you think should be obtained. Let the data "speak for itself", and evaluate the data fairly, even if the data seem to contradict theory you may have been expecting the data to follow. If theory predicted a straight line and your results confirmed the theory, then say so, remembering that the slope and the intercept may be of importance also. If the anticipated straight line was not obtained, say so, and give reasons why it was not obtained. Explain why or why the data does not agree with the theory. Bear in mind that the Discussion is the building block for the Conclusions. One should be able to read your discussion without making undue reference to your results section. Quite often the results of an experiment do not confirm theory. The reader will be interested in why the discrepancy exists, and it is the function of the writer to supply the information. Use the discussion section for comparison, generalizations, and other relations. Don’t describe your graphs verbally; discuss their
significance. A discussion of possible sources of error should be included as well as any limitations which may have affected the validity, and/or application of the results.

7.) **Conclusion**
The conclusions are deductions from the results, not statements of the results. The conclusions should be limited to the experimental work at hand, but if the work confirms or is contrary to accepted theory, a conclusion may be written based on that fact. Purely personal opinions or general statements should not be written. In a well-written report, the reader will have been led to the point where the writer’s conclusions seem obvious and inevitable.

8.) **Recommendations**
This section should include recommendations for changes in equipment or procedure to improve accuracy or usefulness of the results for future work. The basis for these recommendations should have been developed in the discussion section. You should state the problem; describe the effect it has on the results, and how to fix the problem.

9.) **Reference** *(Do not use only web address references – report requires over 50% grounded references)*
*The majority of references must be journal articles and not websites or textbooks. Papers with an inappropriate reference section will not be giving a passing grade.* All materials that were used in writing the laboratory report or to gather background material should be listed. References should be consecutively numbered, as encountered in the lab report. The reference number should be superscripted following the phrase or idea that is being referenced.

Journal citation: authors (last name first), title of journal (usually abbreviated, in italics), year of publication (boldface), volume number (italics), and page number.


Book citation: authors (last name first), title of book (italics), edition (if other than first), publisher (followed by colon), city (and state if the city is small) of publication, and the year of publication.


10.) **Appendices**