Biochemistry Graduate Program Approved 12/6/06

INFORMATION FOR GRADUATE STUDENTS IN BIOCHEMISTRY

Department of Chemistry and Biochemistry

Utah State University
Logan, UT 84322-0300

The Department of Chemistry and Biochemistry offers advanced study and research leading to the M.S. and Ph.D. degrees in Biochemistry. The Ph.D. is awarded primarily for independent research. The M.S. is awarded for successful completion of specific courses and research less comprehensive than a doctoral problem. The section on qualifying examinations does not apply to M.S. candidates.

Entering Students: During orientation week, new students who have not selected an advisor will be advised by the biochemistry faculty. To facilitate advising, entering students will take the biochemistry placement examinations scheduled during orientation. The results of these examinations will initially be used to ascertain a student's preparation for graduate work. Where deficiencies are indicated, students may be advised to take the appropriate courses, which might include chemistry 6700 and/or 6710. A passing grade in the 60th percentile will be required for students to schedule their oral qualifying exams. The biochemistry placement exam can be taken as many times as needed as long as the student adheres to the timetable described in "qualifying exam". Also during orientation week the Department Head will provide students with a list of faculty who participate in the biochemistry graduate training program. Entering students will meet with each faculty member on the list to learn about their research programs. The students who have not already selected their faculty advisor will then select three laboratories in which to do laboratory rotation projects during the Fall Semester (3 laboratory rotations beginning the 1st, 6th, & 11th weeks of the semester).

Major Advisor and Supervisory Committee: Students who have not selected a major advisor at the time of matriculation, will do so after the first semester has been completed. After the rotations have been completed the students will submit a list of 1st, 2nd, & 3rd choices for major advisor to the Department Head no later than December 14. After some deliberation with the people involved, the Department Head will assign a major advisor to the student, normally within two weeks of the submission deadline. If the student has selected and is assigned to a major advisor in chemistry, the student will switch majors from Biochemistry to Chemistry. Students who have selected and are assigned to a major advisor in Biochemistry will continue in the Biochemistry Program. In consultation with the major advisor, the student will then select a supervisory committee for approval by the Department Head. Selection of the committee should be accomplished by April 1. All students must submit a one page research statement to the supervisory committee and meet with the committee during the fall semester of the second year. The one page report should include a paragraph detailing methods learned to date and any other research progress. A second paragraph should outline expected research directions for the coming year. The report is due one week prior to the committee meeting. In all subsequent

years, the student will provide a progress report to the supervisory committee no later than 10 days prior to the committee meeting. This report should be 2-5 pages in length and should provide a progress report of results to date and a clear outline of future directions. A meeting with the supervisory committee should be scheduled before the end of the Fall semester. Within two weeks of the meeting, the committee will forward a letter to the student, summarizing the conclusions from the meeting, which the student will sign acknowledging understanding of its contents. The signed letter will be sent to the student's file. The letter will detail the progress of the student, perceived deficiencies, steps to be taken to remedy them, and expectations for successful completion of the degree, and a recommendation will be made as to whether or not the student should be allowed to continue in the program.

Curriculum: Students should discuss course schedules with the biochemistry faculty during the first year and with the major advisor and supervisory committee in subsequent years. A total of 30 credit hours are required for a M.S., and 90 for a Ph.D. Students entering the program with a Master's degree will only need 60 credit hours to graduate. Students should check the graduate catalog for resident and other requirements. Students must meet with the Department graduate staff assistant prior to registering for classes each semester.

Every graduate student in biochemistry must complete the four (4) graduate biochemistry core courses (CHEM 6730, 6740, 6750, and 6760) and must register for seminar as described below. M.S. and Ph.D. candidates must complete 15 credits in advanced courses as approved by the supervisory committee, exclusive of seminar and research. Chemistry 6700 and 6710, if taken, will not count toward the 15 credits of advanced courses needed, but will count toward the total required credits (30 or 60/90).

Seminar. Students must register for the biochemistry seminar, CHEM 7800, each Fall and Spring Semester. Seminars will expose new students to current graduate biochemistry research programs in the Department and will give advanced students the opportunity to describe progress in their research projects and to get experience in giving scientific presentations. First year, third year, and fifth year students are also required to present a seminar on a subject unrelated to their research. Second and fourth year students are required to present a seminar on their research. No more than 2 missed biochemistry seminars per semester will be allowed. Occasionally outside speakers will be invited to present technical lectures. These lectures will be open to the entire department. Seminars will be announced to the Department one week in advance.

Academic Status: Students who make satisfactory progress are considered candidates for a degree, even though they may not have been formally advanced to candidacy by the Graduate School. Students must maintain a 3.0 average in all courses taken at Utah State University as part of their graduate program, exclusive of seminar and research, and must not receive more than one C in any graduate course work (excluding seminars) taken throughout the program. A student's progress will be evaluated at the yearly supervisory committee meeting.

The supervisory committee will advise the Department Head of students who have failed to meet any of the requirements and recommend that the student either be dropped from the program or be given a probationary semester to make up the deficiency. If the deficiency has not been satisfied by the end of the probationary semester, further reinstatement will be a decision of the entire biochemistry faculty. Every student must meet with the supervisory committee at least once each year to present a written and oral research progress report.

Qualifying Examination: In addition to passing the four (4) graduate biochemistry core courses (CHEM 6730, 6740, 6750, and 6760), Ph.D. students must pass a qualifying examination. This examination must be taken by the end of the seventh semester after entrance, including summer semesters. In order to schedule the examination a student must score in the 60th percentile on the biochemistry placement exam. In the event that a student changes from the M.S. program to the Ph.D. program or changes major advisors within the Biochemistry Program, the student will be given four semesters after the change to complete the qualifying examination unless the Supervisory Committee recommends otherwise to the Graduate Studies Committee. If a student transfers from any other degree program to the Biochemistry Program, that student will be considered a new student in the program and will also have seven semesters from the semester of transfer in which to complete the qualifying exam. The examination will include a formal, written research proposal patterned after those submitted to national funding agencies, including specific aims, progress report, and experimental lines to be pursued. The proposal must contain original ideas, but it will be based on the student's own research project. Consequently, direct assistance from the major advisor will not be permitted in either the writing or the formulation of original avenues of investigation. A student is permitted to solicit information from others, including faculty. However, this must be done on a strictly limited basis and good judgment must be exercised on both sides. It is expected that originality and the bulk of the preparation of the proposal represent the student's own work. If a student is in doubt about the propriety of requesting information in a specific case, the examination committee should be consulted. Any information in the written proposal obtained from others should be acknowledged. The proposal will be presented at a formal, open seminar. The student will meet with the examination committee within 5 working days following the seminar to defend the proposal orally and demonstrate a comprehensive knowledge of biochemistry. A detailed description of the expectations for this examination is contained in the document, "Guidelines for the Qualifying Examination in the Biochemistry Program". Immediately following the examination, the examination committee will decide if the student has passed or failed. In the case of no more than a single negative vote, a recommendation of pass will be forwarded to the faculty. In the event of failure, immediately after the examination the student will be provided with a written statement that clearly details what the student must do to pass the examination in the event that he or she petitions to retake it.

The supervisory committee will serve as the examination committee except that the major advisor will not participate in any aspect of the examination. A biochemist member of the supervisory committee will serve as chairman of the examination committee and the student will

select the chairman from among the biochemistry members. The major advisor will not be present at the oral examination. Upon petition, a student who fails the examination may be allowed to retake it once upon approval of the examination committee in consultation with the major advisor. Consequently, the written document given to the student immediately following the examination must be agreed upon by the committee in detail before being transmitted to the student. The conditions for retaking the examination must be explicit enough so that someone who was not present at the meeting can judge exactly what is expected of the student. The time period within which the examination must be re-taken must be clearly stated (a date would be most appropriate). The conditions for the second examination, if approved, will be set by the examination committee.

Final Requirements: After passing the qualifying examination, Ph.D. students will submit the approved candidacy form to the School of Graduate Studies. With the Graduate School's approval, students will then be advanced to candidacy for the Ph.D. degree. The candidacy form must be submitted to the Graduate School Office at least one semester (three months) prior to the final defense.

When the research project nears completion, students should check on final requirements and scheduling with the School of Graduate Studies. Prior to scheduling the defense seminar, students should meet with the supervisory committee that will provide the student with guidelines and expectations concerning the written thesis/dissertation and its defense. When the research is complete, the results must be reported in a thesis/dissertation that conforms to Graduate School guidelines and that must be presented in a formal departmental seminar. It is the student's responsibility to ensure that the seminar is announced at least one week in advance. The purpose of this seminar is to demonstrate the ability to present material to chemists and biochemists outside of a specific research area. The seminar is an important degree requirement and must be presented to the satisfaction of the faculty at large. The thesis/dissertation must be given to each member of the supervisory committee at least four weeks before the final seminar. After the seminar, the supervisory committee will conduct a final oral examination.

Biochemistry Graduate Student Timeline

Summary of important dates and deadlines

First Year

Dec 14. Deadline to submit choice for major advisor
April 1. Deadline to select supervisory committee

Second Year

1 week prior to committee meeting: Deadline to submit research statement to committee

Committee meeting must be held by end of Fall semester

Third Year: Qualifying Examination

5 weeks prior to exam: schedule must be approved by committee
4 weeks prior to exam: deadline to submit written proposal
1 week prior to exam: seminar announcement

Qualifying exam must be taken by the end of the seventh semester

Subsequent Years: Committee Meetings

10 days prior to committee meeting: Deadline to submit progress report to committee

Committee meetings must be held each year by the end of Fall semester

Final Defense

4 weeks prior to seminar: Deadline to submit thesis/dissertation to committee
1 week prior to seminar: seminar announcement

Guidelines for the Qualifying Examination in theBiochemistry Program

The qualifying examination in Biochemistry will be composed of three parts, (1) a written proposal based on the student's own research project and patterned after a major research proposal to an outside granting agency, (2) a seminar (open to general attendance) and (3) an oral examination, administered by a committee composed primarily of the student's thesis committee. In preparation for the qualifying examination, students should initially consult the current version of the Information for Graduate Students in Biochemistry.

In order to pass the qualifying examination, the student should be able to:

1) identify a significant and originals scientific problem

2) formulate a testable hypothesis

3) formulate an experimental approach to directly test this hypothesis

4) express this research problem clearly and concisely in writing

5) present his/her ideas orally in an effective manner before a general audience and defend before the examination committee

6) demonstrate a comprehensive knowledge of biochemistry

The Written Proposal The schedule for the qualifying examination must be approved by all members of the examination committee no later than one week before the distribution of the written proposal. No less than one month prior to the student's scheduled seminar, a written proposal will be provided to each member of the student's Examination Committee. The composition of this committee will be designated beforehand by the student's thesis committee. A suggested format for the written proposal is described below. The proposal will be complete, with references, and will be composed according to any style acceptable by the graduate school for the Dissertation. Within one week after receipt of this proposal each member of the examination committee will inform the chairman of the committee if the writing or style of the proposal is unacceptable. If unacceptable in writing or style the student will resubmit the revised proposal until acceptable to all members. In preparation for this written proposal, students are encouraged to solicit and examine approved proposals from faculty and previous students.

In general, the written proposal serves two functions: (1) to demonstrate the student's independent ability to compose a well-written and thoroughly documented research proposal, distinct but not necessarily completely separate from proposals previously written by the student's major advisor and (2) to provide an experimental foundation on which the examination committee can base critical questions during the oral examination.

The Seminar The Seminar should be announced in writing to the faculty, students and staff of the Department of Chemistry and Biochemistry at least one week beforehand. This seminar will consist of an oral presentation of the research proposal, directed toward a general audience. The seminar should be a clear and concise presentation of the research with sufficient background for the nonspecialist. An important aspect of the presentation will be the effective use of visual aids. The presentation should be 30 minutes to one hour, with sufficient time for questions from the audience. Members of the examination committee may ask general questions, but the examination should be confined to the oral section.

The Oral Examination The oral examination can be taken as soon as immediately following the seminar, but no later than 5 working days following the seminar. The date of the examination is to be scheduled at least one month in advance of the examination. At the oral examination, the student will defend the proposal in an effective manner and demonstrate a comprehensive knowledge of Biochemistry. Ahead of the oral examination, the committee will convene for a short period before meeting with the student for the oral examination. The student's major advisor will be absent from the oral examination. No later than 60 minutes into the examination the chairman will call for a break for the committee to discuss the progress of the examination without the student present. Immediately following the examination, the committee will decide if the student has passed, failed, or conditionally passed the qualifying examination. In the last case, the conditions that must be fulfilled by the student to pass and the time period within which these conditions must be met will be written by the committee chairman within one week after the conclusion of the meeting and transmitted to the student.

In general, there are three primary purposes of the oral examination, to test the student's abilities for (1) comprehensive knowledge of Biochemistry, (2) original thought, and (3) verbal competence in critical, independent evaluation of experimental protocols and interpretation of data. Publications or preliminary data and/or original lines of proposed experimentation in the proposal (written or oral) are encouraged to the extent that they contribute to these objectives of the oral exam. However, the primary purpose of the oral examination is to examine the student's originality of thought and ability to defend research ideas and to expand upon them. A well-written proposal does not guarantee a successful oral performance, and vice versa; satisfactory performance in the qualifying examination requires a successful completion of all parts.

The student can expect most questions in the oral examination to fall within three general areas:

1. Questions dealing specifically with the hypothesis and the experimental methods and procedures proposed to test the hypothesis. Answers to these questions will reveal whether or not the student is familiar with the experimental procedures needed to test the hypothesis and has envisaged the actual data that might be expected in the proposed experiments.

2. Questions generally dealing with alternative interpretations of existing literature upon which the proposition is based and/or alternative results to be expected from the proposed experiments and/or potential problems in conducting the proposed research. Students can expect to be presented with "hypothetical" data from their proposed experiments and should be prepared to provide logical and well thought out interpretations and to propose additional experiments based on these results.

3. Questions dealing with general background and preparedness of the student in any area of Biochemistry.