

University of North Texas
Health Science Center at Fort Worth

Graduate School of Biomedical Sciences

**DISCIPLINE
OF
BIOMEDICAL SCIENCES**

HANDBOOK 2005-2006

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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 Post Baccalaureate Premedical Certification Program and a non-thesis in Biomedical Sciences. The traditional master of science and doctoral programs in biomedical sciences are interdisciplinary in nature. Many students matriculate into the department 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. Both 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 Post Baccalaureate Premedical Certification allows students to better their chances to gain admission to medical school and may be followed by training for the master's degree in clinical research management.

**DEGREE PROGRAMS ADMINISTERED
UNDER THE DISCIPLINE OF
BIOMEDICAL SCIENCES**

DOCTORAL DEGREE

TRADITIONAL MASTER OF SCIENCE

SPECIALIZED MASTER'S PROGRAMS

POST BACCALAUREATE PREMEDICAL CERTIFICATE PROGRAM

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 Forms and Guidelines web page <http://www.hsc.unt.edu/education/gsbs/forms.cfm>.

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 5600	INTERGRATIVE BIOMEDICAL SCIENCES I: PRINCIPLES OF BIOCHEMISTRY	4 SCH
BMSC 5610	INTERGRATIVE BIOMEDICAL SCIENCES II: MOLECULAR CELL BIOLOGY	4 SCH
BMSC 5960	BIOMEDICAL ETHICS	1 SCH
BMSC 5935	SEMINAR IN CURRENT TOPICS: INTRO. TO FACULTY RESEARCH PROGRAMS	1 SCH
BMSC 5650	LABORATORY ROTATIONS	2 SCH

Year 1 Spring

BMSC 5700	INTERGRATIVE BIOMEDICAL SCIENCES III: PHYSIOLOGY AND PHARMACOLOGY	5 SCH
BMSC 5710	INTERGRATIVE BIOMEDICAL SCIENCES IV: IMMUNOLOGY AND MICROBIOLOGY	3 SCH
BMSC 5935	SEMINAR IN CURRENT TOPICS: INTRO. TO FACULTY RESEARCH PROGRAMS	1 SCH
BMSC 5650	LABORATORY ROTATIONS ELECTIVES	1 SCH 2 SCH

Year 1 Summer

BMSC 5200	BIOSTATISTICS	4 SCH
BMSC 6940	INDIVIDUAL RESEARCH	2 SCH

Year 2 Fall		
BMSC 5940.001	SEMINAR IN CURRENT TOPICS	1 SCH
BMSC 6940	INDIVIDUAL RESEARCH	1-4 SCH
	ELECTIVES	10-7 SCH
Year 2 Spring		
BMSC 6940	INDIVIDUAL RESEARCH	4 SCH
BMSC 5940.001	SEMINAR IN CURRENT TOPICS	1 SCH
BMSC 5010	SCIENTIFIC COMMUNICATIONS	3 SCH
	ELECTIVES	4 SCH
Year 2 Summer		
BMSC 6940	INDIVIDUAL RESEARCH	6 SCH
	<i>ORAL QUALIFYING EXAM</i>	
Year 3 Fall		
BMSC 6010	QUALIFYING EXAM FOR DOCTORAL STUDENTS	3 SCH
BMSC 6940	INDIVIDUAL RESEARCH	8-2 SCH
BMSC 5940.001	SEMINAR IN CURRENT TOPICS	1 SCH
	ELECTIVES	0-6 SCH
Year 3 Spring		
BMSC 6950	DOCTORAL DISSERTATION	3 SCH
	ELECTIVES	3 SCH
	<i>RESEARCH PROPOSAL</i>	
Year 3 Summer		
BMSC 6950	DOCTORAL DISSERTATION	6 SCH
Year 4 Fall		
BMSC 6950	DOCTORAL DISSERTATION	6 SCH
Year 4 Spring		
BMSC 6950	DOCTORAL DISSERTATION	6 SCH
	Total (Minimum)	96 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 Forms and Guidelines web page <http://www.hsc.unt.edu/education/gsbs/forms.cfm>.

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 5600	INTERGRATIVE BIOMEDICAL SCIENCES I: PRINCIPLES OF BIOCHEMISTRY	4 SCH
BMSC 5610	INTERGRATIVE BIOMEDICAL SCIENCES II: MOLECULAR CELL BIOLOGY	4 SCH
BMSC 5960	BIOMEDICAL ETHICS	1 SCH
BMSC 5935	SEMINAR IN CURRENT TOPICS: INTRO. TO FACULTY RESEARCH PROGRAMS	1 SCH
BMSC 5650	LABORATORY ROTATIONS	1 SCH

Year 1 Spring

BMSC 5700	INTERGRATIVE BIOMEDICAL SCIENCES III: PHYSIOLOGY AND PHARMACOLOGY	5 SCH
BMSC 5710	INTERGRATIVE BIOMEDICAL SCIENCES IV: IMMUNOLOGY AND MICROBIOLOGY	3 SCH
BMSC 5935	SEMINAR IN CURRENT TOPICS: INTRO. TO FACULTY RESEARCH PROGRAMS	1 SCH
BMSC 5650	LABORATORY ROTATIONS	1 SCH

Year 1 Summer

BMSC 5930	INDIVIDUAL RESEARCH	2 SCH
	ELECTIVE (BMSC 5200 OR CGEN 6030)	4 SCH

Year 2 Fall		
BMSC 5940.001	SEMINAR IN CURRENT TOPICS	1 SCH
BMSC 5930	INDIVIDUAL RESEARCH	1-4 SCH
	ELECTIVES	7-4 SCH
Year 2 Spring		
BMSC 5950	THESIS	6 SCH
	ELECTIVES	3 SCH
	Total (Minimum)	45 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 5950) - 6 credits
2. ELECTIVES

**SPECIALIZED M.S. DEGREE AND
CERTIFICATE PROGRAMS
ADMINISTERED UNDER THE DISCIPLINE
OF BIOMEDICAL SCIENCES**

BIOTECHNOLOGY

CLINICAL RESEARCH MANAGEMENT

SCIENCE EDUCATION

POST BACCALAUREATE PREMEDICAL CERTIFICATE PROGRAM

ACADEMIC YEAR 2005-2006
Master of Science Degree in Biomedical Sciences
Subdiscipline in Biotechnology

Program Description:

The biotechnology degree program is designed to train individuals for careers in industry and research by providing the tools and experience needed for highly technical positions offered in emerging biotechnology companies and research institutions. The Master of Science degree in the discipline of biotechnology is administered by the Department of Biomedical Sciences. Candidates for the degree earn approximately 46 SCH of which 19 SCH are core requirements and 14 SCH are a laboratory internship practicum. The latter substitutes for the thesis. The program is usually completed in two years.

Program Requirements:

Each student is responsible for the completion of the requirements for the Master of Science in Biotechnology program according to the procedures that follow. Each item must be completed in the sequence and time period indicated. Forms are subject to revision at any time and is available on the graduate school Forms and Guidelines web page <http://www.hsc.unt.edu/education/gsbs/forms.cfm>.

1. Acceptance into the graduate school: A student admitted into the Master of Science in biotechnology program must take a minimum of 9 SCH per long semester and 6 SCH during the summer (24 SCH/year). A minimum GPA of 3.0 must be obtained.

2. By the end of the second semester, the student should select a faculty mentor and an advisory committee consisting of the mentor and two other graduate faculty. The names of these individuals must be filed in the graduate school. In addition, a degree plan must also be filed with the graduate school at this time. Forms may be obtained from the graduate school Forms and Guidelines web page <http://www.hsc.unt.edu/education/gsbs/forms.cfm>. A University Member is also designated at this time and must be in attendance at the final public oral presentation and private defense.

3. Once the graduate mentor is chosen, the student will complete a 6-12 month internship in the mentor's laboratory (BMSC 5920; 14 SCH). During this time, the student will learn how to perform all of the duties expected of a laboratory technician. These may include working under researchers on their projects, doing the student's own research project, purchasing supplies and equipment, repairing and maintaining equipment etc.

During the summer of the first year, the student will enroll in BMSC 5920 (2 SCH), the Laboratory Internship Practicum. The internship will continue in the fall (4 SCH) and spring semesters of the second year (6 SCH). If the student requires the summer to complete his/her thesis work, the student will enroll in an additional 4-6 SCH of Laboratory Internship Practicum.

A formal plan describing how the practicum is to be spent must be approved by the advisory committee and submitted to the graduate school by the end of the summer term (Research Proposal Approval Form obtained from the health science center web page).

4. At the end of the BMSC 5920, the student must submit a report (thesis) and laboratory notebook to the mentor for his/her approval. The advisory committee will meet with the student at this time and review both the notebook and written report. The student will present his work as both an oral and written report. The oral presentation will be advertised and open to the public and will then be followed by a private meeting with the advisory committee. The written report should be given to the committee one to two weeks before the formal meeting. At this time the committee will either approve/or not approve the work of the internship and the report. If disapproved, the student may have a chance to revise the report or repeat the practicum one time at the discretion of the committee. The mentor together with the other members of the committee will assign a letter grade to the practicum. The laboratory notebook will remain with the mentor. A copy of the approved report must be submitted to the graduate school before graduation in accordance with the graduate school rules and time limits for the Master's thesis.

A more detailed description of the internship practicum and thesis requirements may be found at <http://www.hsc.unt.edu/education/gsbs/forms.cfm>. "Internship Practicum Guidelines".

5. It is strongly suggested that the student and mentor meet at least weekly to review the student's progress during the practicum.

Typical Curriculum:

Year 1

Fall

BMSC 5600	INTEGRATIVE BIOMEDICAL SCIENCES I: PRINCIPLES OF BIOCHEMISTRY	4 SCH
BMSC 5610	INTEGRATIVE BIOMEDICAL SCIENCES II: MOLECULAR CELL BIOLOGY	4 SCH
BMSC 5960	BIOMEDICAL ETHICS	1 SCH
BMSC 5935	SEMINAR IN CURRENT TOPICS: INTRO. TO FACULTY RESEARCH PROGRAMS	1 SCH
BMSC 5540	INTRO. TO LABORATORY TECHNIQUES FOR BIOMEDICAL SCIENCES	2 SCH

Spring

BMSC 5700	INTEGRATIVE BIOMEDICAL SCIENCES III: PHYSIOLOGY AND PHARMACOLOGY	5 SCH
BMSC 5710	INTEGRATIVE BIOMEDICAL SCIENCES IV: IMMUNOLOGY AND MICROBIOLOGY	3 SCH

BMSC 5935	SEMINAR IN CURRENT TOPICS: INTRO. TO FACULTY RESEARCH PROGRAMS	1 SCH
BMSC 5650	LABORATORY ROTATION	1 SCH
Summer		
BMSC 5920	LABORATORY INTERNSHIP PRACTICUM	2 SCH
CGEN 6030	METHODS IN MOLECULAR BIOLOGY	4 SCH
Year 2		
Fall		
BMSC 5920	LABORATORY INTERNSHIP PRACTICUM	6 SCH
BIOS 5210	BIOSTATISTICS FOR PUBLIC HEALTH I	3 SCH
Spring		
BMSC 5920	LABORATORY INTERNSHIP PRACTICUM	6 SCH
BMSC 5965	INTRODUCTION TO INDUSTRY PRACTICE	1 SCH
	ELECTIVE COURSES (EXAMPLES: CGEN 6020 PROTEOMICS PHRM 6080 RECEPTORS & DRUG ACTION BIOC 5510 SIGNAL TRANSDUCTION PSIO 6020 ADVANCES IN CV PHYSIOLOGY I LABORATORY TECHNIQUES)	2-4 SCH
BMSC 5970		
	Total Course	46-48 SCH

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July 19, 2005

Graduate School of Biomedical Sciences

UNT Health Science Center, Ft. Worth, Texas 76107-2669

817-735-2560

ACADEMIC YEAR 2005-2006
Master of Science in Biomedical Science
Sub-discipline in Clinical Research Management

Program Description:

Clinical Research involves the testing and determination of safety and efficacy of new unapproved products, including pharmaceuticals, devices and biologics in human subjects. Clinical trials in humans (volunteers and patients) are required prior to marketing approval, by regulatory authorities such as the U.S. Food and Drug Administration (FDA). In the U.S., the law that governs clinical research is spelled out in Chapter 21 of the Code of Federal Regulations (CFR). In addition to requiring and legislating clinical trials, regulatory authorities define the standards by which clinical trials are to be conducted. These standards are known as Good Clinical Practices (GCPs).

In depth knowledge of the CFR and GCP guidelines as well as International Guidelines specifically as they relate to protection of human rights, prevention and detection of fraud and the use of sound scientific principles, is a fundamental requirement for a clinical research professional. These individuals are key personnel involved in the conduct of clinical trials, which in turn are pivotal in getting new products approved and on the market.

The master's program in Clinical Research Management will provide a strong foundation upon which to build a career. The rigorous curriculum focuses on providing students a broad-based view of the biomedical sciences, as well as in depth knowledge of regulatory requirements (code of federal regulations, good clinical practices), ethical issues, and both the medical writing and administrative skills necessary to conduct clinical research. As part of the program, all students will complete a 26-week (40 hours/week) internship practicum in clinical studies and use this experience to write a detailed Internship Practicum Report pursuant to receiving the Master of Science degree. The average time to complete the degree is eighteen months.

Each student is responsible for the completion of the requirements for the Master of Clinical Research Management Program according to the procedures that follow. Each item must be completed in the sequence and time period indicated. Forms are subject to revision at any time and should be obtained from the Graduate School of Biomedical Sciences.

Opportunities for Graduates in Clinical Research Management:

Well-trained clinical research professionals are in high demand. The tremendous increase in medical technology and information in the last decade has resulted in an explosion

of potential new drugs, devices and biologics that must be tested before being released for use by the public. The profession is constantly challenged to improve and streamline the clinical research programs in order to shorten the development timelines and control the cost for new product development.

Clinical research professionals can hold a multitude of positions either in industry, at the investigational site, or in the clinical research service profession either at a contract research organization (CRO) or a site management organization (SMO). Job titles may include, but are not restricted to, clinical research associate, clinical research scientist, clinical research coordinator, medical writer, clinical trial auditor, clinical trial monitor, product safety specialist, clinical research trainer, etc. Industry (sponsor) and service professions (CRO, SMO) usually provide technical and managerial career paths and ample growth opportunities.

Typically a clinical research coordinator who has been involved with the implementation and coordination of a clinical trial at a research site (private, clinic, hospital), will advance his/her career by switching to either industry or one of the service professions. Others make the reverse switch because they prefer the interactions with the patients, or they may want to travel less than what is typically required from a clinical trial monitor. Turnover in all these industries and positions is relatively high because of the growing variety of choices clinical research professionals have, especially after they have accumulated a number of years of experience.

The graduate from the Clinical Research Management program will be qualified to fill a beginning position as a clinical research associate (industry or CRO position) or clinical research coordinator (research site position). These jobs may contain any or all of the following key tasks: regulatory, organizational and administrative tasks related to the implementation of one or more clinical trials: patient enrollment and consenting, protocol writing, data verification, trial monitoring in -house or in the field, summarization and or presentation of study results, investigational drug accountability, interactions with investigators, sponsors and Institutional Review Boards, safety reporting to regulatory authorities, trial document tracking, budgeting, etc.

Depending on the environment and additional relevant education or experience, starting employees can expect to remain at the initial hiring level between 6 months to 2 years, before moving upward in rank, salary and responsibility. In addition to an in-depth knowledge of the regulations and ethics governing clinical research which the students learn in the program, excellent verbal and written communication skills, organizational skills and interpersonal skills are essential to having a successful career as a clinical research professional. Furthermore, a good dose of diplomacy, flexibility and professionalism will be a must to succeed.

Program Requirements:

Each student is responsible for the completion of the requirements for the Clinical Research Management program according to the procedures that follow. Each item must be completed in the sequence and time period indicated. Forms are subject to revision at any time and can be obtained from the graduate school Forms and Guidelines web page <http://www.hsc.unt.edu/education/gsbs/forms.cfm>.

1. The Graduate School Admission Committee will review all applicants for acceptance into the Clinical Research degree program. A student must have either a BA or BS degree and must meet the general requirements of the graduate school as described in the current graduate catalog. All applications must be completed and received into the Graduate School by April 1. A student admitted into the Master of Science in the Clinical Research Management program must take a minimum of 9 SCH per long semester and 6 SCH during the summer (24 SCH/year). A minimum GPA of 3.0 must be maintained.

2. By the end of the second semester or before, the student will be assigned a faculty mentor (major professor) and an advisory committee consisting of the mentor and two other graduate faculty. In addition, a faculty member will be assigned to serve as a university member. This individual must be present at the final thesis defense. The names of these individuals must be filed in the graduate school. In addition, a degree plan must also be filed with the graduate school at this time. Forms may be obtained from the graduate school Forms and Guidelines web page <http://www.hsc.unt.edu/education/gsbs/forms.cfm>.

3. During the summer of year one, the student will enroll in BMSC 5920 (6 SCH), the Internship Practicum. The Practicum will continue into the fall semester of year 2 at which time the student will enroll in an additional 6 SCH. Thus, the student will complete a 26-month (40 hours/week) internship at a site previously approved by the advisory committee. The student is responsible for transportation to and from the site, whether it is on-campus or off-campus. During this time, the student will learn how to perform the duties expected of the particular position in a particular clinical research position. The student will not receive a stipend or other monetary compensation for the internship.

A formal plan describing how the practicum is to be spent must be approved by the advisory committee and submitted to the graduate school before the end of the summer semester, year one (Research Proposal Approval Form obtained from the graduate school Forms and Guidelines web page <http://www.hsc.unt.edu/education/gsbs/forms.cfm>.)

4. At the end of BMSC 5920, the student must submit an Internship Practicum Report and internship daily notebook to the mentor for his/her approval. The advisory committee will meet with the student at this time and review both the notebook and written report. The student will present his/her work as both an oral and written report. The oral presentation will

be open to the public and will then be followed by a private meeting with the advisory committee. The written report should be given to the committee at least two weeks before the formal meeting. At this time the committee will either approve/or not approve the work of the internship and the report. If disapproved, the student may have a chance to revise the report or repeat the practicum one time at the discretion of the committee. The mentor together with the other members of the committee will assign a letter grade to the practicum. A copy of the approved report must be submitted to the graduate school before graduation in accordance with the graduate school rules and time limits for the Master's thesis.

A more detailed description of the internship practicum and report requirements may be found the graduate school Forms and Guidelines web page <http://www.hsc.unt.edu/education/gsbs/forms.cfm>. **“Internship Practicum Guidelines”**.

5. It is strongly suggested that the student and mentor communicate on a regular basis to review the student's progress during the practicum.

TYPICAL CURRICULUM:

The following curriculum is required for all students enrolled in the Clinical Research Management program:

Year 1

Fall

BMSC 5600	INTEGRATIVE BIOMEDICAL SCIENCES I: PRINCIPLES OF BIOCHEMISTRY	4 SCH
BMSC 5610	INTEGRATIVE BIOMEDICAL SCIENCES II: MOLECULAR CELL BIOLOGY	4 SCH
BMSC 5010	SCIENTIFIC COMMUNICATIONS	3 SCH
BIOS 5210	BIostatISTICS FOR PUBLIC HEALTH I	3 SCH

Spring

BMSC 5700	INTEGRATIVE BIOMEDICAL SCIENCES III: PHYSIOLOGY AND PHARMACOLOGY	5 SCH
BMSC 5710	INTEGRATIVE BIOMEDICAL SCIENCES IV: IMMUNOLOGY AND MICROBIOLOGY	3 SCH
BMSC 5965	INTRODUCTION TO INDUSTRY PRACTICE	1 SCH
BMSC 5510.001	INTRODUCTION TO CLINICAL RESEARCH & STUDIES	3 SCH
BMSC 5520	ETHICAL, LEGAL AND SOCIAL ISSUES FOR RESPONSIBLE CLINICAL RESEARCH	1 SCH

Summer

BMSC 5920	LABORATORY INTERNSHIP PRACTICUM	6 SCH
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Year 2**Fall**

BMSC 5920	LABORATORY INTERNSHIP PRACTICUM	6 SCH
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Total Course		39 SCH
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July 19, 2005

Graduate School of Biomedical Sciences

UNT Health Science Center

Fort Worth, Texas 76107-2669

817-735-2560

ACADEMIC YEAR 2005-2006
Master of Science in Biomedical Sciences
Subdiscipline in Science Education

GRADUATE ADVISOR: RUSTIN REEVES, PH.D.

Program Description:

The science education degree program is designed to provide advanced skills to individuals who have chosen careers in middle and high school science teaching. The program will enhance the candidate's appreciation of science and ability to present science in the classroom by providing the tools and experience needed to capture the interest of today's youth. Students will take biomedical science courses that offer training in disciplines ranging from molecules to whole organisms, a specialized course in which students design scientific demonstrations/experiences for middle/secondary school classes, and an internship practicum planned for each student. Those students who do not have a professional secondary teacher certificate upon matriculation will be able to apply and register for the requisite on-line education courses in order to sit for the Texas Examination of Educational Standards (TExES) through an agreement between The University of Texas at Arlington (UTA) and the Health Science Center (HSC). The master's degree that they receive will enable graduates to be more competitive and achieve better salaries upon entering the job market and thus, encourage life-long choice of science education careers.

Program Requirements:

Each student is responsible for the completion of the requirements for the Master of Science in Science Education program according to the procedures that follow. Each item must be completed in the sequence and time period indicated, unless otherwise specified. Graduate school forms are subject to revision at any time and can be obtained from the graduate school Forms and Guidelines web page <http://www.hsc.unt.edu/education/gsbs/forms.cfm>.

1. The average time to complete a degree is approximately 20-24 months.
2. Acceptance into the graduate school. Requirements for acceptance into the graduate school may be accessed on the health science center web site. A teaching certificate is not a requirement for acceptance into the Master's program. Applications are due in the graduate school for fall semester entry by April 1. All applicants to the Master of Science Education program will be notified of acceptance by May 1.

A master's student is required to enroll for a minimum of 9 SCH of formal graduate course work during the long semesters, although 12 SCH is average. During the summer semester the student is required to enroll in 6 SCH. A minimum GPA of 3.0 must be obtained every semester to remain in good academic standing.

3. By the end of the first fall semester, the student must select a faculty mentor from a designated group of faculty and an advisory committee consisting of the mentor and two other graduate faculty members. In addition, the student must have a university member as part of his/her advisory committee. The names of these four individuals must be filed with the graduate school. In addition, a degree plan must be filed with the graduate school at this time.

4. At the beginning of the fall term year 2, the student will enroll in BMSC 5920, the Internship Practicum (6 SCH). At the end of the fall semester the student will a grade of "PR" (In Progress). The internship will continue in the spring semester (6 SCH) so upon completion, the student will have spent a total of approximately 9 months on his/her project. The fall and spring semester Practicum experiences will serve as the basis of the thesis.

Toward the end of the spring semester of the second year, the student must submit a report (thesis) to the mentor for his/her approval. The advisory committee will meet with the student at this time to approve the work of the internship and the report. The student will present his work as both an oral and written report. The oral presentation will be open to the public and will then be followed by a private meeting (defense) with the advisory committee. The written report should be given to the committee one to two weeks before the formal meeting. After the defense, the committee will either approve/or not approve the work of the internship, the report, and oral presentation. If disapproved, the student may have a chance to revise the report and/or retake the defense at the discretion of the committee. The mentor together with the other members of the committee will assign a letter grade to the fall and spring practicum experiences (12 SCH). A copy of the report must be submitted within the appropriate deadlines to the graduate school in accordance with the guidelines for completing the requirements for graduation.

It is strongly suggested that the student and mentor meet at least weekly to review the student's progress during all phases of the practicum.

Professional Certification:

1. Those students who do not have a teaching certificate at the time of matriculation may choose to apply to UTA and once accepted enroll in the professional education courses required for certification while they are pursuing the master's degree. Under an agreement between UTA and the HSC, students may apply to UTA's School of Education (SOE) graduate program, demonstrating they meet UTA and SOEs' admissions requirements. They are then eligible to enroll in fifteen hours of on-line courses (5 three credit hours courses) through UTA. One of these courses EDUC 5315 Practicum Residency requires 12 weeks of in-class teaching as well as on-line coursework and mentoring. These courses will be included in the student's degree program.

2. Successful completion of the courses described in #1 above and achieving an 80% pass rate in each of two practice examinations (one on content and the other covering pedagogy) administered by UTA will allow the student to sit for the Texas Examination of Educational Standards (TEXES). This examination consists of two parts: a Content Exam on one of three areas chosen by the student in consultation with the UTA and UNTHSC faculty and a Pedagogy Exam. The two exams may be taken at different times. A passing grade on both parts of the state examination will enable the individual to receive professional certification.

3. As part of the Internship Practicum (BMSC 5920), the student will have opportunities to be in the secondary school classroom. This in-class experience may be applied to the in-class teaching requirement of EDUC 5315 described in #1 above. Each student's schedule will be determined on an individual basis after consultation with both UTA and UNTHSC faculty.

4. For students not completing EDUC 5315 before completing the master's degree, alternative teaching certification may be possible. Students who fall into this category should consult the appropriate UTA faculty member.

Typical Curriculum:

Year 1

Fall

BMSC 5600	INTEGRATIVE BIOMEDICAL SCIENCES I: PRINCIPLES OF BIOCHEMISTRY	4 SCH
BMSC 5610	INTEGRATIVE BIOMEDICAL SCIENCES II: MOLECULAR CELL BIOLOGY	4 SCH
BMSC 5960	BIOMEDICAL ETHICS	1 SCH
BMSC 5935	SEMINAR IN CURRENT TOPICS: INTRO. TO FACULTY RESEARCH PROGRAMS	1 SCH

SPRING

BMSC 5700	INTEGRATIVE BIOMEDICAL SCIENCES III PHYSIOLOGY AND PHARMACOLOGY	5 SCH
BMSC 5710	INTEGRATIVE BIOMEDICAL SCIENCES IV IMMUNOLOGY AND MICROBIOLOGY	3 SCH
BMSC 5935	SEMINAR IN CURRENT TOPICS: INTRO. TO FACULTY RESEARCH PROGRAMS	1 SCH
[EDUC 5310 (UTA)	DIVERSE POPULATIONS IN TODAY'S SCHOOLS (ON-LINE COURSE)	3 SCH]

At the end of spring semester, sit for UTA practice Content Examination (Student must designate one content area at the beginning of the spring semester. Most students in biomedical sciences will select Life Sciences and be tested on that area in both the practice exam and the state exam).

Passing the practice Content Examination with a score of 80% or better will result in the student receiving a barcode to take the TExES Content Examination in the chosen content area at the next scheduled exam time.

Summer

BMSC 5300	TOOLS FOR TEACHING SCIENCE	2 SCH
CGEN 6030	METHODS IN MOLECULAR BIOLOGY	4 SCH
[EDUC 5329 (UTA)	CLASSROOM MANAGEMENT IN SECONDARY SCHOOL ENVIRONMENTS (ON-LINE COURSE; OFFERED SUMMER SEMESTER ONLY)	3 SCH]

Year 2

Fall

BMSC 5920	INTERNSHIP PRACTICUM	6 SCH
BIOS 5210	BIOSTATISTICS FOR PUBLIC HEALTH I	3 SCH
[EDUC 5314 (UTA)	SECONDARY METHODS (ON-LINE COURSE)	3 SCH]
[READ 5345 (UTA)	CONTENT READING & WRITING (ON-LINE COURSE)	3 SCH]

SPRING

BMSC 5920	INTERNSHIP PRACTICUM	6 SCH
	ELECTIVE COURSES (EXAMPLES: CGEN 6020 PROTEOMICS PHRM 6080 RECEPTORS & DRUG ACTION BIOC 5510 SIGNAL TRANSDUCTION PSIO 6020 ADVANCES IN CV PHYSIOLOGY I)	3-4 SCH
[EDUC 5315 (UTA)	PRACTICUM RESIDENCY (12 WEEKS IN-CLASS TEACHING) (ON-LINE COURSE WORK AND MENTORING)	3 SCH]

After the fall semester or during the spring semester, sit for the UTA practice Pedagogy Examination.

Passing the practice Pedagogy Examination with a score of 80% or better will result in the student receiving a barcode to take the TExES Pedagogy Examination at the next scheduled examination time.

Note: Application and registration at UTA/SOE are required for on-line access. Candidates for Teacher Certification must register and successfully pass a pedagogy/content practice exam administered by UTA prior to being bar-coded to take the state exam. Depending on the student's score, additional pedagogy/content courses may be required.

Total Course SCH (without certification) 43-44

Total Course SCH (including certification) 58-59

The health science center and UTA reserve the right to make changes at any time to reflect current board policies, administrative regulations and procedures, amendments by state law and fee changes. Information provided in this document is subject to change without notice and does not constitute a contract between the University of North Texas Health Science Center and/or University of Texas at Arlington with a student or an applicant for admission. The institutions are not responsible for any misrepresentation or provisions that might arise as a result of errors in preparation.

July 19, 2005

Graduate School of Biomedical Sciences
UNT Health Science Center
Fort Worth, Texas 76107-2669
817-735-2560

College of Education
UT Arlington
Arlington, Texas

ACADEMIC YEAR 2005-2006
Post-baccalaureate Premedical Certification Program

Program Description:

The Postbaccalaureate Premedical Certification program is open to all individuals and particularly to those who have made prior application to medical school through the Texas Medical and Dental Schools Application Service, but have not yet been successful in obtaining admission. Culturally diverse and/or disadvantaged individuals are strongly encouraged to apply. The program is designed to provide opportunities to those individuals who would like to enhance their credentials for entry into medical school by offering a strong, challenging biomedical science core curriculum in the environment of a health science center. In addition, the program provides training in clinical research, that branch of biomedical sciences by which products (drugs, devices, and biologicals) and treatment protocols are developed for patient care. Preparation of health care professionals (both clinical/physician investigators and research site personnel) to conduct trials is critical to the expanding clinical research field. Thus, graduates will be able to use their knowledge either as future physicians who will become involved with clinical studies as part of their medical careers or, in the event that they do not attend medical school, as a means to complete a Master's degree at UNTHSC in Clinical Research Management. Following graduation, the degreed Master's alumnae can then enter the job market as clinical research coordinators/associates. Students who are accepted into medical school also have the option of completing the requirements for a Master's degree in Clinical Research Management during their first year in medical school.

The average time to complete the certificate program is ten months (August through May) while the Master's Science degree in Clinical Research Management can be completed in a total of eighteen months.

Each student is responsible for the completion of the requirements for Postbaccalaureate Premedical Certification according to the procedures that follow. Each item must be completed in the sequence and time period indicated. Forms are subject to revision at any time and should be obtained from the Graduate School of Biomedical Sciences.

Admissions Requirements:

1. All applications must be completed and received into the Graduate School by April 1. The Postbaccalaureate Premedical Certification Admissions Committee will meet during April and decisions will be mailed out by May 15.
2. The Postbaccalaureate Premedical Certification Admission Committee will review all applicants for acceptance into the Medical Science program. A student must have either a B.A. or B.S. degree and must meet the general requirements of the graduate school as described in the current graduate catalog.

3. The Medical College Admissions Test (MCAT) will be accepted as a substitute for the Graduate Record Examination (GRE). While not the only criterion considered in acceptance into TCOM, the applicant should have a competitive MCAT score before the April 1 application deadline (In general, composite MCAT scores below 20 and individual subset scores below 6 are not competitive for medical school).

If the applicant has plans to retake the MCAT for future medical school admissions, he/she must sit for the exam no later than August during the first semester of the year he/she enters the certificate program. The applicant must indicate in writing the actual date he/she will take the MCAT. This information must be filed with the graduate school at the time of admission to the degree program.

A student already accepted into another UNTHSC degree program that requests to transfer into the certificate program would be reviewed by the Postbaccalaureate Premedical Certification Admission Committee. All such applicants must have met the requirements described in steps one through three above.

4. For those students who are planning to qualify for consideration for medical school admission at TCOM as part of the Postbaccalaureate Premedical Certification program, the following are required:

- Successful completion all undergraduate course requirements for TCOM as listed in the current catalog;
- Competitive undergraduate grade point average (In general, an overall undergraduate GPA below 2.8 is not considered competitive for medical school.) and graduate school GPA of 3.5 as described under Curriculum and Program #3 below:
- Competitive MCAT score taken preferably prior to the April 1 admission date, but no later than August of the year entering the postbaccalaureate program;
- Experience in a health care setting to be completed prior to the beginning of the April 1 admission date.
- Completed medical school application submitted to the Texas Medical and Dental Schools Application Service (TMDSAS) and a secondary application submitted to the TCOM Office of Medical Student Admissions by November 1 of the postbaccalaureate fall semester.

All students accepted into the postbaccalaureate program are required to attend a workshop given during the week of orientation on the medical school application process.

Curriculum and Program

1. The following curriculum is required for all students enrolled in the program:

Fall

BMSC 5600	INTEGRATIVE BIOMEDICAL SCIENCES I: PRINCIPLES OF BIOCHEMISTRY	4 SCH
BMSC 5610	INTEGRATIVE BIOMEDICAL SCIENCES II: MOLECULAR CELL BIOLOGY	4 SCH
BIOS 5210	BIOSTATISTICS I	3 SCH
BMSC 5530	INTRODUCTION TO HEALTH DISPARITIES/ISSUES IN THE UNITED STATES	2 SCH

Spring

BMSC 5700	INTEGRATIVE BIOMEDICAL SCIENCES III: PHYSIOLOGY AND PHARMACOLOGY	5 SCH
BMSC 5510.002	INTRODUCTION TO CLINICAL RESEARCH & STUDIES	3 SCH
ANAT 5010	STRUCTURAL ANATOMY	7 SCH
BMSC 5520	ETHICAL, LEGAL AND SOCIAL ISSUES FOR RESPONSIBLE CLINICAL RESEARCH	1 SCH

Total Required Courses 29 SCH

2. One of the objectives of program is to provide students with a workshop to enhance their interviewing skills. This will be available for all students during late August to early September of the fall semester. In addition, to provide practical experience in interviewing for medical school admission, all students will be offered the opportunity to have a formal interview with TCOM faculty. This interview will be scheduled after the workshop during September-December.

3. At the end of the spring semester, all students seeking admission to TCOM who have achieved a 3.5 or higher GPA will be reviewed by the TCOM Medical Student Admissions Committee for possible acceptance into the next entering class. The acceptance of any students for the next TCOM entering class will be contingent upon completing the Postbaccalaureate Premedical Certificate program as described with a 3.5 or higher overall GPA.

The TCOM Medical Student Admissions Committee will place the reviewed students into one of the following categories:

- **Accept** into the August entering class;
- Place on the **Wait List** for the August entering class;
- **Reject** for the August entering class.

Applicants not receiving a seat in the TCOM class entering in August may reapply to TCOM for the next application cycle through TMDSAS or may request transfer into the Master's of Science in Clinical Research Management program.

Provisions exist to allow students in the Post-Baccalaureate Premedical Certification program to transfer into the clinical research management program. A limited number of internship sites will be available. The deadline to request a transfer and start an internship during summer immediately following the spring semester will be March 1st. A limited number of internships in the fall semester of year two will be available, and the deadline for changing disciplines to the clinical research management program to begin internship in the fall semester will be June 15th. All courses in the Postbaccalaureate program will transfer to the Master's program and the student would be required to enroll in the summer BMSC 5510.001 (1 SCH) and complete an internship practicum and thesis for graduation (see Master's of Clinical Research Management Description on the graduate school Forms and Guidelines web page <http://www.hsc.unt.edu/education/gsbs/forms.cfm> or description of the Clinical Research Management program document).

Typical Time-Table for the Postbaccalaureate Premedical Certification Program*

Application for the Postbaccalaureate Premedical Certificate program due in the graduate school	April 1
Review by Postbaccalaureate Premedical	April
Certification Admission Committee Graduate school acceptance letters mailed	May 15
Orientation and required workshop	Week 1 August
MCAT re-examination (optional)	August
Interview Workshop	August/September
Medical school interviews	September-March
Medical school applications due	November 1
Classes (Semesters I and II)	August-May
Review by the TCOM Admissions Committee	May
Notification of medical school decisions	May-June
Orientation week TCOM for accepted students	August

*** The student is responsible for determining actual deadlines. These dates may be obtained from the graduate school.**

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July 19, 2005
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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

DEGREE REQUIREMENTS:

The specialized Master of Science programs and certificate program may have requirements that override or differ from the following degree requirements. The student enrolled in a specialized program is referred to the description of his/her own program where the following requirements do not pertain.

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 5600, BMSC 5610, BMSC 5700 or BMSC 5710), 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 5650). 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 (<http://www.hsc.unt.edu/education/gsbs/forms.cfm>) 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.

Post Baccalaureate Premedical Science Certificate 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

The student will meet with his/her advisor (primary advisor) to select three candidates to serve as university member. Once selected, the student should complete the *Designation of University Member* form (<http://www.hsc.unt.edu/education/gsbs/forms.cfm>) 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. The Graduate Dean will designate the university member of the advisory committee and the student will then be informed of the choice.

The function of the university member is to ensure that the student receives fair and equitable treatment and that all the requirements of the graduate school are followed during the entire degree process. The university member **must** be present at any oral exam (i.e. Ph.D. Oral Qualifying Exam, BMSC 6010 Defense, Thesis/Internship Practicum Report/Dissertation Seminar and Defense). As a matter of courtesy and so that the university member may keep informed of the student's research progress, the student should invite the university member to attend the advisory committee meetings when the research proposal is finalized.

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 (<http://www.hsc.unt.edu/education/gsbs/forms.cfm>) 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.

Postbaccalaureate Premedical Science Certification 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 6). 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 4).
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 5600, BMSC 5610, BMSC 5700 and BMSC 5710). 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 certificate 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 5940.001 (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 6010) 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 6950) in the first semester following BMSC 6010. A student who has successfully passed both the oral qualifying examination and Grant Writing (BMSC 6010) must maintain continuous enrollment in a minimum of 6 SCH of BMSC 6950 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 6010) 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 (<http://www.hsc.unt.edu/education/gsbs/forms.cfm>). 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 6010) and Advancement to Candidacy

In the semester immediately after passing the Oral Comprehensive Examination Ph.D. Qualifying Examination, students must register for BMSC 6010 – “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 an NIH-RO1-style research proposal for a 3-year funding period;
2. Present the proposal at an advertised public seminar;
3. Orally defend the proposal before his/her 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 6010 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 6010 – “Grant Writing”, the student is advanced to doctoral candidacy. A signed form, the Grant Defense Notice (<http://www.hsc.unt.edu/education/gsbs/forms.cfm>), 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 6010). 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 6010 – “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 6010 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 (<http://www.hsc.unt.edu/education/gsbs/forms.cfm>).

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 (<http://www.hsc.unt.edu/education/gsbs/forms.cfm>).

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 (<http://www.hsc.unt.edu/education/gsbs/forms.cfm>). 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 (<http://www.hsc.unt.edu/education/gsbs/forms.cfm>). 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://www.hsc.unt.edu/education/gsbs/forms.cfm>).

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://www.hsc.unt.edu/education/gsbs/forms.cfm>) 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://www.hsc.unt.edu/education/gsbs/forms.cfm>) 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 6010)
- 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.

Both Master's and doctoral students who have successfully completed the first year core curriculum may apply to receive training grant fellowships, such as the NSF-sponsored SCORE fellowship (see Dr. Rustin Reeves, RES-201) or the NIH-sponsored MKITS (see Dr. Robert Kaman, EAD-263). In addition, both Master's and doctoral students may be supported by the grants awarded to their graduate advisor, once he/she is identified. The student should discuss such funding directly with the advisor. Minority Ph.D. students may be eligible for the NIH-sponsored MORE fellowship, but must generally matriculate into graduate school the summer before the core curriculum begins.

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 5600, 5610, 5700 and/or 5710);
- 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, or the graduate advisor for science education.

Descriptions of the research interests of the graduate faculty members are available on the graduate school website (<http://www.hsc.unt.edu/education/gsbs/Facresearch.cfm>). 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 5650)

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 5650. The student may do a laboratory rotation with any graduate faculty member in any discipline. Upon registering for BMSC 5650, 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/forms.cfm>)
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 - Grade Form" can be found at <http://www.hsc.unt.edu/education/gsbs/forms.cfm>) The student's Discipline Graduate Student Advisor will compile all rotation grades and critiques concerning the student and submit final grades to the registrar.



UNIVERSITY of NORTH TEXAS
HEALTH SCIENCE CENTER at Fort Worth
★
Graduate School of Biomedical Sciences

Description of Laboratory Rotation (BMSC 5650)

*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.***

Student's Name:

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 field 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.