Quantitative Analysis CHEM 3417
Department of Physical & Environmental Sciences
Spring 2020

A. COURSE INFORMATION
   Course number/section: 3417.001 and 3417.101
   Class meeting time: Lecture: TR 12:30-1:45PM; lab: R 2:00-4:50PM
   Class location: Lecture: BH-201; lab: CS-221
   Course Website: https://bb9.tamucc.edu/

B. INSTRUCTOR INFORMATION
   Instructor: Nicolas Holubowitch, PhD
   Office location: CS-242 (Center for Science), Lab: CS-235
   Office hours: MW 1:00-3:00PM, T 2:00-3:00PM
   Telephone: 361-825-2987
   e-mail: nicolas.holubowitch@tamucc.edu
   Appointments: Email or call to schedule an appointment outside office hours

C. COURSE DESCRIPTION
   The course addresses the quantitative aspects of chemical analysis. As the follow-up to General
   Chemistry II it assumes a good knowledge of the basic tools of chemistry such as measurement,
   unit management, mathematics and stoichiometry. Students must be familiar with the
   properties and structures of atoms and molecules including electron configuration, periodicity
   and bonding. A good understanding of acid-base chemistry, kinetics and electrochemistry is
   also required. The concept of energy applied to reactivity must be understood qualitatively and
   quantitatively.

   The course applies a rigorous, quantitative approach to chemistry and emphasizes rational
   thinking and analysis rather than memory and number crunching. The lectures, assignments,
   problems and examinations will stress both concepts and context.

   The core of the course will be the study of measurements, interpretation of results with the help
   of statistics, and specific applications in the fields of chemical equilibrium, acid-base chemistry
   and electrochemistry.

D. PREREQUISITES AND COREQUISITES
   CHEM 1412

E. REQUIRED TEXTBOOK(S), READINGS AND SUPPLIES
Required Textbook

*Exploring Chemical Analysis, Daniel C. Harris.* The latest (5th) edition is recommended. However, students can use a previous edition for economy purpose as long as they are ready to enter some minor updates.

**Supplies**

Scientific calculator.

**F. STUDENT LEARNING OUTCOMES AND ASSESSMENT**

Assessment is a process used by instructors to help improve learning. Assessment is essential for effective learning because it provides feedback to both students and instructors. A critical step in this process is making clear the course’s student learning outcomes that describe what students are expected to learn to be successful in the course. The student learning outcomes for this course are listed below. By collecting data and sharing it with students on how well they are accomplishing these learning outcomes students can more efficiently and effectively focus their learning efforts. This information can also help instructors identify challenging areas for students and adjust their teaching approach to facilitate learning.

In this context the overall learning outcome consists in the ability to analyze a chemistry problem, sort all the available data, design a problem-solving strategy, solve the problem, report the work in a clear, concise, logical and comprehensive manner and, most important, develop a work ethic leading to efficient and effective self-learning.

- Apply the analytical method to the investigation of chemical processes.
- Perform chemical metrology and calculate errors and uncertainties.
- Master the fundamentals of statistics for analytical chemistry.
- Apply thermodynamic equilibrium to the study of solutions
- Describe the acid-base equilibrium involving monoprotic and polyprotic acids.
- Design buffers and solve titration problems.

**G. INSTRUCTIONAL METHODS AND ACTIVITIES**

Lecture presentations, assignments, reading materials, and other course-related information will be posted on Blackboard. Lectures will be followed by a review of chapters, problem solving, and student interaction.

Expectations of the student:

1- Attend the lectures and the labs

2- Review all the lectures and if you have difficulties with anyone of them be tenacious until you grasp the concepts
3- Repeat the exercises done in class

4- Do the lab exercises and homework. Don’t worry so much about the answer than the problem-solving strategy. All problems will be corrected. After correction do them again.

5- If you don’t do well in the first exam catch up the missing lectures, textbook reading and exercises and keep working hard.

6- if you have difficulties with the course, speak to the Professor.

H. MAJOR COURSE REQUIREMENTS AND GRADING

Final grade will be calculated as follows:

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exam 1</td>
<td>100</td>
</tr>
<tr>
<td>Exam 2</td>
<td>100</td>
</tr>
<tr>
<td>Lab, quizzes, homework, participation</td>
<td>100</td>
</tr>
<tr>
<td>Final Exam</td>
<td>100</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>400</strong></td>
</tr>
</tbody>
</table>

The lowest exam grade will be dropped.

Final letter grading for the course will be: A> 90%, B>80%, C>70%, D>60 %, F < 60%.

Exams:

Exams will typically be open questions (no multiple choice). No communication between students is allowed. No communication devices are allowed. The final exam will be comprehensive.

The answers to exam questions must follow a self-explanatory logic. The reading must be clear. All calculations must be presented in detail for at least partial credit and absolutely with the proper units. Most of the questions of the exams will consist in problems similar to those seen in class or lab sessions.

Students must be seated no later than 5 min before the start of the exam. There should be as much distance between each student as the classroom configuration allows and the desk must be empty with the exception of specifically authorized items.

Students are not allowed in the classroom after the start of the exam without the permission of the instructor. In any case no student will be admitted after the first exam-taker has left. Students leaving the room will not be allowed to return unless authorized by the instructor. All material
including intermediate calculations will be turned to the instructor at the end of the exam.

There are no make-up exams. All excuses must be requested in advance with the obvious exception of emergencies. Students with a university approved scheduled absence (athletics, military duty, etc.) should contact the instructor well in advance of the scheduled absence to request an exception. Exams may be taken early in those specific cases. Students who do not arrange to take exams ahead of time will not be eligible for this special consideration. A written excuse from the university department involved or the Office of the Dean of Students may be requested.

Homework and quizzes:

Homework assignments can be given. Quizzes will periodically be given in labs and can be given during lectures.

I. COURSE CONTENT/SCHEDULE

Tentative Schedule:

<table>
<thead>
<tr>
<th>WEEK</th>
<th>TOPIC</th>
<th>CHAPTER</th>
<th>EXAM</th>
</tr>
</thead>
<tbody>
<tr>
<td>T 1/21 &amp; R 1/23</td>
<td>Introduction to chemical analysis</td>
<td>0-1</td>
<td></td>
</tr>
<tr>
<td>T 1/28 &amp; R 1/30</td>
<td>Measurements, units, stoichiometry</td>
<td>1-2</td>
<td></td>
</tr>
<tr>
<td>T 2/4 &amp; R 2/6</td>
<td>Laboratory tools</td>
<td>2-3</td>
<td></td>
</tr>
<tr>
<td>T 2/11 &amp; R 2/13</td>
<td>Math and stats</td>
<td>3, 8</td>
<td></td>
</tr>
<tr>
<td>T 2/18 &amp; R 2/20</td>
<td>Acids and bases</td>
<td>8-9</td>
<td></td>
</tr>
<tr>
<td>T 2/25 &amp; R 2/27</td>
<td>Equilibria, buffers</td>
<td>9, 11</td>
<td></td>
</tr>
<tr>
<td>T 3/3 &amp; R 3/5</td>
<td>Exam 1 review</td>
<td>11</td>
<td>Exam 1</td>
</tr>
<tr>
<td>3/9-3/13</td>
<td>Spring Break</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T 3/17 &amp; R 3/19</td>
<td>Electrode potentials</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>T 3/24 &amp; R 3/26</td>
<td>Electrode measurements</td>
<td>14, 15</td>
<td></td>
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<tr>
<td>T 3/31 &amp; R 4/2</td>
<td>Redox titrations</td>
<td>15, 16</td>
<td></td>
</tr>
<tr>
<td>T 4/7 &amp; R 4/9</td>
<td>Electrochemical analysis</td>
<td>16, 17</td>
<td></td>
</tr>
<tr>
<td>T 4/14 &amp; R 4/16</td>
<td>Exam 2 review</td>
<td>17</td>
<td>Exam 2</td>
</tr>
<tr>
<td>T 4/21 &amp; R 4/23</td>
<td>Spectroscopy</td>
<td>18, 19</td>
<td></td>
</tr>
<tr>
<td>T 4/28 &amp; R 4/30</td>
<td>Ion exchange and electrophoresis</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>T 5/5</td>
<td>Open topics, course review</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R 5/14</td>
<td>Final Exam (Comprehensive) 11am</td>
<td></td>
<td>Final</td>
</tr>
</tbody>
</table>
Note: Changes in this course schedule may be necessary and will be announced to the class by the Instructor. Weekly assignments and exams shown are directly related to the Student Learning Outcomes described in Section F.

Exam Schedule:
Exam 1: Thursday, 3/5/20  Exam 2: Thursday, 4/16/20
Final Exam: Thursday, 5/14/20 (11:00am – 1:30pm)

Note: Changes in this course schedule may be necessary and will be announced to the class by the Instructor. The assignments and exams shown are directly related to the Student Learning Outcomes described in Section F.

• Last day to drop the class: April 10, 2020.

J. COURSE POLICIES

Attendance/Tardiness
Attendance is mandatory. The student is expected to arrive on time prepared to take notes and work on in-class problems with pen or pencil, paper, calculator and colored markers/pencils. If absent, it is the responsibility of the student to obtain missed information from a classmate. Missed information includes not only lecture notes, but also any possible information regarding syllabus changes.

Make-up Exams
There will be no make-up exams or quizzes for this class. If you miss one lecture exam, your final exam grade will be counted twice to replace the missed exam. This applies to ONE exam only. If you miss more than one, you will receive a zero for the additional missed exam(s). For those students who do not miss an exam, your final exam grade will be counted twice to replace your lowest exam grade (assuming that this improves your overall grade). Do not show up late to an exam, no student will be admitted to the exam after the first exam-taker has left.

Extra Credit
None unless specified in class.

Cell Phone Use
Before you enter the lecture hall turn OFF your cell phone! Beepers must also be turned off or put on silent mode. Electronic interruptions will NOT be tolerated! Cell phones must be put away and stored out of sight during all quizzes and exams or you will receive a zero!!

Laptop Use
You are welcome to use a laptop to take notes during class. Do not use it to check email, facebook,
Food in Class
Minimally distracting drinks and snacks are allowed. Do not bring in a meal – this is not a cafeteria.

Participation
You are expected to be attentive and participate in asking/answering questions and in group projects, if assigned.

K. COLLEGE AND UNIVERSITY POLICIES

• Academic Integrity (University)
  University students are expected to conduct themselves in accordance with the highest standards of academic honesty. Academic misconduct for which a student is subject to penalty includes all forms of cheating, such as illicit possession of examinations or examination materials, falsification, forgery, complicity or plagiarism. (Plagiarism is the presentation of the work of another as one’s own work.) In this class, academic misconduct or complicity in an act of academic misconduct on an assignment or test will result in a failing grade.

• Classroom/Professional Behavior
  Texas A&M University-Corpus Christi, as an academic community, requires that each individual respect the needs of others to study and learn in a peaceful atmosphere. Under Article III of the Student Code of Conduct, classroom behavior that interferes with either (a) the instructor’s ability to conduct the class or (b) the ability of other students to profit from the instructional program may be considered a breach of the peace and is subject to disciplinary sanction outlined in article VII of the Student Code of Conduct. Students engaging in unacceptable behavior may be instructed to leave the classroom. This prohibition applies to all instructional forums, including classrooms, electronic classrooms, labs, discussion groups, field trips, etc.

• Statement of Civility
  Texas A&M University-Corpus Christi has a diverse student population that represents the population of the state. Our goal is to provide you with a high quality educational experience that is free from repression. You are responsible for following the rules of the University, city, state and federal government. We expect that you will behave in a manner that is dignified, respectful and courteous to all people, regardless of sex, ethnic/racial origin, religious background, sexual orientation or disability. Behaviors that infringe on the rights of another individual will not be tolerated.

• Deadline for Dropping a Course with a Grade of W (University)
I hope that you never find it necessary to drop this or any other class. However, events can sometimes occur that make dropping a course necessary or wise. Please consult with your academic advisor, the Financial Aid Office, and me, before you decide to drop this course. Should dropping the course be the best course of action, you must initiate the process to drop the course by going to the Student Services Center and filling out a course drop form. Just stopping attendance and participation WILL NOT automatically result in your being dropped from the class. Please consult the Academic Calendar (http://www.tamucc.edu/academics/calendar/) for the last day to drop a course.

- **Grade Appeals (College of Science and Engineering)**
  
  As stated in University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures, a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules website at http://www.tamucc.edu/provost/university_rules/index.html, and the College of Science and Engineering Grade Appeals webpage at http://sci.tamucc.edu/students/GradeAppeal.html. For assistance and/or guidance in the grade appeal process, students may contact the chair or director of the appropriate department or school, the Office of the College of Science and Engineering Dean, or the Office of the Provost.

- **Disability Services**
  
  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 believe you have a disability requiring an accommodation, please call (361) 825-5816 or visit Disability Services in Corpus Christi Hall 116.

  If you are a returning veteran and are experiencing cognitive and/or physical access issues in the classroom or on campus, please contact the Disability Services office for assistance at (361) 825-5816.

  http://disabilityservices.tamucc.edu/

- **Statement of Academic Continuity**
  
  In the event of an unforeseen adverse event, such as a major hurricane and classes could
not be held on the campus of Texas A&M University–Corpus Christi; this course would continue through the use of Blackboard and/or email. In addition, the syllabus and class activities may be modified to allow continuation of the course. Ideally, University facilities (i.e., emails, web sites, and Blackboard) will be operational within two days of the closing of the physical campus. However, students need to make certain that the course instructor has a primary and a secondary means of contacting each student.

L. OTHER INFORMATION

- **Tutoring and Test Taking Strategies**
  To be successful in this course, and most others, you must develop good note-taking skills, organization skills, study habits, and test-taking strategies from the very beginning. Your instructor, seminar leaders and TA’s are always available for help, but don’t wait until it’s too late! It is important that you are aware that the Center for Academic Student Achievement in Room 216 of the library provides free tutoring, test-taking strategies, and extra help. **Take advantage of this service!** Should you have test anxiety, stress problems, or need help with study skills, the University Counseling Center (Driftwood 107: 825-2703) also provides a free service.

- **Use of Electronic Devices During Exams**
  Any use of an electronic device (palm pilot, Cell Phone, MP3 player, CD player, computer …) during an exam is strictly prohibited. Any use of such a device will be considered an attempt to cheat on the exam and will result in a 0 on the exam although more severe actions may be considered. Calculators may be allowed on exams when needed, but only for mathematical operations. The use of programmable calculators to store or retrieve information during an exam will be considered an attempt to cheat on the exam. Also, if a calculator is discovered to have saved programs or information that could be used as an unfair advantage on the exam, this will be considered an attempt to cheat on the exam. Programs or operators that aid in mathematical operations such as a quadratic equation calculator may be used.

- **Assigned Homework**
  The homework assignment for this class contains the minimum suggested amount of problems that you should work during the semester. The more problems you work, the more comfortable you will be with the subject…**DO NOT GET BEHIND.**

- **Academic Advising**
  The College of Science & Engineering requires that students meet with an Academic Advisor as soon as they are ready to declare a major. The Academic Advisor will set up a degree plan, which must be signed by the student, a faculty mentor, and the department chair. Meetings are by appointment only; advisors do not take walk-ins.
Please call or stop by the Advising Center to check availability and schedule an appointment. The College’s Academic Advising Center is located in Center for Instruction 350 or can be reached at (361) 825-3928.

GENERAL DISCLAIMER

I reserve the right to modify the information, schedule, assignments, deadlines, and course policies in this syllabus if and when necessary. I will announce such changes in a timely manner during regularly scheduled lecture periods.