
Instructor: Dr. Gregory Naumiec Office: 130 Laney-Manion Annex Email: gregn@uca.edu Phone: 852-0692

Google Classroom: classroom.google.com

Google classroom code: k4d0cv

Website: <https://sites.google.com/a/uca.edu/naumiecgrouphome>

Lecture: MW 2:00 PM – 2:50 PM Laney-Manion 103 (305 for lab)

Office hours: MW 9:00 AM –11:00 AM
Or by appointment

What will I learn in this course?

Modern medical imaging techniques have revolutionized how patients are diagnosed, monitored, and treated. This course will introduce you to these medical imaging techniques, as well as allow you to gain an understanding about how these techniques are used to image the body, the underlying chemistry of the techniques, and the chemistry behind the biosensors used. The imaging techniques covered in this course include:

- Magnetic resonance imaging (MRI)
- Positron emission tomography (PET)
- Single-photon emission computed tomography (SPECT)
- Ultrasound
- X-ray
- Optical Imaging

What are the objectives of CHEM 4V09?

- ✓ To gain a good working knowledge of modern imaging techniques.
- ✓ Apply your understanding of organic chemistry to the design and synthesis of imaging probes.
- ✓ Apply your organic chemistry lab techniques and knowledge of NMR spectroscopy to synthesize and test an MRI contrast agent.
- ✓ Familiarize yourself with searching primary chemistry literature using SciFinder.
- ✓ Learn how to disseminate your work scientifically through the writing of an ACS-style journal article and the presentation of your experimental results.

Prerequisite/Co-requisite:

- ✓ Successful completion of CHEM 3211 and CHEM 3411 (C or better).

Required course materials:



- Assigned primary literature articles concerning course material located on Google Classroom (classroom.google.com).
- Composition notebook used for your laboratory notebook.
- Safety glasses (ANSI Z87+)

How can I be successful in this course?

- Keep up to date. Try to read the assigned reading before coming to class so you can be prepared with any questions you have. I understand journal articles are quite dense and difficult to understand on your own but looking them over will be beneficial.
- Class participation is encouraged. A lot of these topics are very interesting, and I envision this course to be heavy in the discussion of these topics. Please ask questions if you need further help understanding something. Chances are, someone else in the class has the same question.
- Visit me during my office hours (or make an appointment or just stop by) if you need help with the material.

Attendance:

- Lecture attendance is strongly encouraged, this is a very difficult subject to learn on your own and we are not working out of a textbook. **Makeup quizzes and assignments will not be given.** In the event of a valid excuse (UCA sanctioned activity) the next quiz will count as double. It is your responsibility to provide me with documentation at least one week prior to the exam or quiz. For all other absences, if you contact me **prior** to the assignment with a **valid** excuse (documented serious illness, etc.) the next exam/quiz will count as double. **Missing an assignment without an acceptable excuse will result in a grade of "0".**
- Disruptive behavior: Ringing phones, text messaging, and talking, are considered disruptive to me and your classmates. **Tardiness is particularly disruptive to the class.** Penalties for disruptive behavior may range from dismissal from class for the day, deduction of points, to an "F" grade for the course.
- **Laboratory attendance is required.** If a laboratory experiment is missed for acceptable reasons (official UCA activity, serious documented illness, etc.), an exception will be made. If a laboratory experiment is missed without an acceptable excuse, points will be lost on the lab assignment. Late arrival to lab may result in a grade of "0" or a lowered lab grade. Missing more than one laboratory experiment without a documented excuse may result in a "F" grade for the course.

Laboratory Safety:



- Laboratory safety is the primary concern when working in a laboratory. During the semester, you will be working with a wide variety of organic chemicals. These can be toxic, carcinogenic, caustic, or flammable. Make sure to always wear the proper personal protective equipment (PPE) - safety glasses and closed toe/heel shoes. You will not be allowed to attend lab without the proper PPE. Handle all organic chemicals carefully. Disregarding safety practices will result in dismissal from lab and a grade of "0" for the day. Prior to performing any laboratory work, you must review and sign the CHEM 4V09 lab safety agreement.
- The lab safety agreement is located at: <https://uca.edu/web/forms/view.php?id=978>

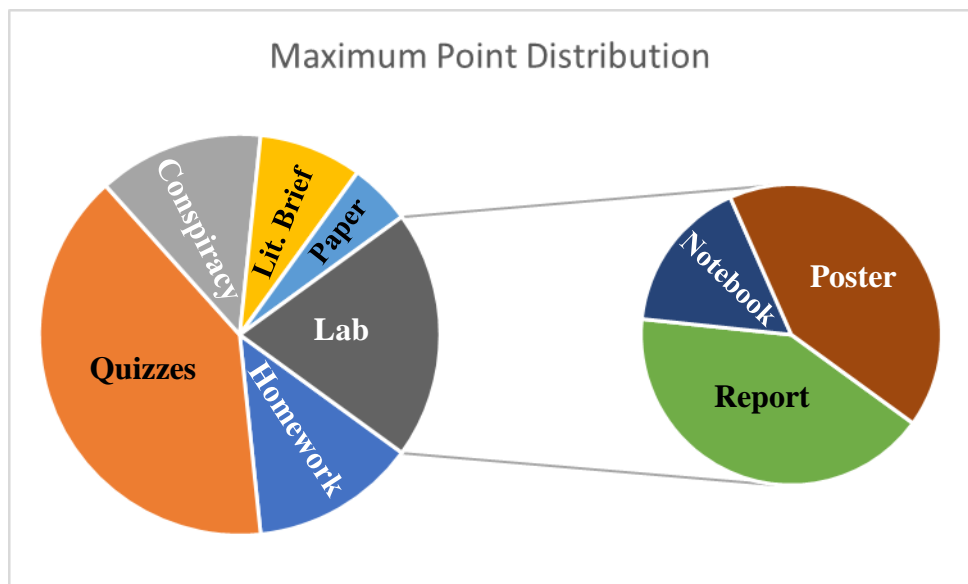
Laboratory Policies and Grading:

- Points may be deducted for poor technique. In the lab, you need to be paying attention to what you are doing. During lab, the instructor will evaluate how well each student is prepared for the lab; follows safety rules; keeps his/her workspace neat; sets up and uses the apparatus properly; is efficient; is able to perform the experiments; works within the group; uses the equipment properly; isolates pure product and (to a lesser extent) in high yield.



Grading:

Lecture	Points
<i>Conspiracy assignments (8)</i>	10 pts each
<i>Quizzes (8)</i>	30 pts each
<i>Homework (8)</i>	10 pts each
<i>Literature brief (2)</i>	25 pts each
<i>Poster</i>	50 pts
<i>Synthesis Paper</i>	30 pts
<i>Laboratory Notebook</i>	20 pts
<i>Laboratory report</i>	50 pts
Maximum Total Points	600



**** Disclaimer: The amount of points in this course may not reach the maximum. The course will move at its own pace and we may not have time to discuss each topic and have the maximum number of quizzes, homework, or conspiracy assignments****

A. Conspiracy Assignments:

- Each imaging technique discussed has elicited some strong negative responses from certain corners of the population. For each imaging technique I want you to delve into the dark corners of the internet (the scary, weird part of the internet where only brave souls (or lunatics) go) to find these conspiracies and then debunk them with the knowledge you have learned in class. There is a maximum of eight of these assignments.

B. Homework:

- Homework problems representative of the material discussed in lecture will be assigned once we start a section and will be worth 10 points each. The due date for the assignment will be determined when it is assigned. Homework sets are due at the beginning of class and late assignments may be accepted for reduced credit. There is a maximum of eight of these assignments.

C. Quizzes:

- There will be a maximum of eight quizzes. These quizzes are comprehensive for each imaging technique discussed and will be worth 30 points each. Each in class quiz will be given at the beginning of class and you will have 15 – 20 minutes to complete it. **Makeup quizzes will not be given unless the reason for absence is an officially sanctioned UCA activity, documented illness, etc.** It is your responsibility to provide me with documentation prior to the quiz. **Missing a quiz without an acceptable excuse will result in a grade of "0".**

D. **Poster Presentation:**

- Your lab group will create and present a scientific poster on the results of their experiments. Each group member will be expected to participate in the presentation. The presentations will be scheduled the day of the final **Friday May 3rd, 10:00 AM – 12:00 PM.**

E. **Papers:**

- There will be several written assignments throughout this course. They will take the shape of literature briefs (2), a brief synthesis paper, and a formal laboratory report.
 1. **Literature Brief:** These assignments will require you to summarize a literature article concerning these imaging techniques. A rubric for these assignments can be found on Google Classroom (classroom.google.com).
 2. **Synthesis Paper:** This assignment will require you to write a “journal article” in the form of Organic Letters (a short communication) to describe the synthesis of a radiotracer. Radiotracers will be assigned toward the beginning of the course. This assignment should follow ACS format. A rubric for these assignments can be found on Google Classroom (classroom.google.com).
 3. **Formal Lab Report:** This assignment will require you to write a formal lab report about the synthesis of your MRI contrast agent in the format of Organic Letters. This assignment should follow ACS format. A rubric for these assignments can be found on Google Classroom (classroom.google.com).

TENTATIVE SCHEDULE

Order of topics to be discussed:

1. Nuclear Chemistry
2. Positron emission tomography
3. Magnetic Resonance Imaging (Laboratory exercises)
4. Ultrasound
5. Single photon emission computed tomography
6. X-ray
7. Optical Imaging (Near Infrared)

Note that this schedule is tentative; assignments are given based upon progress in the course

Drop Deadline: 3/29 (Last day to drop with a “W”)

Schedule for Assignment Due Dates

1/14 (M) – Introduction	1/16 (W) – Introduction
1/21 (M) – MLK Jr. Day (no class)	1/23 (W) – Nuclear Chemistry
1/28 (M) – Nuclear Chemistry	1/30 (W) – PET
2/4 (M) –	2/6 (W) –
2/11 (M) –	2/13 (W) –
2/18 (M) –	2/20 (W) –
2/25 (M) –	2/27 (W) –
3/4 (M) –	3/6 (W) –
3/11 (M) –	3/13 (W) –
3/18 (M) – Spring Break (no class)	3/20 (W) – Spring Break (no class)
3/25 (M) –	3/27 (W) –
4/1 (M) – ACS conference (no class)	4/3 (W) – ACS conference (no class)
4/8 (M) –	4/10 (W) –
4/15 (M) –	4/17 (W) –
4/22 (M) –	4/24 (W) –
5/3 (F) – Presentations: 10:00AM - 12:00PM	

University Academic Policies

Familiarize yourself with all policies included in the 2018–2019 Student Handbook, particularly the following (<http://uca.edu/student/student-handbook>):

- Sexual Harassment Policy
- Academic Policies

Americans with Disabilities Act:

The University of Central Arkansas adheres to the requirements of the Americans with Disabilities Act. If you need an accommodation due to a disability, please contact the UCA Office of Disability Services (450-3135). For more information please refer to the 2016–2017 student handbook (<http://uca.edu/student/student-handbook>).

Academic Integrity:

The University of Central Arkansas affirms its commitment to academic integrity and expects all members of the university community to accept shared responsibility for maintaining academic integrity. Students in this course are subject to the provisions of the university's Academic Integrity Policy, approved by the Board of Trustees as Board Policy No. 709 on February 10, 2010, and published in the *Student Handbook*. Penalties for academic misconduct in this course may include a failing grade on an assignment, a failing grade in the course, or any other course-related sanction the instructor determines to be appropriate. Continued enrollment in this course affirms a student's acceptance of this university policy. For more information please refer to the 2016–2017 student handbook (<http://uca.edu/student/student-handbook>).

Title IX Disclosure:

If a student discloses an act of sexual harassment, discrimination, assault, or other sexual misconduct to a faculty member (as it relates to "student-on-student" or "employee-on-student"), the faculty member cannot maintain complete confidentiality and is required to report the act and may be required to reveal the names of the parties involved. Any allegations made by a student may or may not trigger an investigation. Each situation differs and the obligation to conduct an investigation will depend on those specific set of circumstances. The determination to conduct an investigation will be made by the Title IX Coordinator. For further information, please visit: <https://uca.edu/titleix>. **Disclosure of sexual misconduct by a third party who is not a student and/or employee is also required if the misconduct occurs when the third party is a participant in a university-sponsored program, event, or activity.* For more information please refer to the 2016–2017 student handbook (<http://uca.edu/student/student-handbook>).

Building Emergency Plan Statement:

An Emergency Procedures Summary (EPS) for the building in which this class is held will be discussed during the first week of this course. EPS documents for most buildings on campus are available at <http://uca.edu/mysafety/bep/>. Every student should be familiar with emergency procedures for any campus building in which he/she spends time for classes or other purposes.

Student Evaluations:

Student evaluations of a course and its professor are a crucial element in helping faculty achieve excellence in the classroom and the institution in demonstrating that students are gaining knowledge. Students may evaluate courses they are taking starting on the Monday on the 13th week of instruction through the end of finals week by logging into myUCA and clicking on the Course Evaluations task.