



TEXAS TECH UNIVERSITY

HEALTH SCIENCES CENTER

Graduate School of Biomedical Sciences

Department of Cell Biology and

Biochemistry Graduate Programs™

**PH.D. PROGRAM IN
BIOCHEMISTRY AND MOLECULAR GENETICS**

I. INTRODUCTION

The Doctor of Philosophy degree is an advanced degree conferred in recognition of proficiency in research, breadth and soundness of scholarship, and thoroughness of a specific field of knowledge. Beyond the minimum preparation required of all students, the period and course of study cannot be prescribed in advance, but will depend on the diligence and specific goals of the individual student. A timeline for progress in the Biochemistry and Molecular Genetics Graduate Program is provided as a guide for the typical student in APPENDIX 1.

Admissions procedure for matriculated GSBS undeclared students and declared students changing concentrations/majors:

After an undeclared student has chosen a faculty mentor, the faculty mentor must email a request to the Graduate Program Advisor requesting the student be admitted to the Biochemistry and Molecular Genetics program. Declared students must first meet with the Graduate Program Advisor to determine if there are any available dissertation advisors for mentoring the student, and afterwards interview with available faculty to identify a dissertation advisor prior to initiating a Change in Major request. Upon receipt of the request, the graduate program committee will review pertinent GSBS admission application documents such as transcripts, official GRE results, reference letters, and GSBS lab rotation evaluations. The committee may also request a personal interview with the student and/or faculty mentor. After the admission review, the committee will vote and the results will be communicated to the student and mentor via email. If the student is accepted into the graduate program, the graduate program coordinator will submit the GSBS Application for Change in Major form to the graduate school office.

The program of study leading to the Ph.D. degree in Biochemistry and Molecular Genetics consists of a didactic component and a research component that are pursued simultaneously. Students will proceed through the program as follows:

during the first fall semester the student will complete the GSBS First Year Core Curriculum courses in Core I: Molecules (GSBS 5471), Core II: Cells (GSBS 5372), Core III: Genes (GSBS 5373), Core IV: Biomedical Seminar Series (GSBS 5174), and Core V: Introduction to Biomedical Research (GSBS 5275). The students will also begin the process necessary to select a Supervising Professor in whose laboratory the dissertation research will be conducted. During the second semester the students will complete the advanced courses in Advanced Protein Biochemistry (GBMG 6333), and Advanced Cell Biology (GCMB 6320). By the end of the first year the typical student will have chosen a Supervising Professor and begun dissertation research. In the succeeding two years the student will complete the required courses while continuing the research program. No later than the end of the third year, *i.e.*, the ninth semester, a student must take the Qualifying Examination. The Qualifying Examination consists of preparation and defense of an original research proposition (see Section VI. D.). Upon passing the examination and completion of course work requirements a student will be admitted to Candidacy for the Doctor of Philosophy degree. The final requirement is presentation and public defense of a dissertation based upon original research (see Section VIII).

The progress of each student through the program will be under the direction of a Supervising Professor and a series of faculty committees who represent the Faculty of the Program of Biochemistry and Molecular Genetics and the Graduate School of Biomedical Sciences. During their first year, students will be directed by the Graduate Program Committee. Later, each student will have a Doctoral Advisory Committee on which the Supervising Professor will serve as Chair. The Doctoral Advisory Committee will be responsible for the student through the remainder of the student's degree program.

All students are expected to subscribe to an honor system which is implicit in accepting admission to the BMG Ph.D. Program. Each student shall be responsible for his/her conduct from the time of the application for admission through the actual awarding of a degree, even though conduct may occur before classes begin or after classes end, as well as during the academic year and during periods between terms of actual enrollment.

Ethical standards of conduct will be discussed with students upon entering the Biochemistry & Molecular Genetics Ph.D. program by the Graduate Program Advisor, presented to all GSBS students during orientation, present in every course syllabus, and is described in detail in the TTUHSC Student Affairs Handbook, Code of Professional and Academic Conduct which is available online. Evaluation of students ability to recognize ethical issues and behave in accordance with these ethical standards of conduct are based on their conduct in the laboratory: experimental data are not manipulated, laboratory notebooks reflect the results that were obtained, verification of experimental results by replication of experiments, proper allocation of credit for work done by others, respect for the rights of fellow lab workers.

II. GOVERNANCE BODIES OF THE GRADUATE PROGRAM

A. The Graduate Program Committee exercises general supervision over the Graduate Program of Biochemistry and Molecular Genetics. This committee is made up of the Graduate Program Advisor, who is appointed by the Departmental Chair, and three voting members of the BMG Graduate Program who are elected by voting faculty of the BMG program. The Program's Graduate Advisor will also represent the program on the GSBS Graduate Council. The other three members of the Graduate Program Committee will serve for terms of three years, with one member being replaced alternately each year. The functions of the Program Committee are to make recommendations to the Department Chair and Graduate Dean, on behalf of the Biochemistry and Molecular Genetics Graduate Program Faculty, regarding admission of students to the program, the awarding of Graduate Assistantships and the appointment of a Supervising Professor and Advisory Committee for each graduate student; to supervise the program of each graduate student prior to the formation of an Advisory Committee; to supervise the conduct and content of the Graduate Program's core courses; and to oversee the Program curriculum; and to make recommendations to the faculty concerning the Graduate Program.

B. A Doctoral Advisory Committee is formally appointed by the Dean of the Graduate School of Biomedical Sciences for each graduate student upon the recommendation of the Graduate Program Committee. The Doctoral Advisory Committee consists of at least five Graduate Faculty members, one of whom is the student's Supervising Professor, who serves as Chair of the committee. At least three members must be voting members of the Graduate Faculty of the Program of Biochemistry and Molecular Genetics (see APPENDIX 2), one member should be a faculty member from outside the Program. Once appointed, the Doctoral Advisory Committee will become responsible for the student's progress and approve the program of courses and the area of research to be undertaken for the dissertation. The Doctoral Advisory Committee meets whenever necessary, but **not less than twice each year**, for the purpose of reviewing the student's program, the progress toward completing course work and other degree requirements, and the progress in research. Reports of these meetings will be written by the student and submitted to the Graduate Program Advisor within one week after the meeting to become part of the student's permanent file. This report must be signed by the Supervising Professor, graduate student and all members of the Doctoral Advisory Committee (see APPENDIX 3A for criteria for meeting handouts and minutes, 3B BMG Rubric Advisory Committee, and 3C BMG Student Checklist).

*A voting Graduate Faculty member is defined as one with a primary or joint appointment in the Biochemistry and Molecular Genetics Program of the Department of Cell Biology and Biochemistry of the TTUHSC Graduate School of Biomedical Sciences.

III. SELECTION OF SUPERVISING PROFESSOR

Selection of the Supervising Professor is crucial for each student, since the Supervising Professor serves as Chair of the Doctoral Advisory Committee and most, if not all, of the dissertation research is conducted in the Supervising Professor's laboratory. Therefore, in selecting a Supervising Professor, it is the policy of the Program of Biochemistry and Molecular Genetics at the Texas Tech University Health Sciences Center that each incoming graduate student shall become familiar with the Program faculty and their research areas as soon as possible. In most cases the procedure below will be followed in selecting a Supervising Professor.

1. Within the first semester of entering the Graduate Program, each student must interview with each full-time voting Program faculty member to learn of that person's research program and philosophy (see APPENDIX 4). Interviews with each full-time non-voting Program faculty member (at the Lubbock campus) are also required (see APPENDIX 3). Discussion of active research projects in the faculty member's laboratory will serve to inform students of research problems which might become suitable dissertation projects. This interview process will also serve as the basis for any subsequently arranged laboratory rotations. The student shall also take the opportunity to seek out other students to learn from their experiences within the Program and Department.

2. Upon completion of all the interviews, the Program faculty strongly urge all students to do at least three rotations. Besides facilitating selection of a Supervising Professor, these rotations will be particularly valuable for those students with no research laboratory experience. The Program faculty recognize, however, that circumstances may preclude rotations, and therefore, more than one rotation is not mandatory (see APPENDIX 5).

The length of a rotation will be determined in consultation with the Graduate Program Advisor and will be mutually agreeable to both the faculty member and the student. This time may be influenced by such factors as the course load for that semester, the nature of the project assigned the student, etc., but will generally be six to eight weeks. In any case, the student should develop a laboratory rotation plan, and a schedule of rotations should be provided to the Graduate Advisor by the student. After each rotation, the faculty member involved shall file a written laboratory rotation evaluation on that student for inclusion in the student's departmental file folder (see APPENDIX 6A & 6B). A copy shall also be provided to the student. The faculty member is strongly encouraged to discuss the strengths and weaknesses of the student's performance with the student. This will provide information to the student to prepare for the next rotation and/or their dissertation research.

Under special circumstances, the incoming student may choose to do fewer than three laboratory rotations, for instance, if the student already has a Master's degree, previous work experience as a laboratory technician or for other clearly justifiable reasons has decided on a Supervising Professor. However, the student's request must

be reviewed by the Graduate Program Committee. Nevertheless, the student shall not commit to that laboratory immediately, nor that faculty member to the student, until the student has completed at least eight weeks of a rotation internship with that faculty member, *i.e.*, **the student cannot select a Supervising Professor until at least one rotation has been satisfactorily completed.** After the rotation, the faculty member shall file the laboratory rotation evaluation for the student with the Graduate Program Advisor. Afterward, if agreeable to the faculty member and the student, the student may request that faculty member as Supervising Professor. This request will be submitted **in writing** to the Graduate Program Advisor, who will consult with the Graduate Program Committee on the merit of the request. If recommended by the Graduate Program Committee, the request will be presented to the Department Chair for approval. However, preliminary to this formal appointment, the prospective Dissertation Advisor and graduate student will meet with the Departmental Chair to discuss the issue of graduate student stipend funding.

A fully constituted permanent Doctoral Advisory Committee, (see Section II. B.) shall be established no later than three months after selection of a Supervising Professor. The student and the Supervising Professor should consult to determine a suitable Doctoral Committee, and present these choices to the Graduate Program Advisor. The Graduate Program Advisor will initiate the process of appointment of the Doctoral Advisory Committee, by submitting the request to the Office of the Graduate School of Biomedical Sciences (see APPENDIX 7).

The appointment of a Supervising Professor and Doctoral Advisory Committee consists of the following steps:

1. The Graduate Program Advisor will submit the student's choice for Supervising Professor to the Graduate Program Committee for approval.

2. If the Graduate Program Committee approves the selection, that recommendation will be passed on to the Department Chair who will ask the faculty member to serve. If agreeable, the faculty member will immediately assume responsibility for the direction of the student pending official appointment by the Graduate Dean.

3. As soon as possible after being selected, the Supervising Professor will submit to the Graduate Program Committee for approval all recommendations for faculty members to serve on the student's Doctoral Advisory Committee.

4. If the Graduate Program Committee approves the recommendations, the faculty members will be asked to serve pending official appointment by the Graduate Dean.

5. Official appointment of the Supervising Professor and Doctoral Advisory Committee is made by the Graduate Dean on the basis of recommendations submitted by the Graduate Program Committee.

Subsequent alterations in the composition of the Doctoral Advisory Committee will require the concurrence of the majority of both the Doctoral Advisory Committee and the Graduate Program Committee. The two committees will meet together and arrive at a joint recommendation to be submitted to the Graduate Dean by the Chair of the Graduate Program Committee.

If the student for any reason wishes to change Supervising Professors, the student must first discuss the situation with that faculty member to attempt a resolution of any problems. If that approach is not successful, the student should next discuss the matter with the Biochemistry and Molecular Genetics Graduate Program Advisor for further advice. If that is not successful, the student should petition the Graduate Program Committee in writing for such a change. The request should state the desired transfer and provide specific details of the reasons for making this transfer. Subsequent changes of Supervising Professors for any reason will require prior recommendation of the Graduate Program Committee. The Graduate Program Committee will evaluate the request to determine the substantive nature of the request in making their recommendation. The Graduate Program Committee will then submit their recommendation in writing to the student and the Department Chair or the Chair's designate, who will discuss the matter with the graduate student. The final authority for the decision will rest with the Department Chair. If after this due process, the decision is still unsatisfactory to the student, the student may file a grievance with the Dean of the Graduate School of Biomedical Sciences. This procedure will be followed regardless of whether or not a student has selected a Doctoral Advisory Committee. A new Doctoral Advisory Committee will be constituted with membership of this committee decided by the student and the new supervisor.

IV. REGISTRATION

Each student must remain in compliance with the rules and regulations of the Graduate School of Biomedical Sciences. Each student will generally register for a 12 month period per academic year and will register for at least 9 hours each semester and a total of six during the summer. The student's schedule will be determined in consultation with the Chair of the Graduate Program Committee or the Supervising Professor and the student's Doctoral Advisory Committee. The student must consult with the Doctoral Advisory Committee prior to registration. A detailed description of procedures for online registration can be found at the GSBS website.

V. GRADUATE STUDENT ASSISTANTSHIPS

A. Teaching and Research Assistantships

Graduate Teaching and Research Assistantships are considered part-time (usually 0.5 FTE) positions that are available to graduate students who are enrolled full-time. They are intended to provide a stipend that is compatible with full-time pursuit of a graduate degree. Full-time enrollment is required for a 12-month period per

academic year, and this is minimally 9 hours in a regular semester and 6 hours in the summer term. Once a student has passed candidacy and accumulated 120 hours, the student may register for 3 hours each semester for up to one year. Ex. 3 hours- Fall, 3 hours – Spring, 3 hours - Summer. If the student elects the 3-3-3 enrollment, and does not complete the degree requirements within that period, the student must resume full-time status (9 hours per long semester).

Appointment to an assistantship is a departmental option depending on the availability of assistantships and the student's qualifications relative to requirements of the specific assistantships. **Graduate Assistants are expected to devote a full-time effort to their overall course, research and assistantship obligations and should therefore not be involved in additional employment activities which will detract from or prolong their training program. If for any reason the student takes on additional employment activities the Supervising Professor, the Doctoral Advisory Committee and the Graduate Program Committee must be informed prior to the initiation of this activity. If the activity is undertaken and the Supervising Professor and the Doctoral Advisory Committee determines that this activity is detrimental to the student's progress the Doctoral Advisory Committee will meet to determine what action is required. If a satisfactory resolution of this matter does not occur the Graduate Program Committee will be informed as well as the Chair of the Department. The final authority for the decision will rest with the Chair of the Department. If after this due process, the decision is still unsatisfactory to the student, the student may file a grievance with the Dean of the Graduate School of Biomedical Sciences.**

Graduate Research Assistantships are stipends which, as such, **do not provide formal vacation time**. The overall work schedules of graduate assistants are flexible to the extent required to complete their full-time program of studies, research and assistantship obligations. There is a specific GSBS Guideline dealing with leave time with and without pay. The complete guidelines can be found in the **GSBS Student Handbook** but will be summarized here.

Students must be registered every semester or be on an approved official leave of absence (medical or personal). Mentors have at their **discretion** the ability to grant 10 days of personal leave (with pay) for each student employee per year. Personal leave may not be accumulated and carried forward to the next year. Students exceeding 10 days of personal leave must get approval for extended leave. If extended leave is approved by GSBS, the department will place the student on **leave-without-pay**. Leave periods will not extend the maximum time requirement to complete a degree. Students must be continually registered once they begin thesis/dissertation hours. The enforcement of this policy will be the responsibility of the mentor to document personal leave days for each of their students.

University policy provides that non-resident students who serve as Research Assistants employed at least half time, with an effective date of employment on or before the official census date of the relevant term(s), may pay the same tuition as a

resident of Texas for themselves, their spouses, and their dependent children, regardless of the length of residence in the state.

B. Awarding of Stipends

Acceptance of students into the Graduate Program of Biochemistry and Molecular Genetics of the Texas Tech University Health Sciences Center is considered separately from awarding stipends. Consequently, incoming graduate students will be evaluated and competitively ranked by the Graduate Program Committee.

Students will receive stipend support in order of their ranking, until such sources of stipend support are exhausted. Graduate student stipend support may come from a variety of sources, such as institutional research funds (departmental support), training grants or individual research grants. The Department will strive to insure continued financial support of all graduate students through completion of their Ph.D. graduate training (barring unforeseen financial exigencies beyond the control of the Department).

Stipend support for the student is contingent upon continued satisfactory performance, as judged by the Doctoral Advisory Committee (semi-annual evaluations) and the Graduate Program Committee. The Graduate Program Committee will review annually the student's progress for recommendation of continued support for a period of up to one year. In the event the evaluation of the student's performance is unsatisfactory or marginal, the student will be warned in writing by the Departmental Chair and placed on probation. The student will be expected to correct these deficiencies during the next semester; otherwise the student may lose stipend support and could be dropped from the Program. Alternatively, the student may be advised by the Doctoral Committee or the Graduate Program Committee to apply for the Master of Science program for a terminal degree.

The Department will not normally expect to provide support beyond five years, but if support beyond this five year period is required, the student and the Supervising Professor must petition the Graduate Program Committee in writing, specifying the reasons for the need of the extended support and how long this will be required. The formal request for extended stipend support should normally be filed with the Graduate Program Committee at least six months prior to the anticipated need for the extension. The Graduate Program Committee will review each request and will recommend to the Departmental Chair that the stipend be renewed and extended for specified periods for all students in good standing.

VI. REQUIREMENTS FOR THE DOCTOR OF PHILOSOPHY DEGREE IN BIOCHEMISTRY AND MOLECULAR GENETICS

A. Leveling Requirements

Admission to the Ph.D. program requires prior course work in mathematics, general physics, organic chemistry, analytical chemistry, and biological science. Students with deficiencies in any of these areas may be conditionally admitted pending successful completion of leveling courses prescribed by the Graduate Program Committee. Courses taken for leveling purposes cannot be utilized to satisfy the course work requirements for graduate degree programs.

B. Graduate Course Work

Doctoral study cannot be calculated solely in terms of credit hours, but the Program normally requires completion of a minimum of 60 semester hours of graduate level work exclusive of credit for the dissertation, at least 15 hours of which must be outside the major Program. Course work beyond the minimum requirements may be defined for the individual student by the Doctoral Advisory Committee.

All students will be required to take the following core courses or their equivalent as determined by the Graduate Committee:

Required Courses

GSBS 5471 Core I: Molecules

GSBS 5372 Core II: Cells

GSBS 5373 Core III: Genes

GSBS 5174 Core IV: Biomedical Seminar Series

GSBS 5275 Core V: Introduction to Biomedical Research

GBMG 6333 Advanced Protein Biochemistry

GCMB 6320 Advanced Cell Biology

GSBS 5101 Responsible Conduct of Research

GSBS 5310 Introduction to Statistical Methods in the Biomedical Sciences

In addition to the core courses, each student will be required to register for Biochemistry Seminar (GBMG 7101) once each year and attend all Departmental Seminars. All students, except first year students, will be required to present one departmental seminar each year. Students will be evaluated on the seminar presentation by a panel of six faculty, who constitute the Seminar Evaluation Committee (see APPENDIX 8 Seminar Evaluation Form).

A student may be exempted from a required Program core course if the student has recently had an equivalent graduate level course and performed satisfactorily in that course, (*i.e.*, a "B" grade or better). The student must petition the Graduate Program Committee **in writing** for the exemption and provide the Graduate Program Committee with sufficient supporting documentation to justify the request. After a

careful review of this documentation supplied by the student, the Graduate Program Committee will determine whether exemption is appropriate.

Other course work will be prescribed for the student by the Doctoral Advisory Committee. Suitable courses may be offered by Texas Tech University and Texas Tech University Health Sciences Center. Biochemical Research (GBMG 7000) can be used to satisfy not more than twelve hours of the minimum course work requirement (typically used for lab rotations and training in special techniques). Biochemical Research (GBMG 7000) usually is graded Pass/Fail.

In the event the student transfers to the Master of Science degree program, the student will still be required to take Program courses offered during their enrollment in the Program that are normally required of all Ph.D. degree students. In the case of a Ph.D. to M.S. degree program transfer, the M.S. Thesis Advisor must petition the Graduate Program Committee for final approval of all Program required coursework. However, additional coursework outside the Program may still be needed to complement the M.S. Thesis, as judged by the M.S. Thesis Advisor and the Master Advisory Committee.

C. Teaching Requirement

The purpose of this general requirement is to provide a meaningful teaching experience which, with the organization and delivery of research seminars, will provide students training in the development of good teaching practices. This is particularly important given the heavy emphasis toward research by the Graduate Program of Biochemistry and Molecular Genetics, of the Department and the likelihood that many of our students will subsequently occupy academic positions or industrial training and supervisory positions. Such teaching requirements may include: tutoring first year medical and/or graduate students in the biochemistry course in First Semester Core Curriculum, assisting other graduate students to learn techniques during student rotations through the laboratories of various members of the faculty and offering lectures in undergraduate courses (advanced graduate students only). Fulfilling the teaching requirement will be monitored by the Graduate Program Advisor in consultation with each student's Supervising Professor.

D. Qualifying Examination

After a major portion of the required course work has been completed, and no later than the end of the third year, *i.e.*, the ninth semester, the student must pass a Qualifying Examination that consists of two parts:

1. A written portion prepared in such a manner as to show the student's comprehension of a field of study related to biochemistry, ability to develop hypotheses, and competence to design promising and significant experiments. The written portion will be in the form of a Research Proposal. The Research Proposal can be related to the student's research interest, but should not deal directly with the student's dissertation problem itself.

2. An oral portion conducted by the Doctoral Advisory Committee. The examination will be primarily concerned with the Research Proposal and the student's understanding of fundamental concepts and principles of biochemistry which relate to the written proposition.

The student must first obtain the Doctoral Advisory Committee's approval of the SYNOPSIS (see APPENDIX 9) before beginning to write the full Research Proposal. Approval will be documented in the minutes of the Doctoral Advisory Committee Meeting when the SYNOPSIS is reviewed. In general, faculty input should be limited to that required to develop in the student the power of critical and aggressive thought to a research problem and the ability to communicate these thoughts and plans in writing. The faculty should serve as censor or fault finder rather than creator of ideas or approaches to a problem. To assist in evaluation of this proposition it should be arranged according to the following uniform pattern suggested in APPENDIX 10.

The Doctoral Advisory Committee will receive the Synopsis of the Proposal, review it, and approve it for outside review. When approved, the Supervising Professor will arrange for review by three qualified persons who are not on the student's Doctoral Advisory Committee and not associated with the TTU System. These outside reviewers will be asked to submit written critiques of the proposal as if it were a research grant. When the Supervising Professor receives the critiques, they will be forwarded to the Doctoral Advisory Committee that will schedule and administer the oral portion of the examination. The Doctoral Advisory Committee will also critically review the proposal, as well as the outside written critiques. The oral examination will be given by the Doctoral Advisory Committee during a closed meeting (APPENDIX 10).

The Research Proposal and the critiques should serve as an initial focal point for questioning during the oral portion of the examination though the questions may cover all areas of biochemistry and molecular genetics at the discretion of the Doctoral Committee. At this time the student will defend the proposal against the criticisms of the reviewers and clarify approaches to the proposed problem upon the request of the committee.

The Doctoral Advisory Committee will use the results of the written Research Proposition and the Oral Examination to determine whether the student has passed the Qualifying Examination. The members of the Doctoral Advisory Committee must find the student's overall performance to be acceptable for the student to pass the examination. The outcome will be determined by a vote of the individual committee members. More than one negative vote constitutes failure. The Graduate Program Committee will be notified in writing of the outcome (see APPENDIX 10 for Rubric for written and oral examination).

Procedure When the Examination is Satisfactory. If the Qualifying Examination is considered satisfactory and all other requirements have been met, the Supervising Professor will send to the Dean of the Graduate School of Biomedical Sciences an

Admission to Candidacy request. Authority for admitting an applicant to candidacy for a doctoral degree is vested in the Graduate Council of the Graduate School of Biomedical Sciences. Upon receipt of a recommendation from the Program, the Dean of the Graduate School of Biomedical Sciences will submit it to the Graduate Council for action. The Council may approve the committee's recommendation, or it may, after consultation with the committee, suggest additional requirements which the applicant must satisfy.

The Dean of the Graduate School of Biomedical Sciences will transmit the results of the Graduate Council's action in writing, to the applicant, to the Supervising Professor, to the Program Graduate Advisor, and to the Department Chair.

A student must be admitted to Candidacy for the Doctorate at least four months prior to the date for the defense of the Ph.D. dissertation.

Procedure When the Examination is Not Satisfactory. If the Qualifying Examination is not satisfactory, the Graduate Program Advisor will so notify the Dean of the Graduate School of Biomedical Sciences, in writing. An applicant who does not pass the Qualifying Examination may be permitted to repeat it once, at a time that is determined by the Doctoral Advisory Committee. The repetition shall be according to the decision of the Doctoral Advisory Committee and may encompass all or part of the oral portion or written proposal, or in extreme circumstances, may even require a completely new research proposal, followed by an oral examination on this new proposal. Failure to pass the Qualifying Examination a second time will result in dismissal from the Ph.D. program. The student may be permitted to apply for admission to the Master of Science program.

VII. EXPECTATIONS FOR CONTINUATION IN THE PROGRAM AND APPEALS FOLLOWING DISMISSAL

A. Continuation in the Program

Every enrolled student is required to maintain a high level of performance and to comply fully with the policies of the Institution and the Program. The Graduate School of Biomedical Sciences reserves the right to place on probation or to dismiss any graduate student who does not maintain satisfactory academic standing or who fails to conform to the regulations of the Texas Tech University Health Sciences Center. Students who are admitted conditionally to a degree program are automatically on academic probation. The reasons and specific conditions pertaining to this academic probation will be determined by the Graduate Program Committee and presented in writing to the student. Failure to fulfill the conditions stipulated at the time of admission will result in dismissal from the program.

Every student is expected to maintain a high level of commitment to professional development in all areas. If any aspect of a student's professional development (for

example attention to teaching or research responsibilities, appropriate growth toward development of critical thinking skills, appropriate progress toward research goals, *etc.*) is considered to be unsatisfactory by either the Graduate Program Committee or the student's Doctoral Advisory Committee (if one has been appointed), the student shall be so informed in writing, along with a description of the recommended corrective action and the period of time allowed for the corrective action to be taken. If the student fails to correct the deficiency, Doctoral Committee or the Graduate Program Committee may recommend dismissal of the student from the Ph.D. program.

If a student's grade-point average for a particular semester falls below 3.0, the student is placed on academic probation (a 3.0 average is the minimum requirement of the Graduate School of Biomedical Sciences). In order to remove probationary status, a student must maintain a 3.0 GPA for the next academic session in which the student is enrolled. Failure to do so will result in dismissal. Regulations governing scholastic probation are based on semester grade-point averages and will be applied regardless of overall grade-point average. **The Biochemistry and Molecular Genetics Programs requires all students to obtain at minimum, a letter grade of B in all courses. Failure to do so may result in dismissal from the program.**

B. Appeals and Grievance Process

Student Appeals Policy applies to specific grievances arising from matters affecting students' academic standing and performance such as disputes concerning comprehensive examinations, theses and dissertations, and graduate assistantships. Appeals may be made only when alleged prejudicial, arbitrary or capricious action is involved. The burden of proof of unfair influence or action rests with the student.

A student wishing to appeal a decision or action first should discuss the matter with the faculty member or members involved. If the student is not satisfied with the outcome of this effort, the student should contact the Department Chair. This contact, like that with the faculty members, normally is informal, and the Department Chair may take whatever action he or she deems advisable in attempting to resolve the issue. All parties involved should make every effort to resolve the issue without going beyond this level. The Department Chair may consult with either the Graduate Program Committee or an *ad hoc* committee of graduate faculty from the Program (when the appeal is of an action taken by the Graduate Program Committee or a substantial proportion of its elected members) for advice regarding his or her actions in an appeal. If the student still is not satisfied following these meetings and discussions, the student may make a formal appeal to the Dean of the Graduate School of Biomedical Sciences. The appeal shall be processed according to the rules of the Graduate School in effect at the time it is filed with the Dean.

VIII. DISSERTATION

The final requirement for the Doctor of Philosophy degree is submission and defense of a dissertation based upon original research. What comprises a satisfactory dissertation is highly subjective, although some general statements can be made.

1. The dissertation should be based on a logical program of research designed to answer fundamental questions in some field of biochemistry or molecular genetics. Therefore, a body of experimental observations leading to no significant conclusions would not be acceptable.
2. The research program should be carried to a reasonable degree of completion.
3. The information gained should comprise a contribution to knowledge worthy of publication in standard peer-reviewed scientific journals.

At the appropriate time in the graduate student's program, a clear-cut agreement should be reached between the student, the Supervising Professor and the Doctoral Advisory Committee members as to when the aims and goals of the dissertation will have been fulfilled and the research may be terminated. A student may wish to begin writing portions of the dissertation earlier, but must receive **Doctoral Advisory Committee approval before terminating research. This agreement will be documented in the signed Minutes of the committee meeting when approval was granted.**

The student may then prepare his or her dissertation according to the guidelines of the Graduate School of Biomedical Sciences. The dissertation shall be typed in final draft form and a copy made available to each member of the Doctoral Advisory Committee. This draft must be made available to the Doctoral Advisory Committee at least four weeks prior to the final oral examination. The format of the dissertation must conform to Instruction for Preparation and Submitting Theses and Dissertation (<http://www.depts.ttu.edu/gradschool/current/THDGuidelines.php>). If the Doctoral Advisory Committee finds the final draft acceptable, the Supervising Professor will schedule the Final Examination. Copies of an announcement containing pertinent information, including the student's name, title of the dissertation, Doctoral Advisory Committee membership, examination time, place and other relevant information relating to the examination, and a 150 word or shorter abstract must be prepared and posted throughout the TTUHSC at least two weeks before the scheduled dissertation defense.

The Doctoral Advisory Committee administers the Final Examination after all the Candidate's studies are completed and the dissertation has been found to be acceptable. The examination shall not be administered unless all members of the Advisory Committee and the Graduate Dean's representative are present. In special cases, exceptions can be made through petition of the Dean of the Graduate School of

Biomedical Sciences, according to the rules of the Graduate School in effect at that time. (see APPENDIX 11 Rubric for Written and Oral Defense of Dissertation)

The format for the final oral examination will be as follows:

- a. The student will present the highlights of the dissertation research at a public seminar that shall be announced at least three weeks in advance. The seminar will be open to all faculty, students and other interested people.
- b. An oral examination of the candidate will begin following the seminar. The examination may be devoted to the dissertation or its field of investigation, to the candidate's general professional knowledge, judgment and critical reasoning power.
- c. Following the examination, the Doctoral Advisory Committee will ask the candidate to leave the room, and meet to determine if the Candidate has passed the written and oral portions of the examination. The decision will be reached by a formal vote of the committee members. More than one negative vote shall constitute failure. The Dean of the Graduate School of Biomedical Sciences will be informed by a letter of the outcome of the examination with a copy of the letter being sent to the Graduate Program Committee.

IX. DISSERTATION FEES

When a doctoral dissertation and its abstract have been approved by a student's Dissertation Advisory Committee and accepted by the Dean of the Graduate School of Biomedical Sciences, the candidate will pay the TTUHSC Bursar a "Microfilming and Shipping Charge" for the microfilming. Doctoral dissertations will be microfilmed in their entirety, along with the Defense abstract, which is a separate document. One copy of the Defense abstract prepared in accordance with the instructions listed in Thesis/Dissertation Manuel available through the Site Map on the Home Page for the Graduate School of Biomedical Sciences, along with the electronic copy of the dissertation will be sent to thesisondemand.com website. Details regarding fees are also available on that website.

X. STATEMENT OF INTENTION TO GRADUATE

This statement must be filed with the Graduate School of Biomedical Sciences on the appropriate form prior to or after passing of the final examination and acceptance of the dissertation.

Approved by BMG faculty on 9/16/09-- Subject to revision in periodic future reviews.

Dr. Sandra M. Whelly, Graduate Program Advisor and Chair of the Biochemistry and Molecular Genetics Graduate Program Committee.

APPENDIX 1

Student Progress Timeline

Student Name _____

Anticipated Graduation: _____

Mentor: _____

Graduate Committee Members
 1 _____
 2 _____
 3 _____
 4 _____

Year 1 (hours completed:)	Year 2 (hours completed:)	Year 3 (hours completed:)	Year 4 (hours completed:)	Year 5 (hours completed:)
Admitted:	Seminar:	Seminar: 00/00/00	Seminar: 00/00/00	Seminar: 00/00/00
Faculty Interviews completed:	Mandatory Committee Meetings	Mandatory Committee Meetings	Mandatory Committee Meetings	(or Dissertation Defense)
Lab Rotations	1	3	5	Mandatory Committee Meetings
1	2	4	6	7
2	Submit	Qualifying Exam		8
3	'Program for Doctoral Degree'	Outside Reviewers	Fall	Dissertation
Select Advisor		1		Statement of Intent to Graduate
Select Committee		2		
Fall	Fall	3	Spring	Fall
		Admitted to Candidacy		
Spring	Spring	Fall	Summer I	Spring
			Summer II	
Summer I	Summer I	Spring	Business Meeting	Summer I
Summer II	Summer II	Summer I		Summer II
Business Meeting	Business Meeting	Summer II		Business Meeting
		Business Meeting		

Core Course:

GSBS 5471 Core I: Molecules
GSBS 5372 Core II: Cells
GSBS 5373 Core III: Genes
GSBS 5174 Core IV: Biomedical Seminar Series
GSBS 5275 Core V: Introduction to Biomedical Research

Other Required Courses

GBMG 6055 Research Methods
GBMG 7101 Seminar
GBMG 6333 Advanced Protein Biochemistry
GBMG 7000 Research
GCMB 6320 Advanced Cell Biology
GSBS 5310 Introduction to Statistical Methods
GSBS 5101 Responsible Conduct of Research

Mandatory Committee Meeting Objectives

- 1 Choose course work electives; introduce thesis project
- 2 Approve coursework; review research results; present next six month research plan
- 3 Defend qualifying exam (Research proposal); Review research results; present six month research plan
- 4 Review thesis research; next six month research plan
- 5 Review thesis research; next six month research plan
- 6 Review thesis research; next six month research plan
- 7 Review thesis research; next six month research plan
- 8 Review thesis research; next six month research plan

APPENDIX 2: Program of Biochemistry and Molecular Genetics Graduate Faculty

Professors

Beverly Chilton, Ph.D. *

Gail Cornwall, Ph.D. *

Johannes Everse, Ph.D.

Charles H. Faust, Ph.D.

Patrick Reynolds, M.D./Ph.D. *

Douglas M. Stocco, Ph.D.

Harry M. Weitlauf, M.D., Departmental Chairman ex officio

Associate Professors

Daniel M. Hardy, Ph.D.

Min Kang, Pharm.D. *

Vaughan H. Lee, Ph.D. *

Clinton C. MacDonald, Ph.D.

Barry Maurer, M.D./Ph.D. *

John Pelley, Ph.D.

Brandt Schneider, Ph.D.

S. Sridhara, Ph.D.

Sandra M. Whelley, Ph.D.

Simon C. Williams, Ph.D.

Ina Urbatsch, Ph.D.

Assistant Professors

Jannette Dufour, Ph.D.*

Jeffrey Thomas, Ph.D.*

Daniel R. Webster, Ph.D. *

Primary Faculty of the Biochemistry and Molecular Genetics Program are shown in bold.

* Associate Appointee

APPENDIX 3A: Criteria for Dissertation Advisory Committee Meeting Handouts and Minutes

All students are required to have at a minimum two 6 month dissertation committee meetings per year. More frequent meetings and discussions with committee members should be arranged if needed. The Biochemistry and Molecular Genetics Graduate Program requires that all students prepare detailed handouts for the members of the committee and distribute these handouts at least 5 days in advance of the committee meeting. This allows the faculty sufficient time to review and evaluate progress during the time since your last review. At minimum these handouts should contain: (1) a report of student's progress (with grade) of the didactic program of the student; (2) the laboratory activities during the interval since the last meeting including successes or problems that have been encountered; (3) figures and graphs with legends; (4) description of the methods that were used to perform the experiments; (5) discussion of the results including interpretation of the figures and tables that are presented; (6) and goals for the next 6 months or whatever time frame has been set for the next committee meeting.

Minutes of all committee meetings must detail all activities that occurred during the meeting. The minutes must be written up by the student, reviewed by the mentor and distributed by email to committee members within a week of the meeting date. The committee members will then inform the student of any changes that they feel necessary to reflect what occurred at the meeting. When all members are in agreement with the minutes the committee members should sign the document and signed copies need to be given to the committee members, the Graduate Advisor for the Biochemistry and Molecular Genetics Program, and a copy placed in the Departmental File of the student.

Completion of the following Rubric Evaluation of Student Progress by the Advisory Committee (Appendix 3B) will be used for each Committee Meeting to document student's progress.

APPENDIX 3B RUBRIC

**Biochemistry and Molecular Genetics
Evaluation of Student Progress by the Advisory Committee**

Student Name:	
Mentor:	
Committee Member:	
Committee Meeting Date:	

RATINGS:

4. Outstanding - Exceed expectations.
3. Very Good - Well done, all elements included and clearly addressed
2. Acceptable - Adequate with some weakness
1. Not Acceptable.

	Rating
Enthusiasm/Motivation	
Work Ethic	
Scientific Curiosity	
Ability to Think Independently	
Scientific Knowledge	
Laboratory Skills/Data quality	
Communication Skills	
Evidence of Progress in Dissertation Research	

Additional Comments:

Committee Meeting Minutes ____ Yes ____ No

Minutes of the meeting written by the student will report comments by the committee, identify any problems discussed and state the research goals to be met before next meeting.

Next Meeting in ____ 1 month ____ 3 months ____ 6 months ____ Other (when Needed)

The following individuals have read and understand the comments on this form and the attached minutes of the meeting.

Committee Member Signature:	
Student's Signature:	
Advisor's Signature:	

Completed Form and Minutes to be returned to the CBB Graduate Program Coordinator within one week after the meeting.

APPENDIX 3C RUBRIC**Biochemistry and Molecular Genetics
Student Checklist**

Student Name: _____

REQUIREMENTS	DATE COMPLETED	GRADE
Interview with faculty completed within the beginning first of the semester		
REQUIRED COURSES		
GSBS 5471 Core I: Molecules		
GSBS 5372 Core II: Cells		
GSBS 5373 Core III: Genes		
GSBS 5174 Core IV: Biomedical Seminar Series		
GSBS 5275 Core V: Introduction to Biomedical Research		
GBMG 6333 Advanced Protein Biochemistry		
GANM 6320 Advanced Cell Biology		
GSBS 5101 Responsible Conduct of Research		
GSBS 5310 Introduction to Statistical Methods		
GBMG 7101 Seminar		
Year 1 (attendance requirement only)		
Year 2 Fall, Spring w/ presentation		
Year 3 Fall, Spring w/ presentation		
Year 4 Fall, Spring w/ presentation		
GBMG 6055 Research Methods/Rotations		
1 st Rotation with _____		
2 nd Rotation with _____		
3 rd Rotation with _____		
GBMG 6135, 6235, 6335, 6535 Topics in Biochemistry		
GBMG 7000 Research (12 hours total)		
Completed 60 hours of didactic course work		

	DATE COMPLETED
GBMG 8000 Dissertation	
Advisor Selection (following the end of the 3rd rotation)	
Business meeting with the Department Chairman within 1 month of Advisor selection	
Selection of Advisory Committee and 1 st meeting within 2 months of Advisor selection	
Submit Degree Program to GSBS within 2 weeks after 1 st Advisory Committee meeting	
Qualifying Exam due by the end of the third year, <i>i.e.</i> the ninth semester	
Request Admittance to Candidacy	

Advisory Committee Meetings Meets Whenever Necessary But Not Less Than Twice a Year. Evaluation Form and Minutes to be Submitted Within One Week After Meeting

	Date of Meeting	Date Minutes Submitted
Committee Meeting 1		
Committee Meeting 2		
Committee Meeting 3		
Committee Meeting 4		
Committee Meeting 5		
Committee Meeting 6		
Committee Meeting 7		
Committee Meeting 8		
Committee Meeting 9		
Committee Meeting 10		

REQUIREMENTS	Date Completed
Submit Intent to Graduate to GSBS	
Submit Penultimate draft of dissertation to Advisory Committee 4 weeks prior to the intended defense date	
Final approval for dissertation defense date by Advisory Committee (minimum 3 weeks prior to defense date)	
Dissertation defense date	
Approval by Advisory Committee of Written Thesis	
Approval by Advisory Committee of Oral Defense	

See checklist for graduation deadlines from the GSBS website

APPENDIX 4: FACULTY INTERVIEW LIST

Student Name: _____

The policy of the Program of Biochemistry and Molecular Genetics requires all new incoming students to interview with each faculty member listed below to discuss their research program. The purpose of this is to introduce professionally the new student to each faculty member and vice versa, and to provide the student with sufficient information to choose laboratories for rotations. Therefore, the new student should arrange an appointment with each faculty member for this initial one-half to one hour interview when it is mutually convenient. All faculty must be interviewed. Please remember to take this form with you for the signature or initials of each faculty member interviewed. After all required interviews are complete, return this signed form to the Graduate Advisor. Later, you can indicate your choice of lab rotation(s), upon mutual agreement of you and the faculty member(s). At least one rotation is expected of each student for a minimum of eight weeks, even for those students who may have pre-selected an advisor. Usually, no more than four rotations should be done. Interviews should be completed before the end of the first semester, and the rotations should commence no later than the beginning of next semester.

<u>Primary Faculty</u>	<u>Signature</u>	<u>Associate Faculty</u>	<u>Signature</u>
Johannes Everse	_____	Beverly Chilton	_____
Charles Faust	_____	Gail Cornwall	_____
Daniel M. Hardy	_____	Jannette Dufour	_____
Clinton C. MacDonald	_____	Min Kang	_____
Brandt Schneider	_____	Vaughan H. Lee	_____
S. Sridhara	_____	Barry Maurer	_____
Douglas Stocco	_____	Patrick Reynolds	_____
Ina Urbatsch	_____	Jeffrey Thomas	_____
Sandra Whelley	_____	Dan Webster	_____
Simon C. Williams	_____	Harry M. Weitlauf (Chair)	_____

APPENDIX 5: LABORATORY ROTATION SCHEDULE

Faculty Member	Time Period
1.	
2.	
3.	
4.	

NOTE: If only a single rotation is planned by the Graduate Student, it must be for an eight week period. A formal request for this singular choice should be made to the Program Graduate Committee in writing, specifying the reason(s) for this choice.

4. Would you accept this student into your laboratory after your rotation experience with them? Explain.

5. What do you think would improve this student's laboratory performance?

6. Other remarks.

APPENDIX 6B RUBRIC

**Biochemistry and Molecular Genetic
Evaluation of Student's Laboratory Rotation**

Student's Name _____ Rotation date _____

RATINGS:

- 4. Outstanding Exceed expectations.
- 3. Very Good - Well done, all elements included and clearly addressed
- 2. Acceptable - Adequate with some weakness
- 1. Not Acceptable.

Rating

A. Understanding of concepts	_____
B. Independence in laboratory work	_____
C. Commitment, enthusiasm, drive and ambition	_____
D. Laboratory skills	_____
E. Design of experiments and interpretation of results	_____
F. Laboratory notebook and presentation of results	_____

2. Please add comments on the student's performance that will be of use in evaluating the student's progress and potential in the graduate program.

Faculty Member Name _____ Signature _____

Date _____

Review

Date evaluation reviewed with the student: _____

Student's initials (indicating evaluation was reviewed) _____

APPENDIX 7: GRADUATE STUDENT -- DISSERTATION ADVISOR AGREEMENT

TO: The Program Graduate Advisor
FROM: The Graduate Student
RE: Selection of the Ph.D. Dissertation Advisor
DATE:

Effective, _____, the two parties signed below mutually agree to begin a formal Graduate Student-Dissertation Advisor relationship directed toward the goal of earning a Ph.D. degree for the student.

Graduate Student

Dissertation Advisor

APPENDIX 8: CELL BIOLOGY & BIOCHEMISTRY SEMINAR EVALUATION

Date:

Evaluator: _____

Student: _____

Mark the appropriate box for each statement.

	Not Acceptable	Acceptable	Very Good	Exceptional
The Science				
The background was logical, clear and led to an important unanswered question.				
The central question to be addressed was presented in the form of a hypothesis with associated specific aims to be addressed.				
The methods were appropriately used and presented.				
The results were presented clearly; and were analyzed and interpreted properly using statistics where appropriate.				
The discussion compared the findings with those from previous investigations.				
A conclusion is offered that is logical and fits the results; and emphasized the overall significance.				
The Presentation				
The presentation was clearly organized.				
The slides were readable, illustrate concept and data, and provide smooth transition.				
The student was engaging, enthusiastic, and spoke clearly.				
Questions were answered in a confident and knowledgeable fashion.				
The student was able to accept criticism and suggestions readily, and was also able to defend their presentation when appropriate.				

Comments:

APPENDIX 9: BIOCHEMISTRY AND MOLECULAR GENETICS PROGRAM'S PH.D STUDENT RESEARCH PROPOSAL

A. Synopsis Preparation: A two page synopsis must be submitted to the student's Ph.D. dissertation committee for their review and approval by beginning of the eighth semester. The synopsis must contain a research summary and the specific aims of the research proposal. The full proposal must be completed by the student and sent out for review three months into the eighth semester and the qualifying exam must be taken before the beginning of the ninth semester (end of the third year). Failure to meet these deadlines (also see APPENDIX 1) indicates that the student is no longer in good academic standing, which can result in disciplinary action being recommended by the Biochemistry and Molecular Genetics Program Graduate Committee to the Chair, possibly resulting in dismissal from the Program. In extraordinary circumstances, a one semester extension to these deadlines can be granted by the Biochemistry and Molecular Genetics Program Graduate Committee, if the student petitions this committee in writing, justifying why such an extension should be allowed. This petition should be made at least one semester in advance of the normal deadline.

B. Format for the Ph.D. Student Research Proposal

The Research Project Grant (R01) is the original and historically oldest grant mechanism used by NIH. The R01 provides support for health-related research and development based on the mission of the NIH. R01s can be investigator-initiated or can be in response to a program announcement or request for application. This Web site is devoted to the investigator-initiated R01 application, which means: a good idea and an application, no specific program requirements. However, the R01 research plan proposed by the applicant must be related to the stated program interests of one or more of the NIH Institutes and Centers based on descriptions of their programs. R01s are most often investigator initiated in response to either the R01 Parent Announcement or a Program Announcement highlighting particular scientific areas. Requests for Applications (RFAs) may also utilize the R01 mechanism.

Definition of an R01

The Research Project (R01) grant is an award made to support a discrete, specified, circumscribed project to be performed by the named investigator(s) in an area representing the investigator's specific interest and competencies, based on the mission of the NIH.

The Research Plan of an application for an R01 award must follow the instructions provided in SF424 (R&R) Application Guide,
<http://grants.nih.gov/grants/funding/424/index.htm>

C. Required Elements

1. Student Name, Descriptive Title, Project Summary.

The Descriptive Title is limited to 81 characters, including the spaces between words and punctuation.

The Project Summary consists of two parts, the Abstract and Project Narrative.

The Abstract must contain a summary of the proposed activity suitable for dissemination to the public. It should be a self-contained description of the project and should contain a statement of objectives and methods to be employed. It should be informative to persons working in the same or related fields and insofar as possible understandable to a scientifically or technically literate lay reader. It should state the application's broad, long-term objectives and specific aims, making reference to the health relatedness of the project. Describe concisely the research design and methods for achieving the stated goals. Avoid describing past accomplishments and the use of the first person. The Abstract must be no longer than 30 lines of text, and follow the required font and margin specifications as described in the Format Specifications for Text section of the Written Qualifying Exam Instructions.

The second component of the project summary is the Project Narrative. Use no more than two or three sentences to describe the relevance of this research to public health. Be succinct and use plain language that can be understood by a general, lay audience.

2. Specific Aims (limit 1 page).

State concisely the goals of the proposed research and summarize the expected outcome(s), including the impact that the results of the proposed research will exert on the research field(s) involved. List succinctly the specific objectives of the research proposed, e.g., to test a stated hypothesis, create a novel design, solve a specific problem, challenge an existing paradigm or clinical practice, address a critical barrier to progress in the field, or develop a new technology.

3. Research Strategy (limit 12 pages total).

Organize the Research Strategy in the specified order and using the instructions provided below. Start each section with the appropriate section heading – Significance, Innovation, Approach. Cite published experimental details in the Research Strategy section and provide the full reference in the Bibliography and References Cited section.

a. Significance

- Explain the importance of the problem or critical barrier to progress in the field that the proposed project addresses.
- Explain how the proposed project will improve scientific knowledge, technical capability, and/or clinical practice in one or more fields.
- Describe how the concepts, methods, technologies, treatments, services, or preventative interventions that drive this field will be changed if the proposed aims are achieved.

b. Innovation

- Explain how the application challenges and seeks to shift current research or clinical practice paradigms.
- Describe any novel theoretical concepts, approaches or methodologies, instrumentation or interventions to be developed or used, and any advantage over existing methodologies, instrumentation, or interventions.
- Explain any refinements, improvements, or new applications of theoretical concepts, approaches or methodologies, instrumentation, or interventions.

c. Approach and Preliminary Studies

- Describe the overall strategy, methodology, and analyses to be used to accomplish the specific aims of the project. Include how the data will be collected, analyzed, and interpreted.
- Discuss potential problems, alternative strategies, and benchmarks for success anticipated to achieve the aims.
- If the project is in the early stages of development, describe any strategy to establish feasibility, and address the management of any high risk aspects of the proposed work.
- Point out any procedures, situations, or materials that may be hazardous to personnel and precautions to be exercised.
- Preliminary Studies information must be included in the Approach section. Discuss the PD/PI's preliminary studies, data, and or experience pertinent to this application. Preliminary data can be an essential part of a research grant application and help to establish the likelihood of success of the proposed project.
- Present a putative timeline for proposed research

4. Bibliography and References Cited

Provide a bibliography of any references cited in the project narrative. Each reference must include the names of all authors (in the same sequence in which they appear in the publication), the article and journal title, book title, volume number, page numbers, and year of publication. Include only bibliographic citations. Students should be especially careful to follow scholarly practices in providing citations for source materials relied upon when preparing any section of the Qualifying Exam. The references should

be limited to relevant and current literature. While there is no page limitation, it is important to be concise and to select only those literature references pertinent to the proposed research.

D. Format Specifications for Text

1. Font

- Use an Arial, Helvetica, Palatino Linotype, or Georgia typeface, a black font color, and a font size of 11 points or larger (a symbol font may be used to insert Greek letters or special characters; the font size requirement still applies).
- Type density, including characters and spaces, must be no more than 15 characters per inch.
- Type may be no more than six lines per inch.

2. Paper Size and Page Margins

- Use standard paper size (8-1/2" x 11").
- Use at least 1/2" margins (top, bottom, left and right) for all pages. No information should appear in the margins, except student's last name and page numbers.
- Page Formatting
- The pages should use a standard, single-column format.
- Do not include any information in a header or footer.

3. Figures, Graphs, Diagrams, Charts, Tables, and Figure Legends

- You may use a smaller type size but it must be in a black font color, readily legible, and follow the font typeface requirement. Color can be used in figures; however, all text must be in a black font color, clear and legible.
- Begin each section with a section header (e.g., Specific Aims,).
- All tables, graphs, figures, diagrams, and charts must be included within the Research Strategy page limit.

4. Grantmanship

- Use English and avoid jargon.
- If terms are not universally known, spell out the term the first time it is used and note the appropriate abbreviation in parentheses. The abbreviation may be used thereafter.

APPENDIX 10 RUBRIC

Biochemistry and Molecular Genetics Qualifying Exam Evaluation Rubric

Date: _____ **Evaluator:** _____
Student: _____ **Evaluator** _____
_____ **Signature:** _____

RATINGS:

4. Outstanding Exceed expectations.
3. Very Good - Well done, all elements included and clearly addressed.
2. Acceptable - Adequate with some weakness.
1. Not Acceptable.

The proposal summary includes:

A succinct and accurate description of the proposed work. A statement of the applicant long term objectives and specific aims. A reference to the relevance of the research to public health. A concise description of the research design and methods for achieving the stated goals.

Rating: _____

The Specific Aims page contains:

The long term objectives and goals of the research proposed. A clearly stated hypothesis. A list of specific aims design to address the hypothesis.

Rating: _____

The background and Significance section:

Briefly sketches the background leading to the present application . Critically evaluates existing knowledge. Identifies knowledge gaps that the project is intended to fill. States the importance and health relevance of the research. States how scientific knowledge will be advanced if the aims are achieved .

Rating: _____

The preliminary studies section provides an account of the supportive data present in published literature.

Rating: _____

The research Design and Methods section includes:

Rationale and description of the research design, procedures and analyses to be used to accomplish the specific aims of the project. Discussion of the potential

difficulties and limitations of the proposed procedures and alternatives approaches to achieve the aims. A tentative sequence or timetable for the project.

Rating: _____

The proposal:

Follows a standard form and has a professional scholarly appearance. Is written with correct grammar, punctuation and spelling. Includes citations for the following: direct quotations, paraphrasing, facts and references to research studies.

Rating: _____

The proposal is written in scholarly language (accurate, balanced and objective). The writing is clear, precise and avoids redundancy. Statements are specific and topical sentences are established for paragraphs. The flow of words is smooth and comprehensible. Bridges are established between ideas

Rating: _____

The oral presentation:

Is clearly organized and supported by slides that explain and reinforce the purpose and subject of the proposal. Properly introduces and covers all sections of the proposal. Has an appropriate length and is well-paced throughout. Is dynamic and sustain the engagement of the committee

Rating: _____

The oral presentation reflects the knowledge of the subject and all the questions of the advisory committee are answered with elaboration.

Rating: _____

ADDITIONAL COMMENTS

APPENDIX 11 RUBRIC

**Biochemistry and Molecular Genetics
Written and Oral Dissertation Rubric**

Date: _____ **Evaluator:** _____
Student: _____ **Evaluator** _____
_____ **Signature:** _____

RATINGS:

- 4. Outstanding Exceed expectations.
- 3. Very Good - Well done, all elements included and clearly addressed
- 2. Acceptable - Adequate with some weakness
- 1. Not Acceptable.

Written Dissertation:

a. Well written and organized.

Rating: _____

b. Research question and its scientific context are clearly stated.

Rating: _____

c. Logic and rigor of the arguments associated with the project hypothesis.

Rating: _____

d. Literature review is comprehensive, up to date, selective, analytical and thematic.

Rating: _____

e. Results section contains sufficient, well presented and interpreted data.

Rating: _____

f. Experimental methods are detailed and justified.

Rating: _____

g. Discussion summarizes the finding, provides perspectives by relating them to literature

Rating: _____

h. Discussion includes study's strengths and weaknesses, implication for research field and future direction of research.

Rating: _____

ADDITIONAL COMMENTS

Oral Presentation and Oral Defense:

a. Quality and organization of the presentation.

Rating: _____

b Quality of slides to illustrate concepts, data and provide transitions.

Rating: _____

c. Engagement and enthusiasm of the student.

Rating: _____

d. Confidence and knowledge exhibited while answering questions.

Rating: _____

e. Demonstration of research project ownership during oral presentation and defense.

Rating: _____

ADDITIONAL COMMENTS

