Course Syllabus  
Fall 2017  
Chemistry 475 100  
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.
Class Syllabus
Fall 2017
CHE 475 100
Research

Name: Dr. Darrell R. Fry
Department: Chemistry & Biochemistry
Email: frydr@sfasu.edu
Phone: (936) 468-1406
Office: M-120
Office Hours: MWF 10-11; TR 12-1 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:
Progress Report: This report is due at the end of the semester (12/1/2017) using the appropriate department form. (10%)

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. (45%)

Attendance and assignments in Friday Seminar: The student will attend the Friday Seminar Series and complete all assignments related to this course. (45%)

Method of Evaluation: Grading scale will be pass/fail and will consist of the following:
- Progress report 50 pts (10%)
- Final Report - 225 pts (45%)
- Friday Seminar - 225pts (45%)
- 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.

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/.
1.) Title Page

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**

**Note**: Report must be typed in 12 pt font, 1 in. margins
<table>
<thead>
<tr>
<th>Topic</th>
<th>Date</th>
<th>Instructor or Presenter</th>
<th>Notes/Assignments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research at SFA Chemistry and Biochemistry Department</td>
<td>Sept. 1</td>
<td>Janusa</td>
<td>Students meet with at least 2 professors to discuss research possibilities</td>
</tr>
<tr>
<td>Safety Training</td>
<td>Sept. 8</td>
<td>Franks</td>
<td></td>
</tr>
<tr>
<td>Maintaining a good laboratory notebook/ethics in research</td>
<td>Sept. 15</td>
<td>Odunuga</td>
<td></td>
</tr>
<tr>
<td>Faculty Research Highlight</td>
<td>Sept. 22</td>
<td>Gary and Han</td>
<td>Students submit a typed 2-paragraph summary of their meeting with prospective research advisors - #1</td>
</tr>
<tr>
<td>Use of Excel and Statistical analysis</td>
<td>Sept. 29</td>
<td>Fry</td>
<td>Students choose research advisor</td>
</tr>
<tr>
<td>SFA Library Resources – how to do a literature search</td>
<td>Oct. 6</td>
<td>Library</td>
<td>Students submit a project topic - #2. Students begin literature review</td>
</tr>
<tr>
<td>Making sense of literature review</td>
<td>Oct. 13</td>
<td>Odunuga</td>
<td>Students continue literature review</td>
</tr>
<tr>
<td>Library Resources – doing the actual literature search</td>
<td>Oct. 20</td>
<td>Library</td>
<td>Students continue literature review</td>
</tr>
<tr>
<td>Writing a good proposal – SFA Chem. &amp; Biochem. format (samples and exercises)</td>
<td>Oct. 27</td>
<td>Odunuga</td>
<td>Students submit a typed 1-page summary of review of at least 5 current (≤ 10 years) articles relevant to their proposed research. Cited references should be listed on second page following the ACS Style Guide with Journal of Chemical Education preferences (see notes on reference format below) - #3</td>
</tr>
<tr>
<td>Opportunities in the department (Welch, patent course) and after graduation</td>
<td>Nov. 3</td>
<td>Harris</td>
<td>Students submit first draft of proposal - #4</td>
</tr>
<tr>
<td>Writing a good scientific report:</td>
<td>Nov. 10</td>
<td>Odunuga</td>
<td>Students submit second draft of proposal - #4</td>
</tr>
<tr>
<td>- samples and exercises</td>
<td></td>
<td></td>
<td>Student given assignment that involves writing a report on a previous project</td>
</tr>
<tr>
<td>- Semester progress report versus complete scientific report</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Writing a good scientific report cont’d – samples and exercises</td>
<td>Nov. 17</td>
<td>Odunuga</td>
<td>Students submit final draft of proposal - #5</td>
</tr>
<tr>
<td>Interview with previous students and Discussion about Welch application – forms and process</td>
<td>Dec. 1</td>
<td>Odunuga</td>
<td>Students submit corrected scientific report - #7</td>
</tr>
<tr>
<td>Final class</td>
<td>Dec. 8</td>
<td>Odunuga</td>
<td>Students submit completed, signed Welch application</td>
</tr>
</tbody>
</table>