

University of Massachusetts Boston
Department of Chemistry
Chemistry Doctoral Program
Green Chemistry Track
Written Qualifying Exam

Purpose

The written qualifying exam for the Chemistry Doctoral Program is designed to test each student's mastery of fundamental material covered in the required courses of the Green Chemistry Track. The required courses are Introduction to Green Chemistry (Chem 671), Environmental Toxicology (EEOS 635 or equivalent), and three chemistry sub-discipline courses. The sub-discipline courses comprise one course in Physical/Analytical Chemistry (Chem 601 or 602), one course in Inorganic Chemistry (Chem 611 or 612), and one course in Organic Chemistry (Chem 621 or 622). The written tests are meant to determine if the student has acquired broad mastery of material expected of a general doctoral student in chemistry, and of the material expected of one with special commitment to the practice of green chemistry.

Test Procedures

- Only students who have completed the five required courses are eligible to take the written comprehensive examination. The sixth elective course need not be taken prior to the examination.
- **SIX** research articles will be made available to students. Students will need to pick the packet up in person from the Graduate Program Director. It is the responsibility of the student to pick up the packet in a reasonable time frame.
 - The date on which the research articles will be made available will be announced at the beginning of the semester and students have **one week** to pick up their packet.
- Students have **six weeks** to study, research, and learn the background, methodologies, results, and conclusions of the research papers.
 - It is suggested that the students not limit their study to only the given paper and textbooks from their graduate courses.
- The six research articles will include two papers from each of the following sub-disciplines:
 - Inorganic Chemistry
 - Organic Chemistry
 - Physical/Analytical Chemistry
- A single faculty member will be responsible for each of the following:
 - Selection of a journal article
 - Writing the examination questions pertaining to that article
 - Grading student responses to said questions

- The examination will be administered in a single day in two 3-½ hour testing sessions. The date of the exam will be announced at the beginning of the semester. The exam will take place in the Chemistry Conference Room (S-1-89).
 - First session 9:00 am - 12:30 pm
 - Second session 2:00 pm - 5:30 pm
 - Tardiness will not be accepted.
- Students have TWO chances to pass the written qualifying exam.
 - If students are unable to pass the written qualifying exam they will not earn candidacy into the doctoral program.
 - Students who are unable to pass the written qualifying exam in two attempts will be asked to present their research as a Master's Thesis and if successful the student will earn an MS in Chemistry from UMass Boston.
- The written qualifying exam is given twice a year, in January and June.

Test Structure

- Each of the two testing sessions will consist of three separate exams.
 - Each exam will be designed to take approximately one hour to complete and will focus on the material from a single research article.
 - Students will NOT have access to the article during the examination process
 - The three exams in each session will include one exam from each sub-discipline (inorganic, organic and physical chemistry).
 - As a part of each sub-discipline test, there will be at least one question about Green Chemistry (including toxicology) ~ to illustrate that Green Chemistry is a philosophy that weaves itself through all the disciplines.
 - The Green Chemistry questions will be explicitly labeled.
 - At the beginning of each testing session, students will be given all three exams and allowed to use their allotted 3-½ hours as they see fit.
 - Students will be provided with a test booklet for each exam and may use calculators during the testing process.
 - No notes, books, supplementary material, etc. may be used during the testing process.
 - Use of a computer and specific software will be permitted only if announced in advance and may be limited to only certain tests (e.g., for quantum mechanical calculations related to a physical chemistry test.)

Test Scoring

- Each of the six exams will be worth a total of twelve (12) points.
 - Ten (10) points towards the General Chemistry Score
 - Two (2) points towards the Green Chemistry Score
- Passing the General Chemistry aspect of the Written Qualifying Exam.
 - Students must earn at least 40 points of a possible 60 points from the exams covering all six research articles.
- Passing the Green Chemistry aspect of the Written Qualifying Exam.
 - Students must earn at least 8 points of a possible 12 points from the labeled green chemistry questions on all six exams.
- Students must pass **both** sections of the Written Qualifying Exam. Failure to pass both sections results in the student having to retake the entire written qualifying exam.
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 - If students are unable to pass the written qualifying exam they will not earn candidacy into the doctoral program.
 - Students who are unable to pass the written qualifying exam in two attempts will be asked to present their research as a Master's Thesis and if successful the student will earn an MS in Chemistry from UMass Boston.
- Students who pass the Written Qualifying Examination may proceed to schedule the Oral Examination, which can be taken as soon as all six courses required for the degree have been taken.

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