

University of North Texas Health Science Center *at* Fort Worth

Department of Biomedical Sciences
Graduate School of Biomedical Sciences

**DISCIPLINE
OF
BIOMEDICAL
SCIENCES**

HANDBOOK 2010-2011

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INTRODUCTION

Policies and procedures set forth in this document pertain to all graduate students in the Department of Biomedical Sciences at the University of North Texas Health Science Center. These policies and procedures are in addition to those of the Graduate School of Biomedical Sciences. Thus, the Biomedical Sciences handbook is a supplement to the Graduate School of Biomedical Sciences Catalog and is designed to assist students in the biomedical science discipline to progress in a timely manner through their degree programs.

The Department of Biomedical Sciences oversees several degree programs, as well as the Post Baccalaureate Premedical Certification Program. M.S. in Clinical Research Management has its own handbook. Students in the Master's degree program in clinical research management and certificate students who have an interest in clinical research management are referred to the Clinical Research Management Handbook.

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General Description of the Discipline of
Biomedical Sciences

The Department of Biomedical Sciences offers both M.S. and Ph.D. degrees in a wide range of research areas. In addition, the department administers the Medical Sciences M.S. degree program and a non-thesis M.S. degree program in Clinical Research Management in Biomedical Sciences. The traditional Master of Science and doctoral programs in biomedical sciences are interdisciplinary in nature. Many students matriculate into the Department of Biomedical Sciences for their first year in graduate school because they want the chance to explore more than one discipline before committing to a single focused program, in one of the academic departments. Once they decide on a concentration, they then request a transfer to the chosen discipline, usually towards the end of the spring semester of their first year. Those students who either have been accepted into one of the specialized Master's programs that are administered by the Department of Biomedical Sciences or have become interested in research that spans two or more disciplines remain as graduate students in Biomedical Sciences.

All students in Biomedical Sciences are encouraged to acquire a broad base of knowledge in those disciplines that flourish within a health science center, allowing them to understand and take an active role in research that spans multiple areas of inquiry. All students entering the traditional programs will complete a two semester integrated biomedical science core curriculum that includes fundamental principles of biochemistry, cellular and molecular biology, microbiology and immunology, pharmacology and physiology. In addition, training in biomedical ethics and an introduction to faculty research are part of the required first year curriculum. Since the biomedical science discipline is interdisciplinary in nature, advanced courses focus on the individual student's particular interests and needs. The Ph.D. student must complete a course in biostatistics and will also register for a number of advanced elective courses. These courses may also be taken as electives by M.S. students. The traditional Master's and doctoral students will also participate in seminars and group discussions of current research topics, either by enrolling in Seminars in Current Topics under Biomedical Sciences or in similar seminar courses offered by other disciplines.

Ph.D. students and M.S. students will conduct original, publishable research and will be expected to present their results at national scientific conferences. **Research leading to dissertations must reflect the interdisciplinary nature of the biomedical science discipline, i.e. the research must involve two or more disciplines. Each Ph.D. student is required to select a Primary Advisor from the major discipline and together, the student and the Primary Advisor select a Secondary Advisor from the minor discipline. The research will then be conducted in both professors' laboratories.** The remaining Advisory Committee will reflect the interdisciplinary nature of the student's specific research and may be selected from any discipline, provided they are members of the graduate faculty. The doctoral Advisory Committee will, thus, have one additional member over and above

the four required members. Both the master's and doctoral students must have a university member present at any oral qualifying exam and/or thesis/practicum report/dissertation seminar and associated defense, as required by the Graduate School of Biomedical Sciences.

Completion of the M.S. degree typically requires two years; the Ph.D. degree is generally completed in four to five years. Students who successfully complete a graduate degree in Biomedical Sciences will be well prepared for careers in academic or government research laboratories, as well as in the pharmaceutical/biotechnology industry. Students in specialized Master's programs are trained as secondary school science teachers, clinical research management specialists, or laboratory technicians/managers. The Master of Science program in Medical Sciences is designed to provide additional opportunities to those individuals who would like to enhance their credentials for entry into medical school. This is achieved by offering a strong, challenging biomedical sciences curriculum in the environment of a health science center.

Degree Programs Administered Under the Discipline of Biomedical Sciences

Specialized Master's Programs (see

<http://www.hsc.unt.edu/departments/BMSC/graduatProgram.html>):

1. Biotechnology;
2. Clinical Research Management; and
3. Medical Sciences Premedical Program.

Doctoral Degree

Traditional Master of Science

Doctoral Degree (Ph.D.; D.O./Ph.D.):

The doctoral program in the biomedical science program is designed for those students who are interested in research that spans two or more different disciplines. A student who initially is accepted into the discipline and then decides to focus on a single discipline should transfer into that discipline by the end of the first year in graduate school. To transfer, the student must have approval of the graduate advisor and chair of the new discipline as well as from the graduate advisor and chair of the discipline of biomedical sciences. The change of discipline form is available on the graduate school web page www.hsc.unt.edu/education/gsbs under "Forms".

Degree plans for students in the biomedical science discipline are tailored to the individual student's interests and vary greatly due to the interdisciplinary nature of the program. For these reasons, advanced and elective courses offered after completion of the first year core curriculum are not indicated. Full time enrollment requires a minimum of 12 SCH in the fall and spring semesters and 6 SCH in the summer. The following is a **typical degree plan** for a doctoral student in the biomedical science discipline:

Doctor of Philosophy (Ph.D.) Degree

Year 1 Fall

BMSC 6301	Integrative Biomedical Sciences CORE I: Principles of Biochemistry	4 SCH
BMSC 6302	Integrative Biomedical Sciences CORE II: Molecular Cell Biology	4 SCH
BMSC 5160	Biomedical Ethics	1 SCH
BMSC 5135	Introduction to Faculty Research Programs	1 SCH
BMSC 5150	Laboratory Rotations	2 SCH

Year 1 Spring

BMSC 6303	Integrative Biomedical Sciences CORE III: Physiology	3 SCH
BMSC 6304	Integrative Biomedical Sciences CORE IV: Pharmacology	2 SCH
BMSC 6305	Integrative Biomedical Sciences CORE V: Immunology and Microbiology	3 SCH
BMSC 5135	Introduction to Faculty Research Programs	1 SCH
BMSC 5150	Laboratory Rotations	1 SCH
	Electives	2 SCH

Year 1 Summer

BMSC 5400	Biostatistics for Biomedical Sciences	4 SCH
BMSC 6998	Individual Research	2 SCH
BMSC 6390.001	Special Problems: Short Course in Health Disparities	1 SCH

Year 2 Fall		
BMSC 5140	Seminar in Current Topics	1 SCH
BMSC 6998	Individual Research	1-4 SCH
	Electives	10-7 SCH
Year 2 Spring		
BMSC 6998	Individual Research	4 SCH
BMSC 5140	Seminar in Current Topics	1 SCH
BMSC 5310	Scientific Communications	3 SCH
	Electives	4 SCH
Year 2 Summer		
BMSC 6998	Individual Research	6 SCH
	<i>Oral Qualifying Exam</i>	
BMSC 6390.001		Special
Problems: Short Course in Health Disparities		1 SCH
Year 3 Fall		
BMSC 6310	Grant Writing	3 SCH
BMSC 6998	Individual Research	8-2 SCH
BMSC 5140	Seminar in Current Topics	1 SCH
	Electives	0-6 SCH
	<i>Research Proposal</i>	
Year 3 Spring		
BMSC 6395	Doctoral Dissertation	3 SCH
	Electives	3 SCH
Year 3 Summer		
BMSC 6395	Doctoral Dissertation	6 SCH
BMSC 6390.001		Special
Problems: Short Course in Health Disparities		1 SCH
Year 4 Fall		
BMSC 6395	Doctoral Dissertation	6 SCH
Year 4 Spring		
BMSC 6395	Doctoral Dissertation	6 SCH
	Total (Minimum)	99 SCH

D.O./Ph.D. DEGREES (M.S.T.P. and Dual Degree Students):

At least 45 hours of credits not included in the D.O. program is required to obtain the Ph.D. degree in biomedical sciences as a second terminal degree.

Traditional Master of Science Degree (M.S.; D.O./M.S.):

The master program in the biomedical science program is designed for those students who are interested in research that spans two or more different disciplines. A student who is initially accepted into the discipline and then decides to focus on a single discipline should transfer into that discipline by the end of the first year in graduate school. To transfer, the student must have approval of the graduate advisor and chair of the new discipline as well as from the graduate advisor and chair of the discipline of biomedical sciences. The change of discipline form is available on the graduate school web page www.hsc.unt.edu/education/gsbs under “Forms”.

Degree plans for students in the biomedical science discipline are tailored to the individual student’s interests and vary greatly due to the interdisciplinary nature of the program. For these reasons, advanced and elective courses offered after completion of the first year core curriculum are not indicated. **Full time enrollment requires a minimum of 9 SCH in the fall and spring semesters and 6 SCH in the summer.** The following is a typical degree plan for a traditional master’s student in the biomedical science discipline:

MASTER OF SCIENCE (M.S.) DEGREE

Year 1 Fall

BMSC 6301	Integrative Biomedical Sciences CORE I: Principles of Biochemistry	4 SCH
BMSC 6302	Integrative Biomedical Sciences CORE II: Molecular Cell Biology	4 SCH
BMSC 5160	Biomedical Ethics	1 SCH
BMSC 5135	Introduction to Faculty Research Programs	1 SCH
BMSC 5150	Laboratory Rotations	1 SCH

Year 1 Spring

BMSC 6303	Integrative Biomedical Sciences CORE III: Physiology	3 SCH
BMSC 6304	Integrative Biomedical Sciences CORE IV: Pharmacology	2 SCH
BMSC 6305	Integrative Biomedical Sciences CORE V: Immunology and Microbiology	3 SCH
BMSC 5135	Introduction to Faculty Research Programs	1 SCH
BMSC 5150	Laboratory Rotations	1 SCH

Year 1 Summer

BMSC 6998	Individual Research	2 SCH
	Elective (BMSC 5200 OR CGEN 6030)	4 SCH
BMSC 6390.001	Special Problems: Short Course in Health Disparities	1 SCH

Year 2 Fall

BMSC 5140	Seminar in Current Topics	1 SCH
BMSC 6998	Individual Research	1-4 SCH
Electives		7-4 SCH

Year 2 Spring

BMSC 5395	Thesis	6 SCH
Electives		3 SCH

Total (Minimum)**46 SCH*****D.O./M.S. DEGREES:***

At least 18 hours of credit not included in the D.O. program will be needed to obtain the M.S. degree in the discipline of biomedical sciences. These will normally include:

1. Thesis (BMSC 5395) - 6 credits
2. Electives - BMSC 6998 Individual Research; BMSC 5170 Techniques in Biomedical Sciences; BMSC 5390 Special Problems

Academic Policies

Degree Requirements

- Grades
- Laboratory Rotations
- Selection of the Advisor and Advisory Committee Members
- The University Member
- The Degree Program and Credit Hours Required for Degree Programs
- Research and Internships
- Seminars
- Ph.D. Oral Comprehensive Examination
- Ph.D. Grant Writing (BMSC 6010) and Advancement to Candidacy
- Research Proposals and Grading of Individual Research/Practicum Credit Hours
- Intent to Graduate and Intent to Defend Forms
- Theses/ Internship Practicum/Dissertation Requirements
- Public Seminar and Defense of Thesis/ Internship Practicum Report/ Dissertation

Annual Performance Review

- Milestones for Master's and Doctoral Students

Eligibility to Transfer into the Ph.D. Program from the M.S. Program

Grades

For either the M.S. or Ph.D. program, a student must maintain a grade average of B (3.0) or better each semester. The student who fails to maintain an overall GPA of 3.0 will be placed on academic probation and have one long semester to bring his/her grade average to B. If the student has a graduate teaching assistantship, it will not be withdrawn for the semester the student is attempting to correct his/her deficiency. Failure to obtain an overall GPA of 3.0 after one semester may result in dismissal, continued probation or other penalties.

Policy For Repeating Core Courses

The policies regarding general grade requirements for the core biomedical sciences courses are part of the “Core Curriculum in Biomedical Sciences” syllabus and are not included here. The student is referred to the core syllabus for these requirements.

Any Ph.D. student in the discipline of biomedical science must have an overall core average of 3.0 (B). A grade of C is acceptable in one core course (i.e. in BMSC 6301, BMSC 6302, BMSC 6303, BMSC 6304 or BMSC 6305), as long as an overall core grade of 3.0 is achieved (i.e., a grade of A must be obtained in at least one other core course of equal credit hours to offset the C). As per the Graduate School policy, any Ph.D. student who receives two or more C grades in core courses will be immediately transferred to the M.S. program. The student will not be considered for re-entry into the Ph.D. program until the following conditions are met: the student must have re-taken the necessary core courses and achieved a grade of B or better; the student must successfully complete the M.S. degree. The student will be given one opportunity to retake the required courses. If the student meets the stated criteria, he/she will be considered for re-admittance to the Ph.D. program; however, re-admittance is not guaranteed.

A M.S. student may proceed with his/her program if two C grades are achieved. However, the same requirements for maintaining an overall GPA of 3.0 each semester are in effect as stated under *Grades*.

Laboratory Rotations

All students in the discipline of biomedical sciences are required to perform laboratory rotations (BMSC 5150). The primary goal of rotations is to help a student choose a major professor. A secondary goal is to expose students to a number of areas of study to expand expertise and knowledge in research techniques. Each entering Ph.D. student is required to rotate through three different laboratories within his/her first year in graduate school, and each entering M.S. student is required to rotate through two different laboratories. If, at the time of matriculation, a Ph.D. student has already chosen a mentor, and the mentor has agreed to accept the student, that student is required to rotate in the mentor's laboratory and only one additional lab.

At the beginning of each rotation, the sponsoring faculty member will clearly outline his/her expectations of the student during the rotation period. At the end of the rotation, the faculty member will provide the student with a written constructive critique of his/her strengths and weaknesses. The duration of rotations should be approximately 6-10 weeks. At the conclusion of the final rotation, it is expected that the student will have chosen a major professor.

A copy of the *Laboratory Rotation Description and Report Form* is available in Appendix I of this document.

Selection of Primary and Secondary Advisors and Advisory Committee

As soon as is feasible, a student will select a major professor (or primary advisor, if a Ph.D. student) by joint agreement of that faculty member and the student. Generally the major professor will be identified no later than the end of the second semester of study. The major professor will have the primary responsibility for directing the student's research. Students are required to rotate in faculty laboratories to aid in making this decision (see above). Following identification of a major professor, each Ph.D. student, in consultation with his/her major professor, must select a secondary advisor. In the discipline of biomedical science the dissertation research must span two different disciplines. While the majority of the research will be carried out in the laboratory of the primary advisor under his/her guidance, at least some will take place in the secondary advisor's laboratory under his/her mentorship. The primary and secondary advisors and the student will select the other members of the advisory committee. The advisory committee for a Ph.D. student in biomedical science must include at least five members (including the primary and secondary advisors). This is one more individual than is required by the graduate school. For both the master of science and doctoral students, the advisory committee shares in the responsibility of guiding the student in his/her studies, and has the responsibility of administering major examinations to the student.

The M.S. student is not required to have a secondary advisor. The advisory committee for a M.S. student must include at least three members (including the major professor). Two of the members may be from the same discipline; however, the third member must be from a different discipline and reflect the interdisciplinary nature of the student's research. For both M.S. and Ph.D. students, the major professor (primary advisor) will serve as the chair of the Advisory Committee.

Once the advisor(s) and advisory committee members have been identified the student should complete the *Designation of Advisory Committee* form (www.hsc.unt.edu/education/gsbs under *Forms*) and return the signed form to the Graduate School. At the latest this form should be turned in by the end of the third semester of the student's first year.

Medical Sciences students are not required to have an advisory committee or university member unless a change of discipline is initiated. Until this change is made the graduate advisor of the discipline of biomedical sciences acts as the program advisor.

Each student is required to meet with his/her advisory committee at least once per year. It is the student's responsibility to convene these meetings.

The University Member

Ph.D. Students:

When the advisory committee is formed for students in programs requiring dissertation, the graduate dean will appoint a university member.

The purpose of the university member on doctoral committees is to ensure that the policies and procedures of the Graduate School of Biomedical Sciences and the Health Science Center have been upheld. The presence of the university member is essential for the process of approval of dissertation proposals and defense examinations. The university member's signature on appropriate forms indicates that the integrity of the review process has been preserved. It is the responsibility of the university member to report to the graduate dean any inappropriate due process.

The university member must be incorporated into the review and approval process of the doctoral dissertation, from the formal or substantive inception of the topic through the comprehensive examination and final approval of the dissertation.

The university member must take part in any formal hearing (BMSC 6310 defense and qualifying examination). The university member must be a voting member of the final examination committee and will sign the dissertation.

M.S. Students:

When the advisory committee is formed for students in programs requiring thesis, the graduate dean will appoint a university member.

The purpose of the university member on master's committees is to ensure that the policies and procedures of the Graduate School of Biomedical Sciences and the Health Science Center have been upheld. The presence of the university member is essential for the process of approval of thesis proposals and thesis examinations. The university member's signature on appropriate forms indicates that the integrity of the review process has been preserved. It is the responsibility of the university member to report to the graduate dean any inappropriate due process.

The university member must take part in any formal hearing. The university member must be a voting member of the final examination committee and will sign the thesis fly pages.

Students in MS programs that require Internship Practicum (BMSC 5697) rather than Thesis (BMSC 5395) are not required to have a university member.

Students in programs that require neither internship practicum nor thesis projects will not be assigned a university member.

The Degree Plan and Credit Hours Required for Degree Programs

Once the advisory committee has been formed, the student should decide on a degree plan with the assistance of the major professor (primary and secondary advisors in the case of the Ph.D. student). The degree plan is a list of all courses (including repeated courses) and major exams undertaken by the student as part of the degree program. The student's advisory committee must approve the degree plan. The Degree Plan form may be obtained on the web (www.hsc.unt.edu/education/gsbs under *Forms*) and the signed form returned to the Graduate School. At the latest this form should be turned in by the end of the third semester of the student's first year. The entire advisory committee must approve changes to the degree plan and a new form submitted to the graduate school.

Medical Sciences students are not required to fill out a degree plan unless a change of discipline is initiated.

Credit hour requirements for specialized Master's programs are described in the individual descriptions of the program. The student should consult these documents when filling out the degree plan.

1. The traditional M.S. degree requires a minimum of 36 credit hours (see typical degree page 8).

They are awarded to:

- a. A student choosing to obtain an M.S. degree or
- b. A Ph.D. student who does not fulfill the requirements for a Ph.D. and elects to pursue an M.S. degree.

2. The Ph.D. requires a minimum of 90 credit hours (see typical degree page 6).

3. Core Curriculum Requirements for ALL STUDENTS - Students entering the M.S. or Ph.D. degree programs are required to complete the Biomedical Sciences Core Curriculum (BMSC 6301, BMSC 6302, BMSC 6303, 6304 and BMSC 6305). For those students entering the Ph.D. degree program with an M.S. degree, the graduate discipline advisor may design an individualized core program, if no advisory committee is available. Students may be required to take additional courses or a core requirement may be waived depending on their backgrounds. In order to waive a core course requirement, permission of the associate dean of the graduate school must be obtained. The waiver will only be considered if the student has taken a graduate course at another institution in the last five years, which covers the same material as the core course, and has obtained a B or better in the course. The student must have a copy of the syllabus of the course and present this to the associate dean.

Research and Internships

The Ph.D. degree will require demonstrated research productivity and originality. In general, it is expected that before graduation, Ph.D. will have at least two publications (one of which is a first author paper) accepted for publication, in press or already in print. The traditional M.S. student's graduate advisor may require the student's research to be written and submitted for publication before graduation.

Since research is a major part of the degree requirement for both the M.S. and Ph.D. degree, **it will be expected that once a graduate advisor is selected the student spend a minimum of 40 hours per week at the UNTHSC campus.** Early and continuous involvement in research is a top priority of the graduate school. Students will acquire their most important skills during this time, including skills in independent and critical thinking, grant and manuscript writing, use of computer software applications, and research techniques. These skills will largely determine the future success of a student in obtaining a position in academia or industry.

The specialized master's programs require the student to enroll in an internship practicum for variable lengths of time (see individual program descriptions). The student is to regard this experience as he/she would a full-time job and plan to spend a minimum of 40 hours per week at the internship site. Depending on the practicum report and the internship site, the student may be expected to present his/her work at a scientific meeting or write up the work and submit it for publication.

All degree students in the discipline of biomedical sciences are expected to participate in UNTHSC Research Appreciation Day (RAD). As first year students, individuals may be asked to assist the graduate school staff during the event or may expect to present preliminary research findings at a poster session. Senior graduate students will be required to present their research either as a poster or oral presentation.

Seminars

All students in the discipline of biomedical sciences (with the exception of Medical Sciences students) are expected to attend approximately one seminar per week in its entirety and to meet with invited seminar speakers when requested. Students may elect or are required to take BMSC 5140.001 (Seminars in Current Topics) for course credit (see individual degree plans). Seminar courses offered by other disciplines may also be taken for course credit.

Ph.D. Oral Comprehensive Examination

General Description:

Doctoral students must complete the following two-part process to be advanced to candidacy. First, a discipline-based oral qualifying exam, designed and administered by the discipline's graduate faculty, must be successfully completed within the 72 SCH of coursework inclusive of any advanced standing granted for the completion of a master's degree. Second, the student must register for Grant Writing (BMSC 6310) in the semester following completion of the oral examination and before the completion of 84 SCH. Once Grant Writing is successfully completed, the student is advanced to candidacy and must enroll in Doctoral Dissertation (BMSC 6395) in the first semester following BMSC 6310. A student who has successfully passed both the oral qualifying examination and Grant Writing (BMSC 6310) must maintain continuous enrollment in a minimum of 6 SCH of BMSC 6395 during at least each long semester and one summer semester or until the dissertation has been accepted by the graduate school. Failure to maintain continuous enrollment will result either in dismissal from the graduate school or invalidate any previous dissertation credits. For medical or other exceptional reasons, the graduate dean may grant an official leave of absence.

The following describes the procedures that will be followed in the administration of the qualifying examination for students seeking the doctor of philosophy degree in the discipline of biomedical sciences:

1. **[The semester before the exam will take place]** The student will meet with the graduate advisor of the department of biomedical science to declare his/her intent to sit for the examination. At this time the student will also identify one (1) area of primary interest from the disciplines covered in the core graduate curriculum. These include: Biochemistry, Molecular Biology, Cell Biology, Microbiology, Immunology, Physiology, and Pharmacology. The student will also identify two (2) areas of secondary interest that cannot be the same as the primary discipline.
2. **[The semester before the exam will take place]** A 6 member committee will be appointed distinct from the student advisory committee. The qualifying exam committee will not include the student's mentor.

The committee members will be chosen to reflect the primary and secondary interests of the student. These individuals will be selected from the graduate faculty in a meeting of the graduate advisor of biomedical sciences and the student as follows:

- a. Three members will be chosen by the graduate advisor of the biomedical sciences department;

b. Two members will be selected by the student;

c. The student's university member will also be identified at this time. It is the role of the university member to monitor the actual exam to ensure all rules of the graduate school have been followed and that due process has been carried out. It is the option of the university member to ask questions during the exam or to observe only.

d. The graduate advisor will contact the selected faculty to request service on the exam committee.

e. From the committee members, the graduate advisor will appoint a chairperson.

3. **[The semester before the exam will take place]** The student will inform the chair of the examination committee of his/her one (1) area of primary interest and two (2) areas of secondary interest.

4. **[Either during the semester before or early in the semester that the exam will take place]** The chair of the examination committee will call the members (excluding the university member) together to create twelve (12) questions for the oral exam. Eight (8) of these questions should focus on the primary discipline identified by the student and should be constructed to emphasize the integrated approach of the biomedical sciences discipline. The questions may test information/topics identified during the first year core biomedical science curriculum and information/topics covered in advanced courses of the chosen discipline.

Four (4) of the questions should focus on the secondary disciplines (two for each secondary discipline). All questions should test only information/topics identified during the first year core biomedical science curriculum.

5. **[Early in the semester that the exam will take place]** The student will set up a date, time, and place for the examination. It is the student's responsibility to get prior approval of all members of the examination committee, including the university member, for the date and time and to inform the entire committee of the final date, time, and location of the exam.

6. **[Day of the examination]** The student will meet with the committee chair to receive the twelve (12) questions. Following this, the student will be given thirty (30) minutes to read the questions and outline responses to six (6) of them. Four (4) of the six (6) must be based on the primary interest previously identified by the student and two (2) must be based on the secondary interests (one question for each discipline). The student will then convene with the entire committee to orally present answers to the six chosen questions.

The student is encouraged to use the blackboard in answering questions. The committee members will ask questions pertaining to the subject matter of each question during the exam. The length of the exam will be approximately two hours.

7. **[Day of the examination]** Following the examination, the student will be excused from the room. The committee will then decide to either approve or disapprove the student's performance. If approved, the student will receive a pass. If disapproved, the committee will identify areas of weakness and these will be recorded by the chair to be conveyed to the student in writing at a later date. However, the student will be informed immediately if he/she has passed or not passed the examination.

A student who does not pass will meet with the chair of the committee within one week to receive the written description of his/her weaknesses. The student may repeat the process one (1) time with either the same or a new committee. A student who does not pass after the second attempt will not be permitted to register for Grant Writing (BMSC 6310) and will not advance to doctoral candidacy. The student may request entry into a Master of Science program.

8. **[Within one week following successful completion of the examination]** It is the student's responsibility to obtain signatures from all committee members, including the university member, attesting to the results of the examination. The appropriate form may be obtained from the graduate school website (www.hsc.unt.edu/education/gsbs under *Forms*). The signed form should then be returned to the graduate school office.

9. The oral qualifying committee may award the following designations to a student who has successfully completed the exam: "Qualifying Exam Passed", "Qualifying Exam Passed with Distinction", "Qualifying Exam Failed". Notations are added to the student's transcript.

Ph.D. Grant Writing (BMSC 6310) and Advancement to Candidacy

In the semester immediately after passing the Oral Comprehensive Examination Ph.D. Qualifying Examination, students must register for BMSC 6310 – "Grant Writing". This stage of the advancement to doctoral candidacy evaluates a student's aptitude for independent thought and scientific writing. The student is required to:

1. Prepare a NIH, NSF or other appropriate Federal-style research grant as appropriate for the student's research area;
2. Present the proposal in a public seminar; and
3. Orally defend the proposal before his/her doctoral advisory committee immediately following the public seminar. The defense will not be open to the public.

The proposal should be based on an original hypothesis and should describe specific experimental approaches to address the hypothesis. The proposal may not be identical to what the student will be doing for his/her doctoral research, but it may be in the same area of research.

The student's Advisory Committee will oversee the student's "Grant Writing" process. However, the student's major professor will not be allowed either to participate or be present during the grant writing process and the defense. He/She may attend and participate in the public seminar. The Graduate Student Advisor of Biomedical Sciences will appoint a member of the student's Advisory Committee to act as chair and coordinate the process. **The student must have his/her topic approved by the Committee prior to beginning the 6310 and must meet with the Committee at least two other times during the semester to review drafts of the proposal.** The final draft of the proposal must be typed in NIH format and presented to the Advisory Committee at least two weeks prior to the public seminar and oral defense. Evaluation and grade assignment will take into consideration the originality of the grant proposal and the student's ability to synthesize and communicate the proposal content. Upon successful completion of BMSC 6310 – "Grant Writing", the student is advanced to doctoral candidacy. A signed form, the Grant Defense Notice (www.hsc.unt.edu/education/gsbs under *Forms*), indicating the grade, as described in the next paragraph, must be turned into the graduate school along with a clean copy of the grant.

Incomplete grades will not be assigned for Grant Writing (BMSC 6310). Valid grades are Pass (P) or Fail (F). The F grade will contribute to the student's grade point average for that semester. A student who is assigned a failing grade at the end of the semester must repeat the course during the next semester. If a passing grade is earned, the student will be advanced to candidacy and the original F excluded from the grade point average on the transcript.

Two attempts to successfully complete BMSC 6310 – "Grant Writing" will be allowed. Failure to pass on the second attempt will result in dismissal from the doctoral program in Biomedical Sciences. In this case, a student may be allowed to complete the requirements for the Master of Science degree.

Research Proposals and Grading of Individual Research/Practicum Credit Hours

Ph.D. Students: Following the successful defense of his/her BMSC 6310 proposal and prior to 84 SCH, each Ph.D. student will be required to submit a research (dissertation) proposal to his/her advisory committee. Enrollment will be blocked to prevent the student from registering for additional credits before an approved research proposal is turned into the graduate school.

The suggested format for the proposal is an abbreviated (6-10 page) NIH-type grant proposal that includes the following:

- a. Specific Aims (1 page)
- b. Background and Pilot studies (2-4 pages)
- c. Experimental Design and Methods (3-6 pages).
- d. Full references will be attached without a page limit.

The student's Ph.D. advisory committee will determine if the proposal is satisfactory. If approved, the student must turn in a clean copy to the graduate school along with the signed Research Proposal form (www.hsc.unt.edu/education/gsbs under *Forms*).

M.S. Students: All Master of Science students are required to submit a research (thesis or practicum report) proposal that has been approved by the student's advisory committee describing the thesis/practicum project. Traditional M.S. students must submit the research proposal before registering for thesis credits, whereas Clinical Research Management students must submit their practicum proposal no later than the end of the second month of the internship practicum. Biotechnology and Science Education students are required to submit the to submit the practicum proposal before the end of the fall semester of the second year of study. If approved, the student must turn in a clean copy of the proposal to the graduate school along with the signed Research Proposal form (www.hsc.unt.edu/education/gsbs under *Forms*).

In general the Master of Science research proposal content is similar to that of the doctoral research proposal. The document on research proposals for the internship practicum is available in Appendix II and also applies to the traditional M.S. research proposal.

Grading: Students registering for individual research, internship practicum, thesis, or doctoral dissertation will be assigned either a grade of Satisfactory (S) or Unsatisfactory (U). Neither the S nor U carries grade points. Courses with S grades count toward total credit hours earned toward the degree, but U grades do not. Any student achieving a U grade will automatically be placed on probation until he/she has achieved an S grade the next semester.

A letter grade (A, B, C, F) will be assigned by the primary graduate advisor, possibly after consultation with the secondary advisor (Ph.D. students) and/or the advisory committee, to the last semester of graduation only.

Declaration of Intent to Graduate and Declaration of Intent to Defend Forms

The semester all students planning to graduate should submit the Declaration of Intent to Graduate Form to the graduate school (www.hsc.unt.edu/education/gsbs under *Forms*). Thirty days before the student plans to present his/her work to the public and defend it in front of the advisory committee, the student must also submit the Declaration of Intent to Defend form to the graduate school (www.hsc.unt.edu/education/gsbs under *Forms*). The graduate school will publicize the student's seminar to the institutional community.

Thesis/Internship Practicum Report/Dissertation Requirements

It is normally expected that the Ph.D. candidate be first author on a minimum of one peer-reviewed research paper (either submitted, published or in press) and secondary author on a minimum of one peer-reviewed research paper (either submitted, published or in press) prior to his/her being awarded the terminal degree. (This expectation applies to all students in the Ph.D. program, regardless of the degree held upon entrance into the program). A student may use first author manuscripts as chapters in his/her dissertation in accordance with the requirements of the Graduate School. Alternatively, a student who, in the judgment of the advisory committee, was not the primary author of the submitted paper on his/her research will be required to write a traditional dissertation.

Traditional Master's students will write a traditional thesis and all specialized Master's students will write an internship practicum report following the Research Proposal Guidelines.

The thesis/internship report/dissertation must be prepared for digital submission according to the instructions in the Guidelines for Filing Theses, Internship Practicum Reports and Dissertations (available online at <http://hsc.unt.edu/education/gsbs> under *Forms*).

Public Seminar and Defense of Thesis/Internship Practicum Report/ Dissertation

After completion of the research/practicum, the student should convene his/her advisory committee and present an abbreviated seminar to the committee to allow them to determine if the student has completed the specific aims of the Research Proposal. If the committee approves, the student may then proceed to write the thesis/ report/ dissertation. This meeting should occur at the latest the beginning of the semester the student plans to graduate. Some specialized Master's students may be exempt from this meeting (e.g. clinical research management students).

The student will present the primary advisor with a preliminary draft of the thesis/internship practicum report/dissertation. After reading the manuscript, the student will make changes suggested by the advisor (allow approximately two-three weeks for this process) before submitting the document to the advisory committee members. The advisory committee members should receive the manuscript no later than two weeks before the defense.

The primary advisor will advise the student about the public seminar. In general it is a 30-40 minute presentation using visual aids. During or immediately after the seminar, the audience may ask questions, but usually the student's advisory committee members will hold their questions until the private defense. The private defense takes place immediately after the seminar and usually lasts about one-two hours. At this time, the committee members question the student about his/her work and discuss any changes/corrections the committee members feel should be incorporated into the draft document. When initially scheduling the public seminar and defense, the student should leave enough time to be able to make changes to the document prior to the graduate school deadline for final thesis/internship practicum report/dissertation submission. The student should bring the Report of the Final Comprehensive Examination (Defense) form (available online at <http://hsc.unt.edu/education/gsbs> under Forms) to the defense. The signed form must be turned into the graduate school with the final thesis/internship practicum report/dissertation.

ANNUAL PERFORMANCE REVIEW

The performance of every student in the discipline of biomedical sciences will be reviewed on a yearly basis by the student's primary advisor. The review will include assessment of the student's complete UNTHSC academic record, his/her performance in the laboratory, participation in departmental functions, etc. If a student's performance is judged to be marginal in one or more areas, the student may be required to meet with the departmental Graduate Advisor and/or the Chair of Biomedical Sciences. In these meetings, remedial work may be assigned to the student, including specific goals that must be met for the student to remain in the program. Further, a student whose performance is unsatisfactory may be dismissed from the program.

Each year the student must send a complete CV, his/her achievements for the year, and a list of goals and objectives for the following year to both the graduate advisor and the primary advisor. This information will be used in the annual performance review. The advisor will fill out the Annual Performance Evaluation (available online at <http://hsc.unt.edu/education/gsbs> under Forms) and meet with the student to discuss it. Both the advisor and the student will sign the Evaluation and a copy will then be sent to the graduate advisor.

M.S. Student Milestones

The time to achieve the M.S. degree may vary, but typically requires 2 to 2 ½ years (with the exception of the Clinical Research Management program, which requires 1½ years). Each M.S. student will be expected to advance through the program in a timely manner. Major milestones/requirements to achieve the M.S. degree are noted here (Clinical Research Management students should consult the Clinical Research Management Handbook).

By the end of the first year of study, each M.S. student should have:

- completed the core curriculum
- completed laboratory rotations
- chosen a major professor
- selected a Graduate Advisory Committee
- filed a degree plan

By the end the first semester of the second year of study, each M.S. student should have:

- submitted a research (thesis/internship practicum) proposal

By the end of the second year of study, each M.S. student should have:

- completed required course work
- have a tentative timetable for completing the degree requirements or have completed all degree requirements

Ph.D. Student Milestones

Due to the nature of Ph.D. training, the time to complete the degree will vary some from student to student. However, each student should expect to complete several significant requirements in a timely manner. Major milestones/requirements are noted here.

By the end of the first year of study, each Ph.D. student should have:

- completed the core curriculum
- completed laboratory rotations
- chosen a major professor

By the end of the second year of study, each Ph.D. student should have:

- taken oral qualifying examination
- selected a Graduate Advisory Committee
- filed a degree plan

By the end of the third year of study, each Ph.D. student should have:

- completed Grant Writing (BMSC 6310)
- submitted a research (dissertation) proposal

Eligibility to Transfer into Ph.D. Program from M.S. Program

A student in the M.S. program in the discipline of biomedical sciences may petition to transfer into the Ph.D. program. The student can petition to transfer only if the following conditions are met: 1) the student must have completed the core curriculum with a core GPA of at least 3.0; 2) the student must have identified a major professor who is willing to direct the student; 3) funds have been identified to support the student; and 4) the student must have successfully completed a rotation in the prospective major professor's laboratory. If all these conditions are satisfied, the Graduate Advisor and the Department Chair will review the student's file. The review process will include assessment of academic and laboratory performance. *Note that meeting the above criteria for consideration for transfer into the Ph.D. program does not in any way guarantee the transfer will be approved.* If the transfer is approved and funds have been identified, the transfer will be effective once the necessary paperwork has been filed with the Graduate School of Biomedical Sciences.

Financial Aid Policies

General Policies

Request for State-Supported Assistantship

Financial Aid Policies

General Policies

Several forms of support are available to students. The graduate school through the discipline of biomedical sciences offers a limited number of state-supported teaching assistantships to Ph.D. students. Consideration for these may be requested at the time of application to the graduate school or later (see below). The graduate teaching assistantships are granted on a one year or one semester basis and are generally renewed for a maximum of two years, after which it is expected the primary graduate advisor or other grant (e.g. training grants, grants obtained by the student etc.) will support the student.

Senior Ph.D. students are strongly encouraged to apply for student-eligible funding from agencies outside institution. The graduate advisor of biomedical sciences will assist any student to identify such funding sources. The process of applying for a grant is instructional and if successful, is a beneficial addition to the student's curriculum vitae.

The Office of Financial Aid, which is housed in Student Affairs, is also a source for obtaining support. In addition, the financial aid staff can help identify scholarships for which the student may qualify.

Request For State-Supported Assistantship

Any Ph.D. student in the discipline of biomedical sciences who does not have financial support may apply to be considered for a state-supported graduate teaching assistantship, *only if all of the following conditions are met:*

- The student must have obtained an A in at least one course of the core curriculum (BMSC 6301, 6302, 6303, 6304 and/or 6305);
- If a grade of C is obtained in any of the core courses, the student is not eligible for a stipend;
- The student must have completed at least one laboratory rotation.

If all conditions are met, the student can request to be evaluated for financial support. At that time, the student's file will be reviewed. The review process will include assessment of academic and laboratory performance. If approved, and if funds are available, the student will receive an assistantship. Note that meeting the above criteria for consideration for funding does not in any way guarantee that an assistantship will be awarded.

The starting date for the assistantship may vary, and will depend in part on the time of application and approval, and availability of funds. As with all students, continued receipt of an assistantship is dependent upon the student maintaining good academic standing.

Courses and Faculty

Courses and Faculty

Course descriptions may be found in the Graduate School of Biomedical Sciences Catalog. Registration is accomplished on-line. If the student has a question about which courses to register for, he/she should consult with the following individuals depending on the student's situation and/or degree program: the graduate advisor for the discipline of biomedical sciences (in cases either where there is no primary research advisor or one has not yet been selected/assigned), the primary research/internship advisor.

Descriptions of the research interests of the graduate faculty members are available on the graduate school website (www.hsc.unt.edu/education/gsbs under Faculty). For those degree programs in which the primary advisor is not assigned, the student should investigate the research interests of the faculty before selecting potential laboratories in which to do a rotation. It is also worthwhile to have an appreciation of faculty research interests in case the student may require specialized assistance with a particular research problem.

Appendix I

Laboratory Rotations

Laboratory Rotations (BMSC 5150)

Graduate School of Biomedical Sciences UNTHSC at Fort Worth

Approved by Graduate Council 1-10-02

1. The laboratory rotation is met by registering for BMSC 5150. The student may do a laboratory rotation with any graduate faculty member in any discipline. Upon registering for BMSC 5150, the student should identify his/her Discipline Graduate Student Advisor by including the graduate advisor's faculty section number in the appropriate space. The section number may be found at the beginning of the class schedule.
2. The purpose of the Laboratory Rotation is to:
 - a. expose the student to research early in his/her graduate program;
 - b. allow the student to get to know and work with potential mentors;
 - c. expose the student to different research problems and techniques.
3. The student should begin early in the first semester in graduate school to decide on 1-3 individuals with whom the student would like to do a rotation. The student should begin by contacting the faculty member to set up an appointment where the student will explain his/her interests and learn more about the faculty member's research. The student may have to interview several faculty before deciding on the ones to do rotations with. When the student has narrowed down his/her choices, the student should make a second appointment with those individuals.
4. During the second interview, the student and faculty member decide the specific dates of the rotation. In general, a rotation lasts approximately 6-10 weeks (1 SCH). The student should learn from the faculty member what his/her expectations are during the rotation, what the student will be doing, when the student will be expected to be in the lab, etc. A letter grade will be given for the rotation.
5. A student may enroll in two different rotations (i.e. two different labs; 2 SCH) per semester. Moreover, students may register for additional rotations in other semesters. However, the student will only be permitted to register for 1 SCH of rotation per faculty member.
6. Faculty conducting laboratory rotations will submit to the student and the student's Discipline Graduate Student Advisor a description of the content and requirements of the rotation and dates when the rotation will take place. (See "Laboratory Rotation Report -Description Form" can be found at <http://www.hsc.unt.edu/education/gsbs/documents/forms/LabRotationDescribe.dot>.)
7. Following the rotation, the faculty member will submit a brief written critique of the student's attendance and performance during the rotation as well as a grade to the student's Discipline Graduate Student Advisor. (See "Laboratory Rotation Report

Form" can be found at <http://www.hsc.unt.edu/education/gsb/docs/forms/LabRotationReport.dot>.)

The student's Discipline Graduate Student Advisor will compile all rotation grades and critiques concerning the student and submit final grades to the registrar.

Description of Laboratory Rotation (BMSC 5150)

*Complete this form for each student who is performing a rotation in your laboratory and submit it to the graduate advisor for the student's discipline at the beginning of the student's rotation. Please provide the student with a copy of this form **before start of the rotation or at the latest, at the beginning of the student's rotation.***

Student's Name:

EMPL ID:

Faculty Member:

Rotation Start Date:

Rotation End Date:

In the field below, give a brief, description of the content and requirements of the rotation. The text box will expand as you type.

Student Signature:

Date

Faculty Signature

Date

Description of Laboratory Rotation - GRADE (BMSC 5150)

Complete this form for each student who is doing a rotation in your laboratory and submit it to the appropriate Discipline Graduate Student Advisor at the end of the student's rotation. Provide the student with a copy of this form as well.

Student's Name:

EMPL ID:

Grade:

Faculty Member:

Rotation Start Date:

Rotation End Date:

In the space below, give a brief, constructive critique of the student's attendance and performance during the rotation. The text box will expand as you type.

Student Signature:

Date

Faculty Signature

Date

Appendix II

Research Proposal Guidelines

Research Proposal Guidelines For Internship Practicum Reports

Many studies end in futility or waste considerable amounts of time because the student begins the project with only a meager understanding of the area under consideration and no real plan or road map. To be successful, the student should have a detailed plan as well as an overall conceptualization of the study. The research proposal for the internship practicum allows the student to specify the problem/activities that will be pursued during the internship; to elaborate on the significance of the study to a particular profession; to review related literature; and outline the appropriate methodology employed in the study within a reasonable time-frame. In essence the proposal serves as a "road map" for the activities to follow.

Each program will have its own specific guidelines as to what must be included in Research Proposal, but in general all proposals will have the following components. When the final Practicum Report is written, it will have many of these same components, but each will be expanded over what is in the Research Proposal and there may be addition of new components.

I. **Summary:** Provide one or two paragraphs that describe the environment where the work will be done, what the focus of practicum work will be, what activities will be accomplished and how these will be conducted.

II. **Problem/Hypothesis/Specific Aims:** *Statement of the Problem* - A concise and clearly written statement describing the focus and direction of the practicum problem. *Hypothesis* or *Goal* (1-2 sentences) - A reasonable, educated guess or suggested answer to the problem. *Specific Aims* (2-4 Listed) - List the specific aims that will test the hypothesis.

III. **Significance of and Justification:** An opportunity to explain why the practicum project is important; Justify the study by explaining how the project will further knowledge and extend theory. (One-two paragraphs) Note: To determine the significance, you must know the literature!

IV. **Brief Review of Related Literature*:** Provide a review of the salient literature (with citations) that directly supports or opposes the stated hypothesis. For an Internship Practicum Report, this section may be a review of the recent observations or opposing arguments that support the larger review of the problem or methods development. Make clear that there is a need, as illustrated in the literature or based on the needs of the site, to do the study.

V. **Preliminary Data:** If available, preliminary findings, demonstration of methodology etc. may be included.

VI. Practicum Design and Activities:

Relate to Specific Aims Described Earlier

Description of internship practicum site environment

Present clearly and concisely the practicum design and analyses to be employed (includes statistical analyses)

Describe the data to be collected

Describe methods, data collection and sampling techniques to be employed

Describe briefly any new methods or tools that will be developed.

Describe briefly any populations that will be sampled

Describe briefly any databases that will be sampled

Describe any potential pitfalls that may arise and alternate means to approach the problem

Describe any key factors that will limit your ability to interpret the data

VII. Citations: List all references cited in the proposal using an accepted form of scientific citation. Choose whether you will use the name system, e.g. (Miles et al, 2004), or the number system, e.g. (1) through (n). Then be consistent! Unless the idea is totally your own, cite a source. Failure to do so is plagiarism!

* There are several evidence-based full-text and abstracting services available through online computer services at the library. These databases can save the student an immense amount of time when seeking high-quality evidence-based information. Examples are: MEDLINE, PubMed and TRIP. If you've never used these services, ask a librarian for assistance. Use primary sources (books and journal articles) not information gathered from non-reviewed internet sites in your literature review.

NOTE: The student should read the requirements for writing the practicum report before beginning to actually write either the proposal or the final document. These may be found on the graduate school web page under Forms.

2009

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