San José State University  
Department of Chemistry  
Chemistry 55, Quantitative Analysis, Spring, 2015

Course and Contact Information

Instructor: Professor Joseph J. Pesek
Office Location: Duncan Hall 501
Telephone: 408-924-4950
Email: joseph.pesek@sjsu.edu
Office Hours: Mon and Wed, 1200-100 pm
Class Days/Time: Mon. and Wed, 930-1020 am
Classroom: Washington Square 109
Prerequisites: Chemistry 1B

MYSJSU Messaging

Course materials such as syllabus, handouts, notes, assignment instructions, etc. can be found on the Canvas learning management system course website. You are responsible for regularly checking with the messaging system through MySJSU (or other communication system as indicated by the instructor) to learn of any updates.

Course Description

Introduction to theories and techniques of chemical analysis. Prerequisite: CHEM 001B (with a grade of "C" or better; "C−" not accepted); eligibility for ENGL 001A. Lecture 2 hours.

Learning Outcomes

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

Course Learning Outcomes (CLO)

Upon successful completion of this course, students will be able to:

CLO #1 Utilize basic statistical methods to interpret chemical analysis data
CLO #2 Understand and solve complex chemical equilibria involving acids/bases, solubility, metal-ligand complexes, and redox systems
CLO #3 Prepare buffer solutions for pH control
CLO #4 Understand spectroscopic measurements and instrumentation involved in molecular and atomic absorption as well as atomic emission methods.
CLO #5 Understand the theory and instrumentation involved in chromatographic separation processes
CLO#6 Understand the basic theory and instrumentation of potentiometric and amperometric electrochemical methods

Required Texts/Readings

Textbook

*Exploring Chemical Analysis*, 5th ed., Daniel C. Harris, *(RECOMMENDED)*
Supplementary material available at [www.whfreeman.com/qca](http://www.whfreeman.com/qca).

Course Requirements and Assignments

SJU classes are designed such that in order to be successful, it is expected that students will spend a minimum of forty-five hours for each unit of credit (normally three hours per unit per week), including preparing for class, participating in course activities, completing assignments, and so on. More details about student workload can be found in [University Policy S12-3](http://www.sjsu.edu/senate/docs/S12-3.pdf).

Homework problems for extra credit: [http://saplinglearning.com](http://saplinglearning.com)
Instructions for accessing these problems are found on CANVAS

EXAM SCHEDULE

Exam 1: February 25th
Exam 2: April 1st
Exam 3: May 6th

Final Exam: Friday, May 15th, 715 – 930 am

NOTE that [University policy F69-24](http://www.sjsu.edu/senate/docs/F69-24.pdf) states that “Students should attend all meetings of their classes, not only because they are responsible for material discussed therein, but because active participation is frequently essential to insure maximum benefit for all members of the class. Attendance per se shall not be used as a criterion for grading.”

Grading Policy

GRADING: The course grade will be based on the scores obtained for the three hour-exams and the final. Additional points come from three unannounced problem solving sessions that are given during the lecture period and homework problems available from Sapling Learning.

<table>
<thead>
<tr>
<th>3 Hour exams @ 100 pts</th>
<th>Final exam @ 220 pts</th>
<th>Total Exam pts = 520 pts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extra credit for online homework = 50 pts.</td>
<td>Extra credit for in-class problem sessions = 30 pts</td>
<td></td>
</tr>
</tbody>
</table>

There are no make-up exams for missed lecture test on the scheduled day. For any missed exam, the weighted average of your other exams will be used to determine the grade for the missed test. This does only applies to the hour exams, not the final, which must be taken according to university policy.

Classroom Protocol

LECTURE NOTES are available on CANVAS. The notes are not complete but will make it easier for you to follow the lecture material. They are not a substitute for attending lecture. You are expected to arrive at the
start of the class and remain quiet after the lecture begins. There is no cell phone use or texting allowed during class and during exams.

University Policies

General Expectations, Rights and Responsibilities of the Student

As members of the academic community, students accept both the rights and responsibilities incumbent upon all members of the institution. Students are encouraged to familiarize themselves with SJSU’s policies and practices pertaining to the procedures to follow if and when questions or concerns about a class arises. See University Policy S90–5 at http://www.sjsu.edu/senate/docs/S90-5.pdf. More detailed information on a variety of related topics is available in the SJSU catalog, at http://info.sjsu.edu/web-dbgen/narr/catalog/rec-12234.12506.html. In general, it is recommended that students begin by seeking clarification or discussing concerns with their instructor. If such conversation is not possible, or if it does not serve to address the issue, it is recommended that the student contact the Department Chair as a next step.

Dropping and Adding

Students are responsible for understanding the policies and procedures about add/drop, grade forgiveness, etc. Refer to the current semester’s Catalog Policies section at http://info.sjsu.edu/static/catalog/policies.html. Add/drop deadlines can be found on the current academic year calendars document on the Academic Calendars webpage at http://www.sjsu.edu/provost/services/academic_calendars/. The Late Drop Policy is available at http://www.sjsu.edu/aars/policies/latedrops/policy/. Students should be aware of the current deadlines and penalties for dropping classes.

Information about the latest changes and news is available at the Advising Hub at http://www.sjsu.edu/advising/.

Consent for Recording of Class and Public Sharing of Instructor Material

University Policy S12-7, http://www.sjsu.edu/senate/docs/S12-7.pdf, requires students to obtain instructor’s permission to record the course and the following items to be included in the syllabus:

- “Common courtesy and professional behavior dictate that you notify someone when you are recording him/her. You must obtain the instructor’s permission to make audio or video recordings in this class. Such permission allows the recordings to be used for your private, study purposes only. The recordings are the intellectual property of the instructor; you have not been given any rights to reproduce or distribute the material.”
  - It is suggested that the greensheet include the instructor’s process for granting permission, whether in writing or orally and whether for the whole semester or on a class by class basis.
  - In classes where active participation of students or guests may be on the recording, permission of those students or guests should be obtained as well.

- “Course material developed by the instructor is the intellectual property of the instructor and cannot be shared publicly without his/her approval. You may not publicly share or upload instructor generated material for this course such as exam questions, lecture notes, or homework solutions without instructor consent.”

Academic integrity

Your commitment, as a student, to learning is evidenced by your enrollment at San Jose State University. The University Academic Integrity Policy S07-2 at http://www.sjsu.edu/senate/docs/S07-2.pdf requires 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 Student Conduct and Ethical Development website is available at http://www.sjsu.edu/studentconduct/.

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 at http://www.sjsu.edu/president/docs/directives/PD_1997-03.pdf requires that students with disabilities requesting accommodations must register with the Accessible Education Center (AEC) at http://www.sjsu.edu/aec to establish a record of their disability.

Accommodation to Students’ Religious Holidays

San José State University shall provide accommodation on any graded class work or activities for students wishing to observe religious holidays when such observances require students to be absent from class. It is the responsibility of the student to inform the instructor, in writing, about such holidays before the add deadline at the start of each semester. If such holidays occur before the add deadline, the student must notify the instructor, in writing, at least three days before the date that he/she will be absent. It is the responsibility of the instructor to make every reasonable effort to honor the student request without penalty, and of the student to make up the work missed. See University Policy S14-7 at http://www.sjsu.edu/senate/docs/S14-7.pdf.

Student Technology Resources

Computer labs for student use are available in the Academic Success Center at http://www.sjsu.edu/at/asc/ located on the 1st floor of Clark Hall and in the Associated Students Lab 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 DV and HD digital camcorders; digital still cameras; video, slide and overhead projectors; DVD, CD, and audiotape players; sound systems, wireless microphones, projection screens and monitors.

SJSU Peer Connections

Peer Connections, a campus-wide resource for mentoring and tutoring, strives to inspire students to develop their potential as independent learners while they learn to successfully navigate through their university experience. You are encouraged to take advantage of their services which include course-content based tutoring, enhanced study and time management skills, more effective critical thinking strategies, decision making and problem-solving abilities, and campus resource referrals.

In addition to offering small group, individual, and drop-in tutoring for a number of undergraduate courses, consultation with mentors is available on a drop-in or by appointment basis. Workshops are offered on a wide variety of topics including preparing for the Writing Skills Test (WST), improving your learning and memory, alleviating procrastination, surviving your first semester at SJSU, and other related topics. A computer lab and study space are also available for student use in Room 600 of Student Services Center (SSC).

Peer Connections is located in three locations: SSC, Room 600 (10th Street Garage on the corner of 10th and San Fernando Street), at the 1st floor entrance of Clark Hall, and in the Living Learning Center (LLC) in Campus Village Housing Building B. Visit Peer Connections website at http://peerconnections.sjsu.edu for more information.
SJSU Counseling Services (Optional)

The SJSU Counseling Services is located on the corner of 7th Street and San Fernando Street, in Room 201, Administration Building. Professional psychologists, social workers, and counselors are available to provide consultations on issues of student mental health, campus climate or psychological and academic issues on an individual, couple, or group basis. To schedule an appointment or learn more information, visit Counseling Services website at http://www.sjsu.edu/counseling.
## Review and Background Information

(For your review only, will not be covered in class)

### Statistics

Chapter 4

### Gravimetric Methods

Chapters 7-1, 7-2, 7-3

### Chemical Equilibrium Concepts

Lecture Notes & Chapter 6-4

### Activity Concepts

Lecture Notes & Chapter 12-2

### Monoprotic Acid-Base Equilibria

Chapter 8-1 to 8-7

### Polyprotic Acid-Base Equilibria

Chapter 11-1, 11-2, 11-3

### Buffers

Chapter 9-1 to 9-6

### Acid-Base Titrations

Chapter 10-1, 10-2, 10-3, 10-4, 11-4

### Complex Titrations

Chapter 13-1 to 13-6

### Spectroscopy

Chapter 18-1, 18-2, 18-3, 18-4, 19-1

### Atomic Spectroscopy


### Analytical Separations

Chapter 21-1, 21-2, 21-3

### High Performance Liquid Chromatography

Chapter 22-2, 22-3

### Gas Chromatography

Chapter 22-4

### Electrochemistry

Chapter 14-1 to 14-6, 15-1, 15-2, 16-1, 16-2, 17-2, 17-3

<table>
<thead>
<tr>
<th>Final Exam</th>
<th>Venue and Time Washington Square Hall, 109, 715 – 930 am</th>
</tr>
</thead>
<tbody>
<tr>
<td>Friday, May 15th</td>
<td></td>
</tr>
</tbody>
</table>

Not all material in each chapter is covered. Only those topics discussed in lecture will be on exams.
Chemistry 55 Practice Problems
The problems listed below are designed to give you extra practice on the concepts taught in lecture. Completing the problem assignments will better prepare you for the hour exams and final. They are not be turned in and will not be graded. In chapter numerical order, not in topical order.

<table>
<thead>
<tr>
<th>Text Chapter</th>
<th>Problem Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>1, 2, 3, 5, 7, 8, 9, 10, 14, 15</td>
</tr>
<tr>
<td>6</td>
<td>17, 18, 19, 21</td>
</tr>
<tr>
<td>7</td>
<td>2, 3, 4</td>
</tr>
<tr>
<td>8</td>
<td>3, 5, 10, 11, 13, 17, 18, 19, 21, 22, 23, 25, 27, 30, 32</td>
</tr>
<tr>
<td>9</td>
<td>3, 6, 7, 9, 10, 11, 13, 19</td>
</tr>
<tr>
<td>10</td>
<td>6, 7, 8, 9, 12, 15</td>
</tr>
<tr>
<td>11</td>
<td>7, 9, 10, 12, 15, 16, 18, 25, 26</td>
</tr>
<tr>
<td>12</td>
<td>10, 11</td>
</tr>
<tr>
<td>13</td>
<td>1, 19, 20, 21, 24</td>
</tr>
<tr>
<td>14</td>
<td>12, 13a, 23, 25</td>
</tr>
<tr>
<td>15</td>
<td>1, 3, 4</td>
</tr>
<tr>
<td>16</td>
<td>2, 3, 4</td>
</tr>
<tr>
<td>18</td>
<td>14, 16, 19, 21</td>
</tr>
<tr>
<td>19</td>
<td>2</td>
</tr>
<tr>
<td>20</td>
<td>Lecture note problems</td>
</tr>
<tr>
<td>21</td>
<td>2, 7, 8</td>
</tr>
<tr>
<td>22</td>
<td>1a, b, c, 3, 5</td>
</tr>
</tbody>
</table>

Homework problems for extra credit: [http://saplinglearning.com](http://saplinglearning.com)
Instructions for accessing these problems are found on CANVAS