Instructor: Maria Matyska-Pesek, Ph.D.
Office Location: DH-501
Telephone: 408-9244951
Email: maria.matyska-pesek@sjsu.edu
Office Hours: Mo We 1:30 to 2:20 and by appointment
Class Days/Time: Section 02 Mo We 10:30 am - 1:20 pm
                Section 03 Mo We 2:30 pm - 5:20 pm
Classroom: DH-413
Prerequisites: Chem 1B with Grade “C” or better ("C-" not accepted)
Course Fees: Inquire in DH-518

Course Description
Chem 055 Quantitative Analysis
Introduction to theories and techniques of chemical analysis. Lecture 2 hours, lab 6 hours.
4 units

BS/BA CHEMISTRY PROGRAM LEARNING OUTCOMES ADDRESSED BY Chem 55 - lab

PLO #3 - Demonstrate understanding of core concepts and to effectively solve problems in analytical chemistry.

PLO #6 - Answer questions regarding safe practices in the laboratory and chemical safety.

PLO #7 - Demonstrate safe laboratory skills (including proper handling of materials and chemical waste) for particular laboratory experiments.
COURSE LEARNING OUTCOMES FOR Chem 55
Upon successful completion of this course, students will be able to:

CLO #1 Perform accurate and precise analysis in the field of analytical chemistry
CLO #2 He or she will be able to keep records of all performed analysis in the manner which is required in modern analytical laboratory.
CLO #3 Student will be able to do statistical analysis and evaluate repetability of obtained results
CLO #4 Perform quantitative and qualitative analysis of known standards as well as unknown samples.
CLO #5 Identify, properly use, and care for equipment and supplies used in analytical laboratory
CLO #6 Identify the requirements for adequate protection of personnel form solvents and materials used in the analysis.

Required Texts/Readings

Other Readings

Other equipment / material requirements
(Lab Notebook: A laboratory notebook, with carbon copy pages, is required for all students. Notebook carbons will be due at the conclusion of each day of lab. All primary data must be taken in the notebook in ink. In many industry or research laboratories, the lab notebook can be used as a legal document, so good notebook habits are essential for success in science! Notebooks can be purchased in Spartan bookstore. It is fine with me if you use part of an old notebook or one in use for another class.

Classroom Protocol

Penalties are imposed if an analysis must be repeated because of poor reported results (8 points out of 100) or if results are reported after announced deadline dates (10 points out of 100). Adequate time is allotted to complete the assignments and to repeat some determinations. If because of illness or other reason a student falls behind, she or he may work outside of the scheduled time if permission is
obtained from the instructor. HOWEVER, A STUDENT SHOULD NEVER WORK ALONE, AND AN INSTRUCTOR SHOULD BE WITHIN CALLING DISTANCE.

Dropping and Adding
Students are responsible for understanding the policies and procedures about add/drops, academic renewal, etc. Information on add/drops are available at http://info.sjsu.edu/web-dbgen/narr/soc-fall/rec-324.html. Information about late drop is available at http://www.sjsu.edu/sac/advising/latedrops/policy/. Students should be aware of the current deadlines and penalties for adding and dropping classes.

Assignments and Grading Policy
See separate sheet for points to be awarded for analyses, quizzes, notebook, calibration of equipment, and technique. Attendance per se will not be used as a criterion for grading according to Academic Policy F-69-24.

University Policies
Academic integrity
Students should know that the University’s Academic Integrity Policy is available at http://www.sa.sjsu.edu/download/judicial_affairs/Academic_Thanksgiving_Policy_S07-2.pdf. Your own commitment to learning, as evidenced by your enrollment at San Jose State University and the University’s integrity policy, require you to be honest in all your academic course work. Faculty members are required to report all infractions to the office of Student Conduct and Ethical Development. The website for Student Conduct and Ethical Development is available at http://www.sa.sjsu.edu/judicial_affairs/index.html.

Instances of academic dishonesty will not be tolerated. Cheating on exams or plagiarism (presenting the work of another as your own, or the use of another person’s ideas without giving proper credit) will result in a failing grade and sanctions by the University. For this class, all assignments are to be completed by the individual student unless otherwise specified. If you would like to include in your assignment any material you have submitted, or plan to submit for another class, please note that SJSU’s Academic Policy F06-1 requires approval of instructors.

University Policies
Campus Policy in Compliance with the American Disabilities Act
If you need course adaptations or accommodations because of a disability, or if you need to make special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours.
Presidential Directive 97-03 requires that students with disabilities requesting accommodations must register with the DRC (Disability Resource Center) to establish a record of their disability.

**Any student with a disability requiring special testing conditions must show the necessary documentation from the university to the instructor within the first two weeks of class.**

### Student Technology Resources

Computer labs for student use are available in the Academic Success Center located on the 1st floor of Clark Hall and on the 2nd floor of the Student Union. Additional computer labs may be available in your department/college. Computers are also available in the Martin Luther King Library. A wide variety of audio-visual equipment is available for student checkout from Media Services located in IRC 112. These items include digital and VHS camcorders, VHS and Beta video players, 16 mm, slide, overhead, DVD, CD, and audiotape players, sound systems, wireless microphones, projection screens and monitors.

### Learning Assistance Resource Center

The Learning Assistance Resource Center (LARC) is located in Room 600 in the Student Services Center. It is designed to assist students in the development of their full academic potential and to motivate them to become self-directed learners. The center provides support services, such as skills assessment, individual or group tutorials, subject advising, learning assistance, summer academic preparation and basic skills development. [The LARC website is located at http://www.sjsu.edu/larc/](http://www.sjsu.edu/larc/).

### SJSU Writing Center

The SJSU Writing Center is located in Room 126 in Clark Hall. It is staffed by professional instructors and upper-division or graduate-level writing specialists from each of the seven SJSU colleges. Our writing specialists have met a rigorous GPA requirement, and they are well trained to assist all students at all levels within all disciplines to become better writers. [The Writing Center website is located at http://www.sjsu.edu/writingcenter/about/staff/](http://www.sjsu.edu/writingcenter/about/staff/).

### Peer Mentor Center

The Peer Mentor Center is located on the 1st floor of Clark Hall in the Academic Success Center. The Peer Mentor Center is staffed with Peer Mentors who excel in helping students manage university life, tackling problems that range from academic challenges to interpersonal struggles. On the road to graduation, Peer Mentors are navigators, offering “roadside assistance” to peers who feel a bit lost or simply need
help mapping out the locations of campus resources. Peer Mentor services are free and available on a drop-in basis, no reservation required. The Peer Mentor Center website is located at http://www.sjsu.edu/muse/peermentor/.

**Exercises:** In this course we will:

a. Discuss quantitative chemical analysis, statistics and error analysis, chemical equilibria, acid-base and buffer chemistry, basic spectrophotometry, chromatography and electrophoresis.

b. Conduct lab experiments in acid–base and EDTA titrametry, flame and solution photometry, electrochemistry, high performance liquid chromatography and capillary electrophoresis

**SAFETY:** Strict adherence to laboratory safety rules is required. You must pass a quiz on safety rules. Wearing eye protection is mandatory. See, ADDENDUM TO ALL CHEMISTRY DEPARTMENT GREENSHEETS.

**EMERGENCIES/EVACUATIONS**

If you hear a continuously sounding alarm, or are told to evacuate by Emergency Coordinators (colored badge identities), walk quickly to the nearest stairway (end of each hall). Take your personal belongings with you as you may not be immediately allowed to return. Follow instructions of Coordinators. Be quiet so you can hear. Once outside, move away from the building. Do not return to the building unless the Police or Coordinators announce that it is permissible. If an alarm should occur during an exam or quiz, please attempt to give your instructor the paper or if taking test on line please attempt to save the test.

**Course Schedule**

See separate sheet for Chem_55 Schedule. *The schedule is subject to change with notice announced during the lab, lecture and on D2L (or Canvas - TBD) website.*
1. Check-in and preliminary operations
   a. Safety orientation and safety quiz, has to be taken on D2L (or Canvas) website before second lab
   b. Review of analytical balance

2. Gravimetric determination of chloride in a solid sample. SILVER IS COSTLY. Put excess 5% AgNO₃ solution as well as solid AgCl in bottles provided. Do not save wash solutions. Report results by February 15th 2013.

3. **Gravimetric Analysis - Quiz – February 20th 2013.**

4. Preparation of standard EDTA solution.


6. Preparation and standardization of 0.1 M NaOH.

7. Calibration of pH electrode. No due date, but please remember to turn in the report (20 points).


9. **Complexing titrations, HPLC - Quiz April 3rd 2013.**

10. Potentiometric titration of a mixture of phosphoric acid and sodium dihydrogen phosphate.


13. **Phosphates, HPCE - Quiz – May 8th 2013.**
HPLC (Determination of components of a mixture of polycyclic aromatic hydrocarbons by high performance liquid chromatography) and HPCE (Capillary Electrophoresis determination of Analgesics) experiments are done in groups of 4 students (due to instrumentation restrictions). There will be a sign up sheet for both experiments. The report for each experiment will be due after next lab period. For example if you perform experiment on Monday May 20th, the report will be due in the end of the lab on Wed. May 22nd, 2013, etc. Grades for the HPLC, HPCE experiments will depend on each individual student (sample preparation-HPLC, report- HPCE).

Due Dates posted below are tentative. You are allowed to determine the order in which you will do the experiments. Reports for any one of the experiments below are due on each due date. Thank you.


16. Check out of locker before last day of laboratory (May 13th 2013) NO LAB Work on May 13th 2013. Students failing to check out officially will be charged a fee for the Service Center to check out the locker.
## CHEMISTRY 55 LABORATORY

**Grading:**
A single letter grade will be assigned for Chem 55 class. A passing grade in Chem 55 course requires a passing grade in both the lecture and the laboratory portion of the course.

<table>
<thead>
<tr>
<th>Chemistry 55 Laboratory points</th>
<th>Maximum</th>
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<tbody>
<tr>
<td>Chloride w/w % gravimetry</td>
<td>100</td>
</tr>
<tr>
<td>Total Hardness (ppm) titration</td>
<td>100</td>
</tr>
<tr>
<td>Ca and Mg w/v %</td>
<td>100</td>
</tr>
<tr>
<td>Calibration of pH electrode</td>
<td>20</td>
</tr>
<tr>
<td>Phosphates w/v % by titration</td>
<td>200</td>
</tr>
<tr>
<td>Preparation of 500 mL pH 7.0 buffer solution</td>
<td>20</td>
</tr>
<tr>
<td>Mn in steel w/w % by: photometry (Spec 20) by AAS Calibration curve</td>
<td>50</td>
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<td></td>
<td>50</td>
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<td>50</td>
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<tr>
<td>HPLC – PAH in the mixture (mg/mL)</td>
<td>100</td>
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<tr>
<td>HPCE – analysis of drug formulations (ppm)</td>
<td>100</td>
</tr>
<tr>
<td>Vitamin C (mg/250 mL) by voltametry</td>
<td>100</td>
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<tr>
<td>Calibration of one instrument</td>
<td>30</td>
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<thead>
<tr>
<th>TOTAL POSSIBLE POINTS</th>
<th>1020</th>
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<tr>
<td>Multiply above by 0.4412 (1020 x 0.4412) = 450</td>
<td>450</td>
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**NOTEBOOK**
- 3 Quizzes (100 points each x 0.42 = 125) | 125 |
- Technique | 25 |

**LAB TOTAL POSSIBLE POINTS**
- Adjusted lab points | 480 |

**GRAND TOTAL FOR THE LAB**
- 480