Special Topic: Introduction to Mass Spectrometry - CHEM 4490
Department of Physical and Environmental Sciences
Summer II 2017

A. COURSE INFORMATION

Course number/section: CHEM 4490.001
Class meeting time: MTWR 01:00-02:55 PM
Class location: TBD
Course Website: https://bb9.tamucc.edu/

B. INSTRUCTOR INFORMATION

Instructor: Dr. Hussain Abdulla
Office location: CS-242
Office hours: M, T, W, R 10:00 am- 12:00 pm and by appointment
Telephone: 361-825-6050
e-mail: Hussain.abdulla@tamucc.edu
Appointments: Appointment should be arranged a head of time via e-mail.

C. COURSE DESCRIPTION

Catalog Course Description
The course is taught at an advanced undergraduate/first-year graduate level with the curriculum focusing on the Principle and application of mass spectrometry. The course aims to present foundational theoretical concepts of different mass spectroscopy techniques. This includes different types of mass spectrometer analyzers like Quadrupole, time of flight (TOF), Ion trap, Orbitrap, Ion cyclotron Resonance (ICR), Magnetic and Electromagnetic analyzers. In addition the course will cover some strategies for mass spectrometer data interpretations. It will also provide hand on experience with the Fusion Orbitrap mass spectrometer, and the Isotope Ratio Mass Spectrometer (IRMS) systems available at TAMUCC.

D. PREREQUISITES AND COREQUISITES

Prerequisites
CHEM. 3411, or permission of instructor.

Corequisites
None

E. REQUIRED TEXTBOOK(S), READINGS AND SUPPLIES

Required Textbook(s)
Optional Textbook(s) or Other References

Supplies
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.

By the end of this course, students should be able to:

1) Identify the main type of ion sources and their advantage and disadvantages
2) Describe different types of mass analyzers
3) Explain tandem mass spectrometry.
4) Identify different mass spectrometry/chromatography coupling techniques.
5) Interpret mass spectrometer spectra of unknown compounds.

G. INSTRUCTIONAL METHODS AND ACTIVITIES
The course is given by face-to-face lectures augmented with PowerPoint slides. It will also provide hand on experience with the Fusion Orbitrap mass spectrometer, and the Isotope Ratio Mass Spectrometer (IRMS) systems that available at TAMUCC. Attendance will be taken. There will be two in-class exams and a final exam.

H. MAJOR COURSE REQUIREMENTS AND GRADING
There will also be two (2) in-class exam and a final exam. The in-class exam is will cover the material that has been covered in class up to the date of the examination and the final is comprehensive.

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>GRADE</th>
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<tbody>
<tr>
<td>Two (2) in class Exams</td>
<td>100 each</td>
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<tr>
<td>Final exam</td>
<td>200</td>
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<tr>
<td>Attendance and participation</td>
<td>50</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>350</strong></td>
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Final letter grading for the course will be as follows: A: 90% +, B; 80%+, C; 70% +, D; 60%+, F < 60%.

I. COURSE CONTENT/SCHEDULE

The schedule below is a preliminary outline of the semester. It is your responsibility to keep up with changes to this schedule. The reading and problems assignments should be completed before the due dates. Failure to stay current on reading and problem assignments will greatly affect your ability to keep up during lecture and will affect your grade in this course.

<table>
<thead>
<tr>
<th>DATE (BY DAY OR WEEK)</th>
<th>TOPIC</th>
<th>CHAPTER(S)</th>
<th>ASSIGNMENTS</th>
</tr>
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<tbody>
<tr>
<td>Week of July 3rd</td>
<td>Introduction to mass spectrometry, Ion Sources and mass analyzers</td>
<td>1 and 2</td>
<td></td>
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<tr>
<td>Week of July 10th</td>
<td>Detectors and Tandem mass spectrometry.</td>
<td>3 and 4</td>
<td>Exam 1</td>
</tr>
<tr>
<td>Week of July 17th</td>
<td>Mass spectrometry/Chromatography coupling and Analytical Information</td>
<td>5 and 6</td>
<td></td>
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<tr>
<td>Week of July 24th</td>
<td>Fragmentation Reactions and analysis of biomolecules</td>
<td>7 and 8</td>
<td>Exam 2</td>
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<tr>
<td>July 31st and August 1-4th</td>
<td>Exercises on mass spectroscopy data interpretations</td>
<td>9 and review for final</td>
<td>Final Exam</td>
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</table>

Exam Schedule
Exam 1, July 17th
Exam 2, July 31st
Final Exam: Friday, August 4, 2017

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.

J. COURSE POLICIES

Attendance/Tardiness
I expect students to attend every class meeting. Failure to attend class may affect your performance on scheduled examinations. Lecture notes will only be provided during lecture and will not be repeated in the event that a student fails to attend at the scheduled meeting time. Changes to the course content and schedule will be announced during lectures.

Late Work and Make-up Exams
There will be a 10% reduction, per day, in credit for overdue assignments. Students with a university approved scheduled absence (athletics, military duty, etc.) MUST contact the instructor in advance of the scheduled absence. 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 is required. Exam taken outside class will not be multiple choice and it will not include any bonus points. Bring your university picture ID to all lecture exams.

**Extra Credit**
The addition of extra credit to examinations or for individuals will remain at the sole discretion of the professor.

**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!

**Laptop Use**
Laptops and tablets are allowed in the classroom for course related activities only.

**Food in Class**
No food is allowed in the classroom, unless related to academic activities, medically necessary, or nutritionally sound with teacher permission. But beverages in spill proof containers are permitted.

**Missed Exam**
If an exam date is missed and the student cannot fulfill the above requisites for excuse, an exam grade of 0 will be recorded. Providing a student with an opportunity to make up an unexcused missed examination will remain at the sole discretion of the Professor. NO STUDENT WILL BE ADMITTED TO THE EXAMINATION AFTER THE FIRST EXAM-TAKER HAS LEFT!

**Participation**
Participation in class discussions is required and will count for a significant portion of final grade.

**Others**
Any use of an electronic device (PDA, Cell Phone, MP3 player, Computer etc…) 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 grade of zero on the exam. In addition, more severe actions may also be considered.

**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)**
  The grade of W will be assigned to any student officially dropping a course. Please consult with the instructor before you decide to drop to be sure it is the best thing to do. Just stopping attendance and participation WILL NOT automatically result in your being dropped from the class. Should dropping the course be the best course of action, visit the Office of the University Registrar for the Course Drop Form that must submitted. No student is eligible to receive a W without completing the official drop process by this deadline. Please consult the Academic Calendar ([http://www.tamucc.edu/academics/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](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](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/](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**

- **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.