

## Diagnostic Examination Requirements

Each entering graduate student must demonstrate sufficient working knowledge of basic undergraduate chemistry in their area of specialization, and must be assessed in two other areas of chemistry, as determined by scores on “diagnostic” examinations. These are organized in two tracks. For most students they will be the standardized, multiple-choice tests written by the American Chemical Society. In format, these resemble the advanced chemistry subject GRE exam.

For students pursuing biochemistry, who possess an undergraduate degree that emphasized biology over chemistry, there is a special diagnostic exam, “Biological Chemistry”, with 60 questions. Approximately 20 questions address the chemical and physical properties of proteins, enzymes, nucleic acids, carbohydrates, lipids and membranes; approximately 20 question address metabolism including bioorganic chemistry pathways and their regulation; and approximately 20 questions address cell and molecular biology.

Students who enter the Graduate Program with combined general GRE scores (verbal + quantitative) of at least 300 (1100 on the old GRE scale) and an advanced chemistry subject GRE score in the 80th percentile, are exempt from taking the diagnostic examinations. Students specializing Biochemistry are exempt from the Biological Chemistry diagnostic requirement\* if they have combined general GRE scores of at least 300 and an advanced biochemistry, cell and molecular biology subject GRE score in the 80th percentile. Students specializing in chemical physics are exempt from the requirement of taking and passing the physical chemistry diagnostic exam, if they demonstrate a combined general GRE score of at least 300 and an 80th percentile or higher ranking on the physics subject GRE; however, these students must still take two additional chemistry diagnostic exams in other areas.

Apart from the above exceptions, all entering graduate students must take three diagnostic exams at their first opportunity after arriving at Texas Tech, one of which should be in their area of specialization. If the exam in the specialization area is not passed in the first attempt, the student will be provided with a second chance to pass this exam, at the next available opportunity approximately one semester later. All students *must* pass the diagnostic exam in their specialization area within these first two opportunities, in order to remain in the graduate program in the Department of Chemistry and Biochemistry. The exams are offered by each of the divisions of the Department of Chemistry and Biochemistry prior to registration for each fall

**WE BUILD  
INNOVATORS**

and spring semester, and at the end of the spring semester. Each exam is comprehensive, three hours in length, and covers undergraduate material only. Each student must select the three fields in which he/she will take the diagnostic exams according to the following requirements:

<u>Area of specialization:</u>	<u>Required Exams:</u>
Analytical Chemistry	pass Analytical Chemistry, take any two others
Biochemistry	pass ACS Biochemistry or the "Biological Chemistry" exam described above, take any two others. Physical Chemistry for Biological Sciences may be substituted for the regular Physical Chemistry exam.
Chemical Education	see "Requirements for M.S. and Ph.D. Degree with Specialization in Chemical Education."
Chemical Physics	pass Physical Chemistry, take any two others
Inorganic Chemistry	Take Inorganic Chemistry and any two others. Pass Inorganic Chemistry or achieve 85 <sup>th</sup> percentile or better on an ACS exam from another subject area.
Organic Chemistry	pass Organic Chemistry, take any two others
Physical Chemistry	pass Physical Chemistry, take any two others

If you do not pass the diagnostic exam in your specialization area on your first attempt, then you must engage in self-study (possibly including not-for-credit enrollment in an undergraduate-level course) in that subject prior to retaking the exam the next time that it is offered.

Please note the following additional information relating to diagnostic requirements:

- 2) Graduate students specializing in biochemistry and who have not taken an undergraduate laboratory course in biochemistry (or do not have laboratory experience in biochemistry from prior graduate-level research work) must take CHEM 3313 ("Biological Chemistry Lab," offered in the Spring), even if they have passed the Biochemistry diagnostic examination. This CHEM 3313 course will not count toward the student's graduate degree.
- 3) Entering students who petition the Department to have graduate-level courses that they have taken elsewhere transferred for credit toward their Ph.D. program will have their diagnostic exam performances scrutinized as part of the approval process.

## **SUGGESTED TEXTS FOR REVIEWING FOR DIAGNOSTIC EXAMS**

These are only suggested texts. Review of any comparable texts instead of, or in addition to, the ones listed will be of value to you in preparing for the diagnostic examinations.

### **ANALYTICAL CHEMISTRY**

Skoog and West, Fundamentals of Analytical Chemistry, any edition, Brooks/Cole

Willard, Merritt and Dean, Instrumental Methods of Analysis, any edition, Wadsworth

### **BIOCHEMISTRY**

Zubay, Biochemistry, 3rd Edition, William C. Brown

Nelson and Cox, Lehninger Principles of Biochemistry, 4<sup>th</sup> Edition, Freeman

Voet, Biochemistry, 4th Edition, Wiley

### **INORGANIC CHEMISTRY**

Miessler and Tarr, Inorganic Chemistry, 3<sup>rd</sup> Edition, Prentice Hall

Housecroft and Sharpe. Inorganic Chemistry, 3<sup>rd</sup> Edition, Pearson Education Limited

Huheey, Keiter and Keiter, Inorganic Chemistry: Principles of Structure and Reactivity, 4th Edition,  
Benjamin Cummings

Shriver and Atkins (et al.) Inorganic Chemistry, 4<sup>th</sup> Edition, W.H. Freeman (2006)

## **ORGANIC CHEMISTRY**

“ACS Organic Chemistry Exams – The Official Guide” (some are available for check out from the graduate office)

Gorzynski-Smith, Organic Chemistry, 3rd edition, McGraw-Hill

McMurry, Organic Chemistry, 6th edition, Brooks/Cole

Fessenden and Fessenden, Organic Chemistry, 6th Edition, Brooks/Cole

Clayden, Greeves, Warren, Wothers, Organic Chemistry, Oxford University Press

Bruice, Organic Chemistry, 4<sup>th</sup> Edition, Prentice Hall

Solomons and Fryhle, Organic Chemistry, 8th Edition, Wiley

## **PHYSICAL CHEMISTRY**

De Paula and Atkins, Physical Chemistry, any edition, Freeman

Levine, Physical Chemistry, any edition, McGraw-Hill

McQuarrie and Simon, Physical Chemistry: A Molecular Approach, University Science Books

Silbey, Alberty, Bawendi, Physical Chemistry, any edition, Wiley

Engel and Reid, Physical Chemistry, any edition