TABLE OF CONTENTS

STATEMENT FROM THE GRADUATE DIRECTOR .................................................................. iii
INTRODUCTION .................................................................................................................... 1
STATEMENT OF MISSION AND GOALS .............................................................................. 1
MISSION OF THE GRADUATE PROGRAM .......................................................................... 2
ADMISSION REQUIREMENTS ................................................................................................. 2
  Masters and PhD ........................................................................................................... 2
GRADUATE STUDY IN ANATOMY AND CELL BIOLOGY ....................................................... 4
PROGRAM GOALS AND DEGREE REQUIREMENTS ............................................................ 4
  Master of Science ......................................................................................................... 4
  Doctor of Philosophy ................................................................................................... 6
MD/PhD PROGRAM ............................................................................................................... 9
  Admission Requirements .............................................................................................. 9
  Degree Requirements .................................................................................................. 10
FINANCIAL ASSISTANCE AND TUITION WAIVERS ......................................................... 11
ACADEMIC EXPECTATIONS ............................................................................................... 12
DEPARTMENTAL GUIDELINES FOR GRADUATE STUDENTS ............................................. 12
  General ....................................................................................................................... 12
  Assessment and Disciplinary Actions ........................................................................... 14
  Dissections ................................................................................................................ 14
  Tours of the Medical School ....................................................................................... 14
  Employment with the University of North Dakota ....................................................... 15
  Graduate Student Organization ................................................................................... 15
  Graduate Student Travel Money .................................................................................. 15
RESPONSIBILITY FOR MEETING DEADLINES AND REQUIREMENTS ............................. 17
REGISTRATION ..............................................................................................................................17

ROTATION OF NEW GRADUATE STUDENTS THROUGH LABORATORIES ..................17

SELECTING A FACULTY ADVISOR ..........................................................................................18

FACULTY ADVISORY COMMITTEES ..........................................................................................19

    Master’s ................................................................................................................................19

    PhD and MD/PhD ..................................................................................................................19

PROGRAM OF STUDY ...............................................................................................................19

COMPREHENSIVE EXAMINATIONS .........................................................................................20

    Exams for Current PhD Program Students and Current Master’s Program Students
    Wanting to Pursue a PhD .......................................................................................................20

ADVANCEMENT TO CANDIDACY FOR THE PhD DEGREE ..................................................23

TOPIC PROPOSAL FOR THESIS OR DISSERTATION ..........................................................24

DEFENSE OF THESIS/DISSERTATION ..................................................................................24

FACULTY RESEARCH ACTIVITIES .........................................................................................APPENDIX A

CHECKLISTS ..........................................................................................................................APPENDIX B

    Tasks to Complete for Degree Completion ......................................................................B-1

    Comprehensive Exam Checklist .......................................................................................B-2
STATEMENT FROM THE GRADUATE DIRECTOR

Welcome to the Department of Anatomy and Cell Biology! We are delighted that you have either joined or are looking to possibly join our Department. The Anatomy and Cell Biology Department at the University of North Dakota provides opportunities for a couple of unique experiences not offered at too many other schools. The first is having the opportunity to study in all areas of anatomy (gross anatomy, microanatomy/histology, developmental anatomy and neuroanatomy). Secondly, you have the opportunity to learn how to teach anatomical sciences at the medical and graduate level. However, your studies and opportunities to teach in anatomy constitute only one aspect of being a graduate student. The other is performing novel basic science research alongside and under the mentorship of one of our faculty members. This means we will train you to become a scientist! You will receive training so that you can think like a scientist, design and perform experiments, write like a scientist, and publish your graduate work! AND if you receive stipend support (as a graduate teaching assistant / GTA or graduate research assistant / GRA) we will pay you to learn all of this!! So now that you are excited about our program, you can learn nearly everything you need to know regarding Anatomy and Cell Biology graduate education by exploring through this manual. However, if you have still have questions you should feel free to contact me via email: jane.dunlevy@med.und.edu.

Jane R. Dunlevy
INTRODUCTION

This manual is provided to you as a graduate student in the Department of Anatomy and Cell Biology in order to acquaint you with Departmental and Graduate School policies and requirements that will affect you during your career as a student here at the University of North Dakota. It is meant to supplement and not reiterate the Academic Catalog, which indicates the general requirements of the Graduate School and the specific deadlines to be met by each student. The material presented in this booklet consists of policies and traditions that continually are under review by the Anatomy and Cell Biology Graduate Faculty.

Detailed information regarding Graduate School policies is available electronically in the Graduate Academic Catalog at:
http://graduateschool.und.edu/_files/docs/masters-final-fall2012.pdf and
http://graduateschool.und.edu/_files/docs/doctoral-final-fall2012.pdf and
our Departmental Website is available at
http://www.med.und.edu/anatomy/index.cfm

STATEMENT OF MISSION AND GOALS

The mission of the University of North Dakota Department of Anatomy and Cell Biology is: (1) to educate and train medical, graduate, and undergraduate students in the anatomical and cell biological sciences, (2) to prepare these students for service to North Dakota and the nation, and (3) to advance medical and biomedical science through research.

The mission of the Department is carried out with emphasis on the following equivalent goals:

1. **Education and Training in Anatomy and Cell Biology for Medical and Paramedical Personnel:**
   The anatomical sciences are essential disciplines for understanding human biology and form the foundation for studies of function and disease processes. They are, therefore, requisites for the practice of any of the healing arts. It is an objective of the Department of Anatomy and Cell Biology to pursue a continuing high level of excellence in teaching anatomical disciplines to professional and undergraduate students in health-related fields.

2. **Advancement of Biomedical Sciences Through Research:**
   The advancement of both medical care and biological sciences requires continuous research activity. It is strongly felt that basic research activity must be fostered to insure a high level of intellectual activity and positive faculty morale. No department can maintain a faculty of high quality without an adequate environment for its research activities. An objective of the Department of Anatomy and Cell Biology is, therefore, to promote biomedical investigation by providing an environment conducive to productive and ongoing research.

3. **Educating and Training Teachers and Researchers in the Anatomical Sciences:**
   The faculty of the Department of Anatomy and Cell Biology feel strongly the need to perpetuate their discipline by the training of graduate students so that highly qualified teachers and researchers will be available for future demands of biomedical education and research. It is, therefore, an objective of the Department of Anatomy and Cell Biology to maintain its dedication to the training of graduate students in the anatomical and cell biological sciences.
4. **A Resource of Service for the University and the Community:**
   It is felt that the Department of Anatomy and Cell Biology must contribute to the welfare of the University by participating in committee work, by providing instruction to students of other departments and by providing a resource for continuing medical education of physicians.

5. **Development of Human Relationships within the Academic Community:**
   The Anatomy and Cell Biology Department is firmly committed to the principle that the development and fostering of human relationships must form a part of any academic program of excellence.

---

**MISSION OF THE GRADUATE PROGRAM**

The mission of the Department of Anatomy and Cell Biology Graduate Program is to prepare its students for careers in teaching and research in the biomedical sciences. The mission is carried out with emphasis on the following goals:

1. To provide a strong foundation in the anatomical and cell biological sciences.

2. To foster in students an attitude of inquiry that leads naturally to the scientific method of investigation.

3. To train students in state-of-the-art methods of biomedical research.

4. To engender in students a spirit of cooperation for the mutual benefit of all colleagues.

---

**ADMISSION REQUIREMENTS**

**Masters and PhD**

The application process occurs through the Graduate School. Information is available from the UND Graduate School website (http://graduateschool.und.edu/).

If further advice or help would be beneficial to an applicant's decision-making process, we encourage her or him to contact our Director of Graduate Education, who can be reached by e-mail, telephone, fax, or letter.

1. Completion of a four-year degree from a recognized university.

2. Coursework: Admission into any of the graduate programs offered through our department is dependent upon the applicant's demonstration of effective academic skills and appropriate undergraduate training.

Minimally, the applicant will have completed successfully the following coursework:

   General Biology or Zoology (one year sequence)
Preference for admission will be given to applicants who have completed coursework in at least one of the following areas: Cell Biology, Human Anatomy, Comparative Anatomy, Histology, Developmental Biology/Embryology, or Biochemistry.

Coursework in Physics, Molecular Biology, or Genetics is highly recommended.

Applicants must have a cumulative undergraduate GPA of at least 3.00, and a cumulative GPA of 3.50 in graduate level coursework, if applicable.

3. Graduate Record Examination Scores: Applicants must submit Graduate Record Examination (General Test) scores. Preference for admission will be given to applicants whose test scores fall at or above the reported national averages or 50th percentiles.

4. Satisfy the School of Graduate Studies English Language Proficiency Requirements: Currently, a minimum TOEFL Score of 550 on the paper-based test or 213 on the computer-based test, or for the Internet-based TOEFL, a composite score of 76, with minimum scores of 21/30 (Speaking*); 19/30 (Listening); 19/30 (Reading); and 17/30 (Writing) for applicants whose native language is not English is required. Applicants may also meet language requirements by presenting IELTS scores of 6.5.

*Applicants being considered for Graduate Teaching Assistantships must achieve these minimum TOEFL scores, as well as have a minimum score of 26/30 on the Speaking subtest.

5. Students who have received a bachelor’s degree or higher from the United States or English-speaking Canada are not required to submit the TOEFL.

6. Admission to the Anatomy and Cell Biology graduate program can be made either through the MS degree program or by application directly to the PhD degree program.

7. Students who elect to begin the MS degree program and later decide they wish to pursue the PhD degree may choose to attempt to bypass the MS degree by taking the Comprehensive Examination. Such an examination is administered by a departmental committee and consists in part of the preparation of a written research proposal by the student, with an oral defense of that proposal. By passing it and meeting the other requirements, such as a GPA of 3.5 or higher in graduate level coursework, a student may be admitted to the PhD program without completing the MS program. Otherwise, a student admitted to the MS program must complete the degree as listed.
GRADUATE STUDY IN ANATOMY AND CELL BIOLOGY

You have been admitted to graduate student status by a vote of the entire Graduate Faculty of the Department Anatomy and Cell Biology with final approval by the Graduate School. As a graduate student in Anatomy and Cell Biology, your initial focus will be on learning major cell biological and biochemical concepts. This will be accomplished by taking the Cellular and Molecular Foundations of Biomedical Sciences course (BIMD 500), which has been developed to introduce you to biological structure and function at the molecular level and to teach you the basic techniques utilized in designing cellular and molecular biological experiments. This will be followed by a course in Basic Biomedical Statistics (BIMD 510) and courses centered on microscopic morphology and the normal development of the human body. Other courses such as Gross Anatomy and Neuroscience will lead you into the structure and function of the entire human body and its central nervous system. You will gradually be introduced to specialty areas in Anatomy and Cell Biology through advanced courses, readings, seminar courses, and by exposure to the research activities within the department. After selection of your Faculty Advisor, you will begin work in a field of research that will be a foundation for your future investigative activities, both during and after completion of your graduate degree(s). As a graduate student in Anatomy and Cell Biology, you are aiming toward a profession that may involve research in the private sector, in teaching and research in the atmosphere of a medical education center, or some other equally important area of scientific productivity. Regardless of where your career takes you, your education will continue through your research.

PROGRAM GOALS AND DEGREE REQUIREMENTS

Graduate School requirements regarding the following are presented in the current Academic Catalog, which should be consulted for further guidance.

Master of Science

Program goals

The Department of Anatomy and Cell Biology masters program exists to prepare students for life-long learning and careers in research and teaching in the anatomical and cell biological sciences. The program provides a quality academic curriculum that emphasizes training, mentoring, and practical experience in state-of-the-art research and in teaching.

Goal 1: Students will possess and be capable of applying knowledge and understanding of the anatomical and cell biological sciences as they encounter new or unfamiliar problems in broader contexts related to their field of study.

Goal 2: Students will demonstrate the ability to develop and apply ideas in a research context.

Goal 3: Students will possess communication skills necessary to relate the results of their scholarly work clearly and convincingly to others and to teach effectively the anatomical and cell biological sciences.
Goal 4: Students will recognize and adhere to ethical principles, exhibit professional behavioral standards, and fulfill their professional responsibilities to their institution, the scientific community and society in general.

Master’s Degree Requirements

Students seeking the Master of Science degree through the Department of Anatomy and Cell Biology at the University of North Dakota must satisfy all general requirements set forth by the Graduate School as well as particular requirements set forth by the Department of Anatomy and Cell Biology.

I. Coursework:

1. Minimum of 37 semester hours of graduate credit.

2. Completion of the following core graduate level courses (31 credits):

   BIMD 500  Cellular and Molecular Foundations of Biomedical Science  6 cr
   BIMD 510  Basic Biomedical Statistics  2 cr
   BIMD 513  Seminars in Biomedical Science  1 cr
   BIMD 516  Responsible Conduct of Research  1 cr
   ANAT 505  Seminar in Anatomy and Cell Biology (one semester for each year in the program, excluding year one)  1 cr
   ANAT 593  Research  16 cr
   ANAT 998  Thesis in Anatomy and Cell Biology  4 cr

   **Total required number of credits**  31 cr

3. Completion of a minimum of 6 credits selected from among the graduate level courses listed below.

   ANAT 513  Gross Anatomy  6 cr
   ANAT 517  Principles of Histology  3 cr
   ANAT 521  Principles of Developmental Biology  3 cr
   ANAT 522  Neuroscience  6 cr
   ANAT 591  Special Topics in Anatomy and Cell Biology  1–3 cr
   BMB 533  Advanced Topics  1-3 cr
   MBIO 501  Molecular Virology  2 cr
   MBIO 504  Microbial Physiology  2 cr
   MBIO 508  Microbial Pathogenesis  2 cr
   MBIO 509  Immunology  3 cr
   MBIO 512  Microbial Genetics  2 cr
   MBIO 519  Advanced Immunology  2 cr
   PPT 500  Principles of Physiology and Pharmacology  6 cr
   PPT 511  Biochemical and Molecular Mechanisms of Pharmacology  3 cr
   PPT 525  Advanced Renal Physiology  3 cr
   PPT 526  Advanced Respiratory Physiology  3 cr
   PPT 527  Advanced Neurophysiology  3 cr
Other graduate level courses may be selected if approved by the graduate student’s Faculty Advisory Committee. Elective courses chosen should be appropriate to the student’s area of interest.


II. Research:

A. The MS Program in Anatomy and Cell Biology requires completion of a thesis, based on laboratory research, which has been supervised by a faculty member.

B. Students must obtain a 3-member Faculty Advisory Committee, composed of the Faculty Advisor as chairperson (Faculty Advisor must be at least an Associate Member of the Graduate Faculty), and at least one member from the Anatomy and Cell Biology Graduate Faculty.

C. Students must file a Program of Study, and an Outline of Thesis with the Graduate School, both of which must be approved by the Advisory Committee. Deadlines set in the Academic Calendar must be met if the student wishes to graduate on time.

D. The thesis prepared by the candidate must be presented and defended before the Advisory Committee and the Anatomy and Cell Biology Graduate Faculty.

Doctor of Philosophy

Program Goals

The Department of Anatomy and Cell Biology doctoral program exists to prepare students for self-directed, life-long learning and careers as independent scientists in the anatomical and cell biological sciences. The program provides a quality academic curriculum that emphasizes training, mentoring, and practical experience in state-of-the-art research and in teaching.

**Goal 1:** Students will possess and be capable of applying systematic knowledge and understanding of the anatomical and cell biological sciences in their scholarly endeavors as independent, self-directed, life-long learners.

**Goal 2:** Students will demonstrate the ability to conceive, design, implement, and adapt work in research with scholarly integrity and originality.

**Goal 3:** Students will possess communication skills necessary to relate the results of their scholarly work clearly and convincingly to others and to teach effectively the anatomical and cell biological sciences.
**Goal 4:** Students will recognize and adhere to ethical principles, exhibit professional behavioral standards, and fulfill their professional responsibilities to their institution, the scientific community, and society in general.

*Doctor of Philosophy Degree Requirements*

The graduation requirements for the PhD degree in the Department of Anatomy and Cell Biology consist of required and elective coursework, research leading to the preparation of a dissertation, teaching in major courses, and scholarly tools (minimum of 90 semester hours of graduate credit).

I. **Coursework:**

1. Minimum of 90 semester hours of graduate credit.

2. Completion of the following core graduate level courses (81 credits):

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIMD 500</td>
<td>Cellular and Molecular Foundations of Biomedical Science</td>
<td>6 cr</td>
</tr>
<tr>
<td>BIMD 510</td>
<td>Basic Biomedical Statistics</td>
<td>2 cr</td>
</tr>
<tr>
<td>BIMD 513</td>
<td>Seminars in Biomedical Science</td>
<td>1 cr</td>
</tr>
<tr>
<td>BIMD 516</td>
<td>Responsible Conduct of Research</td>
<td>1 cr</td>
</tr>
<tr>
<td>ANAT 505</td>
<td>Seminar in Anatomy and Cell Biology (one semester for each year</td>
<td>3 cr</td>
</tr>
<tr>
<td></td>
<td>in the program, excluding year one</td>
<td></td>
</tr>
<tr>
<td>ANAT 593</td>
<td>Research in Anatomy and Cell Biology</td>
<td>62 cr</td>
</tr>
<tr>
<td>ANAT 999</td>
<td>Dissertation in Anatomy and Cell Biology</td>
<td>6 cr</td>
</tr>
</tbody>
</table>
   **Total required number of credits** | **81 cr**        |

3. Completion of a minimum of 9 credits selected from among the graduate level courses listed below.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANAT 513</td>
<td>Gross Anatomy</td>
<td>6 cr</td>
</tr>
<tr>
<td>ANAT 522</td>
<td>Neuroscience</td>
<td>6 cr</td>
</tr>
<tr>
<td>ANAT 517</td>
<td>Principles of Histology</td>
<td>3 cr</td>
</tr>
<tr>
<td>ANAT 521</td>
<td>Principles of Developmental Biology</td>
<td>3 cr</td>
</tr>
<tr>
<td>ANAT 591</td>
<td>Special Topics in Anatomy and Cell Biology (per course)</td>
<td>1–3 cr</td>
</tr>
<tr>
<td>BMB 533</td>
<td>Advanced Topics</td>
<td>1-3 cr</td>
</tr>
<tr>
<td>MBIO 501</td>
<td>Molecular Virology</td>
<td>2 cr</td>
</tr>
<tr>
<td>MBIO 504</td>
<td>Microbial Physiology</td>
<td>2 cr</td>
</tr>
<tr>
<td>MBIO 508</td>
<td>Microbial Pathogenesis</td>
<td>2 cr</td>
</tr>
<tr>
<td>MBIO 509</td>
<td>Immunology</td>
<td>3 cr</td>
</tr>
<tr>
<td>MBIO 512</td>
<td>Microbial Genetics</td>
<td>2 cr</td>
</tr>
<tr>
<td>MBIO 519</td>
<td>Advanced Immunology</td>
<td>2 cr</td>
</tr>
<tr>
<td>PPT 500</td>
<td>Principles of Physiology and Pharmacology</td>
<td>6 cr</td>
</tr>
<tr>
<td>PPT 511</td>
<td>Biochemical and Molecular Mechanisms of Pharmacology</td>
<td>3 cr</td>
</tr>
<tr>
<td>PPT 525</td>
<td>Advanced Renal Physiology</td>
<td>3 cr</td>
</tr>
<tr>
<td>PPT 526</td>
<td>Advanced Respiratory Physiology</td>
<td>3 cr</td>
</tr>
<tr>
<td>PPT 527</td>
<td>Advanced Neurophysiology</td>
<td>3 cr</td>
</tr>
</tbody>
</table>
Other graduate level courses may be selected if approved by the graduate student’s Faculty Advisory Committee. Elective courses chosen should be appropriate to the student’s area of interest.

4. All candidates for the PhD degree must demonstrate competence in the scholarly tools for study and research in the discipline of Anatomy and Cell Biology. Each department at UND is responsible for establishing its own “Scholarly Tool” requirements. For the Department of Anatomy and Cell Biology, this requirement is fulfilled by successfully completing a course in biomedical statistics (e.g., BIMD 510 or the equivalent).

5. Students must serve as a Teaching Assistant:
   a. Teaching and directing two semesters of ANAT 204 Laboratory

   OR

   b. Other equivalent teaching experience as approved by the ACB Graduate Advisory Committee

6. The PhD degree in Anatomy and Cell Biology requires a completion of a dissertation based on the results of a research project completed by the graduate student under the guidance of a faculty advisor. The project must represent an original and independent investigation by the student. It is expected that the results of the research will be published in a refereed scientific journal. The dissertation prepared by the candidate must make a significant contribution of the advancement of knowledge in the field and must be presented and defended before the student’s Faculty Advisory Committee and the Anatomy and Cell Biology graduate faculty.

II. Scholarly Tools:

All candidates for the PhD degree must demonstrate competence in the scholarly tools for study and research in the discipline of Anatomy and Cell Biology. Each department at UND is responsible for setting up its own “Scholarly Tool” requirements. These requirements must be completed before the student is permitted to take the comprehensive examination or becomes a candidate for the PhD degree. Anatomy and Cell Biology graduate students should demonstrate proficiency in at least one of the following areas:

A. A computer science course, such as CSci 101 and 101T (3 and 1 credit, respectively) or the equivalent.

B. A biochemical or cell biological laboratory research technique course at the graduate level, such as ANAT 591 (1 to 3 credits).

C. A course in biomedical statistics (BIMD 510 or the equivalent).
D. Other formal training experiences appropriate to the graduate student’s program of study.

The quantity and quality of the above experiences are to be determined by the student’s Faculty Advisory Committee.

III. Research and Dissertation:

The PhD degree in Anatomy and Cell Biology requires completion of a dissertation based on the results of a research project completed by the graduate student under the guidance of a faculty advisor. The project must represent an original and independent investigation by the student. It is expected that the results of the research will be published in a refereed scientific journal. The candidate must make a significant contribution to the advancement of knowledge in the field. The dissertation prepared by the candidate must be presented and defended before the Advisory Committee and the Anatomy and Cell Biology Graduate Faculty.

MD/PhD PROGRAM

Through the cooperation of the Graduate School and the School of Medicine and Health Sciences, students may concurrently pursue the Doctor of Philosophy degree in Anatomy and Cell Biology, and the Doctor of Medicine program.

The MD/PhD program permits students in the School of Medicine and Health Sciences to be admitted to the Graduate School in the Basic Science Departments of the School that offer the PhD degree. Students interested in the joint MD/PhD program should first obtain admission to the School of Medicine and Health Sciences. Admission to medical school does not constitute admissibility to the MD/PhD program. The minimum amount of time necessary to achieve both the MD and the PhD will be seven years. Students interested in the MD/PhD program should inquire at the Office of Academic Affairs in the UND School of Medicine and Health Sciences.

Students enrolled in either the first or second year of medical school may apply for admission to the PhD program in the Department of Anatomy and Cell Biology. If granted admission, the student should apply to the School of Medicine and Health Science Medical Student Academic Performance Committee (MSAPC) for a “modification of original program” which will accommodate work on the PhD degree while a medical student. Before enrolling in the Graduate School, successful applicants must meet the following departmental Admission and Degree Requirements.

Admission Requirements

A. Satisfactory performance in all components of the first two years of the medical curriculum including passing scores on all required assessment instruments.

B. Successful completion of the USLME Step I examination no later than July 1st before the first academic year of graduate school.

C. Satisfactory scores on General GRE examination or on the MCAT.
D. All other Graduate School requirements listed in the UND Academic Catalog.

**Degree Requirements**

A. Completion of the first two years of the medical school curriculum, transferred as 44 credits toward the PhD.

B. A minimum of 90 credit hours, including research and dissertation as described below.

C. Performance of original research of a quality suitable for publication in a refereed, professional journal.


E. A “scholarly tool”, met by the successful completion of a cell biology laboratory technique course (e.g. ANAT 591), a course in statistics (e.g. BIMD 510) or a computer science course (e.g. CSci 101/101T).

F. Students must serve as a Teaching Assistant:
   a. Teaching and directing two semesters of ANAT 204 Laboratory

   OR

   b. Other equivalent teaching experience as approved by the ACB Graduate Advisory Committee

G. An overall GPA of 3.00 for graduate level courses.

H. Passing performance on the Comprehensive Examination covering the course work in the major areas.

---

**Summary of required coursework**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCL</td>
<td>Blocks 1–8</td>
<td></td>
</tr>
<tr>
<td>BIMD 510</td>
<td>Basic Biomedical Statistics</td>
<td>44 cr</td>
</tr>
<tr>
<td>BIMD 513</td>
<td>Seminars in Biomedical Science</td>
<td>1 cr</td>
</tr>
<tr>
<td>BIMD 516</td>
<td>Responsible Conduct of Research</td>
<td>1 cr</td>
</tr>
<tr>
<td>ANAT 505</td>
<td>Seminar in Anatomy and Cell Biology (one</td>
<td>2 cr</td>
</tr>
<tr>
<td></td>
<td>semester for each year in the program,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>excluding year one)</td>
<td></td>
</tr>
<tr>
<td>ANAT 593</td>
<td>Research and Dissertation (Dissertation is</td>
<td>42 cr</td>
</tr>
<tr>
<td>and</td>
<td>typically 6–18 cr)</td>
<td></td>
</tr>
<tr>
<td>ANAT 999</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total minimum number of credits 90 cr
FINANCIAL ASSISTANCE AND TUITION WAIVERS

A. Graduate Teaching Assistantships (GTAs):

Currently, most Anatomy and Cell Biology graduate students have 1/2-time GTA positions. GTAs are 9-month appointments (August 16th to May 15th), and the stipend level is determined each year. In 2012–2013, 1/2-time GTA stipends were $1,961.67 per month for Master’s and pre-comprehensive exam PhD candidates and $2,106.92 for post-comprehensive exam PhD candidates.

Students on GTAs are involved in the departmental undergraduate teaching activities as well as in medical school and graduate courses. Students on GTAs are limited to a six-credit hour load. Summer GRA stipends are provided by the department on a seniority basis, but ordinarily all students who are on GTAs during the academic year are awarded GRAs in summer. Summer GRAs are for three months and generally carry the same monthly stipend. Summer support requires a commitment by the student to 14 weeks of in-residence research with vacation time to be decided between the student and their graduate advisor.

Graduate students admitted directly into the PhD program ordinarily will be given no more than 5½ years of departmental GTA/GRA support. Graduate students admitted to the MS degree program generally will be given no more than 3 years of departmental GTA/GRA support.

B. Graduate Research Assistantships (GRAs):

Occasionally, faculty members may have provision for a graduate student(s) to work on a research grant. In these cases a graduate student may be offered a GRA by this mechanism. Students with GRAs (regardless of funding source) are not required to teach. However, GRA students must at some point complete their teaching requirement for the PhD degree.

C. Tuition Waiver Scholarships:

The Graduate School Tuition Waiver Policy is as follows:

1. Tuition waivers will be awarded independently of stipends. A student may receive a stipend, a Tuition Waiver, or both. Graduate Assistants receiving a stipend may or may not receive a waiver.

2. Tuition waivers will be awarded in dollar equivalents and may reflect a fraction of total tuition. (Dollar amount waived = credit hours × tuition rate by residency)

3. Individual programs will be provided a waiver pool and be responsible for prioritizing and setting the amount of each waiver. Actual allocation to each program is at the individual College or School Dean’s discretion.

4. Tuition Waivers do not accumulate or carry over from semester to semester.
5. In any given program, a student may not receive tuition waivers for more than the number of credits in their approved Program of Study.

6. In any one semester, the maximum dollar value of tuition waived may not exceed the total tuition billed.

7. Students receiving Graduate Assistantships must enroll in a minimum of 6 credits per semester (Fall and Spring) and 3 credits in the summer. Only students in “Approved” or “Qualified” status are eligible for Tuition Waivers. Students in their last semester who have fewer than 6 credits remaining on their Program of Study (3 credits in summer) may petition the Graduate School for an exemption to this requirement. Continuing enrollment (996) credits used in accordance with Graduate School policy apply once a student has already completed their program of study.

8. Students receiving graduate assistantships will be notified of the amount of their tuition waiver in their appointment letter.

A Program of Study must be submitted and approved by the time a Master’s student earns 24 credits or a PhD student earns 36 credits. Once students reach that threshold, further tuition waivers will not be awarded.

ACADEMIC EXPECTATIONS

All graduate students are expected to maintain at least a 3.0 grade point average. The Academic Catalog describes the action necessary when the grade point falls below 3.0.

DEPARTMENTAL GUIDELINES FOR GRADUATE STUDENTS

General

Academic work should be viewed as your profession, not as a project-oriented job or school assignment. Inherent in all of the statements below is the need to be personally responsible to your professors, your students, your graduate student colleagues and, most of all, to yourself by doing the best work possible in your teaching, learning and research.

A. Graduate students are expected to be committed to the academic life of teaching and research.

B. Teaching by graduate students is a serious responsibility and the department expects its GTAs to be well prepared and concerned for their students. This includes attending to the preparation of lab material and exams in a careful, timely manner.

C. In addition to course responsibilities and research, all graduate students and faculty are expected to participate actively in the academic and social life of the department
and University. This includes attendance at departmental seminars and workshops and participation in the activities that occur when there are scientific guests in the department (luncheons, receptions, etc.).

D. Graduate teaching assistants should be aware that dating or sexual interaction with their current students is ethically unsound. Such behavior may imply favoritism to other students and may open you to serious charges (real or contrived) of sexual harassment.

E. Graduate teaching assistants must not act as paid tutors to their current students. This also implies favoritism, and the appearance that students who can't afford to pay don't get as much help from their instructors. Paid tutoring, however, is a legitimate means of earning extra money, as long as there is no current or ongoing formal teaching assistant/student classroom relationship.

F. Research activity is a primary commitment of the graduate student. Such activity goes beyond actual laboratory performance and includes library and journal research reading. Research time commitments are not effectively measurable in hours, but are relative to the obligations of the research project itself.

G. It should be remembered that a Graduate Teaching or Research Assistant is an employee of the University, usually half-time. In addition, a half-time course load is carried by the student. UND policy states that “Graduate School does not encourage outside employment for Graduate Student Assistants. Such employment may limit the ability of the student to make satisfactory progress toward his/her degree. Failure to make satisfactory progress toward their degree can constitute grounds for dismissal.”

The department also does not encourage external employment although it may not presume to monitor extracurricular activities of students. However, such activities become the concern of the department if they interfere with scheduled course activities, GTA meetings, research activities and obligations, or seminars and related activities. Scheduling conflicts due to courses, teaching, research or reasonable family obligations are acceptable. Conflicts relating to extracurricular activities or external jobs are not acceptable. Students should be aware that such external obligations may be time- and energy-consuming blocks to academic success.

H. Graduate assistants are expected to meet the terms of their appointment in areas of teaching, research and/or service. These appointments should not exceed 100%. The Graduate School defines 100% effort for assistants as 50% employment and 50% coursework (1/2 time assistants) or 25% employment and 75% coursework (1/4 time assistants). In unusual circumstances Graduate Assistants can serve as consultants to projects or activities supported with University-administered funds provided all of the following criteria are satisfied: (1) The services of the Graduate Student Consultant are outside the realm of their Graduate Assistant responsibilities, (2) the services provided are limited in scope and do not involve prolonged teaching or research activities, (3) the combined activities, Assistant + Consulting, cannot exceed 120% effort, (4) the consulting fee is appropriate considering the qualifications of the individual to be utilized, and the nature of the services to be rendered. The hourly rate should be no less that minimum wage, and
(5) the overload must be sanctioned by the Graduate Program Director of the program in which the student is enrolled and approved by the Graduate School Dean. Notice of appointment forms are administered by the Graduate School.

I. Graduate students are expected to be at the medical school and working during the business hours and beyond as their research demands.

Assessment and Disciplinary Actions

All students who have or are requesting a GTA stipend will be evaluated by the Graduate Advisory Committee on an annual or as needed basis. The criteria considered will include research accomplishments, academic performance, teaching performance, and professionalism. All graduate students are expected to adhere to the academic and professional guidelines outlined in the Academic Catalog. Failure to consistently adhere to the guidelines and/or performance criteria will result in the following actions that are anticipated to occur in the following order (although there may be instances in which some of these actions may be combined):

1. A meeting with the student will be held to go over a written letter detailing the problems and expected solutions. A copy of the letter will be stored in the student’s file in the ACB office.

2. Probation with criteria that will be specified in writing. For removal of probationary status, the student will have to meet expectations as outlined. A copy of the letter will be stored in the student’s file in the ACB office.

3. Suspension of GTA stipend support. A letter outlining the action will be stored in the student’s file in the ACB office.

4. Dismissal from the Graduate program. A letter outlining the action will be stored in the student’s file in the ACB office.

Dissections

In addition to laboratory instruction, Anatomy and Cell Biology graduate students receiving a GTA stipend are expected to occasionally assist with gross anatomy specimen preparation by participating in dissections. This is a faculty directed and assisted task that takes approximately 1 hour and it is done in a group setting with multiple anatomy faculty members and 2–3 graduate students. GTA students are expected to complete this service to the department and the school approximately once every 1–2 months.

Tours of the Medical School

The Department of Anatomy and Cell Biology, along with other medical school departments, is periodically asked to participate in the tours by conducting demonstrations of anatomical specimens that the department has set aside for tour purposes (buckets with specimens, skeletons, models, etc.). Departmental graduate students receiving a GTA stipend are responsible for seeing that the tour demonstrations are conducted. When the Director of his service is made aware of an upcoming tour, a sign-up sheet will be placed in the Anatomy office soliciting volunteers to conduct the tour. Usually two graduate students are asked to work
together and the demonstrations are usually conducted in the departmental conference room (Frank Low Conference Room, B710).

Tours are one of the significant ways that the medical school establishes relationships with the community. Also, many of the high school students that come through are interested in health professions; exposure to what we do here in terms of teaching, research and preparation for academic or clinical careers stimulates significant interest and may plant a seed in their minds regarding graduate study. It is also a wonderful opportunity for graduate students to continue to develop their skills in teaching and presentation.

When help is solicited for the tours, graduate students are being asked that they volunteer to help carry out an important function of the department and the medical school. It doesn’t take a significant amount of time and is quite rewarding as a service outreach to the community.

Employment with the University of North Dakota

According to page 1 of the Graduate Assistant Handbook, any employment, within the University System, for a student receiving a GRA or a GTA must be approved by the Dean of the Graduate School before this employment is to begin. As a result, the Anatomy and Cell Biology department has drafted a new requirement that you are responsible of informing the Departmental Graduate Director of any employment you are considering within the University system. Failure to do so in a timely manner (at least 3 weeks ahead of the employment start date) will result in the student risking their stipend for that semester. In the case of students who will be working with INMED, the Graduate Director will be forwarding names of students interested in tutoring or participating in the Pathways program. This will ensure that the proper paperwork is processed and approved in a timely manner.

Both the Graduate School and the Department strongly discourage any employment outside the University system.

Graduate Student Organization

The graduate students in the School of Medicine have formed a Graduate Student Organization which has as its goal the achievement of a stronger voice for graduate students in the areas of governance that apply directly to them. There are now graduate student representatives on the Educational Resources Committee, the Graduate Student Curriculum Committee, Animal Care Committee, and the Faculty Academic Council. Additionally, an Anatomy and Cell Biology graduate student representative attends all Anatomy and Cell Biology faculty meetings. The Graduate Director and/or Chairman of the department may meet periodically with the graduate students as a group.

Graduate Student Travel Money

Students wishing to have departmental financial assistance to national meetings must show evidence that they have applied for travel funds from each of the following sources by the required deadline:

A. The Graduate School (for doctoral students only):
   http://graduateschool.und.edu/graduate-students/financial-assistance/doctoral-funding.cfm
B. The Office of Research and Economic Development:  
http://und.edu/research/grants-and-funding/student-travel-funds.cfm

C. The Office of the Provost  
http://und.edu/provost/forms.cfm

D. The professional society hosting the conference (e.g. American Association of Anatomists) if at all possible.

Afterwards, the following guidelines will be used to establish priorities for covering costs that are not supported in full by the resources listed above:

A. Top priority should be given to PhD students who are presenting their research.

B. Next priority should be given to Master’s students who are presenting their research.

C. Next priority should be given to post-doctoral students who are presenting work originating in our department.

D. Next priority should be given to students who are not presenting, but are co-authoring a presentation at the meeting.

E. Students not presenting should not expect financial support from the department or from any of the above-listed sources.

F. Reimbursement for half of the cost of the hotel room is expected. If the room is shared with more than one person, the department will cover the student’s share of the bill.

G. Per Diem for meals is set at 75% per day of the allowable per diem and will be prorated for partial travel days.

H. Additional costs will be covered at the discretion of the Administrative Assistant and departmental chair.

Funds from the above resources as well as from the department are available to students only once per academic year.

If travel funds are available through a grant, then those resources should be utilized.

Students should also plan well in advance of the conference they would like to attend as most resources have deadlines approximately 6 months in advance of the travel dates.

Students wishing to attend workshops or other training venues will have their travel fund request reviewed by the Graduate Advisory Committee.
RESPONSIBILITY FOR MEETING DEADLINES AND REQUIREMENTS

It should be noted that it is the responsibility of the student to see that all forms are filed by the appropriate deadlines. Faculty members are available for advisement, but the student must initiate all steps of the processing of documents with the Graduate School Office. For specific information, refer to the Graduate School Web site home page, or relevant Graduate Student Handbooks published by the Graduate School. Along with your advisor, the Director of Graduate Education is your resource person in the department.

REGISTRATION

Necessary information regarding registration is provided regularly by the Graduate School and by the Registrar. You will need your EMPLID number and your password to register. Registration is available on CampusConnection. If you want to register for a course that requires instructor or departmental permission, a permission number may be generated by the department or the instructor. If a course is full, you must get a signature from the instructor or department on a Registration Action Form and register at the Registrar’s Office (Twamley Hall 201).

ROTATION OF NEW GRADUATE STUDENTS THROUGH LABORATORIES

The goal of research rotations is for all graduate students to have a research experience in a laboratory before committing to a specific project or advisor. It is recommended that the research rotation be coordinated with Anatomy 590 (Readings in Anatomy and Cell Biology) so that the faculty member guiding the research rotation will also be responsible for directing Anat. 590. All first year graduate students are expected to engage in at least one 6–8 week research rotation. The following are recommended guidelines for research rotations.

A. **Become familiar with faculty research interests.** At the start of the first semester of the first year, new students will be given a booklet containing a description of each faculty member’s research focus, ideas and questions being considered in the lab, and a selected bibliography which includes selections from the faculty member’s publications and/or review articles by other researchers that focus on the field of that faculty member. This should be written almost in laymen’s terms so that the new student can understand the ideas expressed.

B. **Choosing a Research Rotation Laboratory.** Some students will enter the graduate program already committed to a specific laboratory (receiving a GRA, undergraduate or summer laboratory experience). However, this will not be the situation for most students and they will need to decide which laboratory(ies) stimulate their scientific interests and begin setting up rotations during the Fall semester. For these students it is required that they contact and set up a short meeting with each faculty member in the department to determine:
   1. If the faculty member is accepting new students
   2. The research focus of the laboratory
   3. What projects would be available in the laboratory for the student
Other considerations are to:
1. Talk to other students in the laboratory
2. Read about the laboratory focus through recent publications and the web site posting

After having ample time to consider the different available laboratories, the student should consult with the graduate director regarding their rotation options and decision.

C. **Starting a Research Rotation, Length of Rotation and Laboratory Hours.**
Research rotations should begin at some point during the month of October depending on the student's needs and schedule. Each research rotation should be 6–8 weeks in length. The hours and schedule for working in the laboratory are to be decided between the student and advisor and should be based in part on the hours of ANAT 590 and ANAT 593 the student is enrolled in. For students in their first semester and taking BIMD 500, hours in the basic sciences laboratory should **not** exceed 20 hours of work per week.

D. **Choosing a Research Advisor.** Students who enter the program undecided on a major advisor and who have completed at least one research rotation are eligible to declare a major advisor. Although it is recommended that students perform more than one research rotation, consideration will be given to students who feel particularly committed to a project and laboratory after their rotation.

**SELECTING A FACULTY ADVISOR**

When a student has become acquainted with the departmental faculty and research activities within the department, it is time to select an advisor who will guide the student during the progress of his/her research project. The research project may be an extension of the work of the faculty advisor or may be in a related area. Each faculty member has a unique method of training graduate students. In some cases, the Faculty Advisor may follow each step of the project very closely. In others, there may be more responsibility and independence given to the student very early in the training period. There are many gradations between these extremes, but all seem to work well in ultimately producing a research scientist. Students have a variety of motives for selecting a certain Faculty Advisor. Most often, the major factor is the student’s interest in the research area of the faculty member. However, commonly, personality compatibility between the faculty member and the graduate student can be a factor as well. In any case, it is important that the student consider the fact that the research area should be one that can be stimulating to him or her and that the relationship between the faculty member and the graduate student must allow for a free exchange of ideas and opinions.
FACULTY ADVISORY COMMITTEES

Master's

The composition of Faculty Advisory Committees has been described elsewhere. The committee for the MS student has 3 members, generally consisting of:

A. Faculty Advisor (chairperson)
B. Anatomy and Cell Biology Graduate Faculty member
C. Graduate Faculty member from a related field or from the Department of Anatomy and Cell Biology

PhD and MD/PhD

The committee for the PhD student has 5 members, generally consisting of:

A. Faculty Advisor (chairperson)
B. 1–2 members from the Anatomy and Cell Biology Graduate Faculty
C. 1–2 Graduate Faculty members from a related field
D. At-large member from outside the department appointed by the Graduate Dean

Only the departmental chairperson or the Director of Graduate Education may request establishment of these committees by the Graduate Dean. However, the student and his/her advisor make the selection of four members of the Advisory Committee and may make suggestions regarding the “at-large” member.

It is the responsibility of the Faculty Advisory Committee to monitor the graduate student’s progress and to certify the student’s academic plans and accomplishments. It is required that all committee members be present at the final examination of the student. It is therefore incumbent upon the student to inform the committee members of his or her plans for completion of the thesis or dissertation well in advance of the anticipated date. This is especially crucial with regard to the at-large member on the PhD committee. Many of these members are from outside the medical school and they may make summer plans which will take them off campus during the student’s anticipated final exam date. Early notification and communication between the graduate student and committee members can prevent last minute postponements because of prior commitments by committee members.

PROGRAM OF STUDY

A Program of Study must be filed by the student for both the Master’s and Doctoral degrees. Instructions for filing and samples of the forms are included in Graduate Student Handbooks published by the Graduate School. The forms themselves are to be found on the Graduate School Web site home page.
A Program of Study must be submitted and approved by the time a Master's student earns 24 credits or a PhD student earns 36 credits. Once students reach that threshold, further tuition waivers cannot be awarded.

COMPREHENSIVE EXAMINATIONS

Exams for Current PhD Program Students and Current Master’s Program Students Wanting to Pursue a PhD

A. Objectives of the comprehensive examination

Students will proficiently demonstrate:

1. Knowledge of basic cellular and molecular biology
2. Ability to express in written and/or oral formats an integrated understanding of the required coursework listed on the student's program of study.
3. Understanding of the principles of the scientific method.
4. Ability for critical, independent thinking
5. The ability to clearly articulate scientific concepts and research results in oral and written formats.

B. Overview of the PhD comprehensive examination

1. The comprehensive examination will consist of two parts:
   a. A written "test of knowledge" examination in an open book format.
   b. An oral examination based on a written "research proposal" reflecting the student's intended dissertation research project.
2. The comprehensive examination will be taken sometime during the student's third year of study, barring mitigating circumstances. It is anticipated that students will have completed their required coursework by this time. Mitigating circumstances might include health and illness issues, unanticipated scheduling problems with required course work.
3. No special distinction will be made between PhD pursuing and MD/PhD pursuing students.
4. The order of the comprehensive examination will be as follows:
   a. The student will prepare, submit to his/her faculty advisory committee, revise as needed, and gain final approval of the abstract including specific aims, for the research proposal.
   b. Satisfactory completion the “test of knowledge” portion of the examination.
   c. Satisfactory completion the “research proposal” portion of the examination.
C. Format and nature of the written "test of knowledge" examination

1. The "test of knowledge" examination will be a written examination in which questions will be answered in "open book" format. It will be taken prior to submitting and defending the full written research proposal. The specifics will be as follows:
   a. There will be two consecutive days of examination.
   b. The student will be given one or two questions per day from which the student will select and answer one question in an open book, open internet format.
   c. Questions will be integrated in nature and may reflect the required coursework taken.
   d. The questions will be written and approved by the departmental graduate faculty. The ACB graduate faculty may solicit advice from graduate faculty members outside the department depending on the coursework taken.

D. Evaluation of the written "test of knowledge" examination
   a. Each question will be graded by at least two members of the departmental graduate faculty with appropriate content expertise solicited as needed. A numerical score (%) will be provided by each grader and the final score will be the mean of the two scores. If there is a greater than 12 point discrepancy between the two grades with one of the grades falling below 75%, then a third person will be assigned to grade that question. The average of all three grades will be the final grade for that question.
   b. Questions will be evaluated for both information content and the level of integration and synthesis, with an emphasis on the latter.
   c. To receive an “unconditional pass” for the written examination, a student must achieve a score of 75% or better on all questions. A student receiving a score of less than 75% on one or more questions, but achieving an overall average of 65% or better will receive remediation status. A student receiving an overall average of less than 65% will receive a “failure.”
   d. In the event of receiving an “unconditional pass,” the student will proceed to the second phase of the Comprehensive Examination – the written research proposal and oral defense – as indicated below.
   e. In the event of the student receiving remediation status or a failure, a meeting of the Anatomy and Cell Biology graduate faculty members will be called to outline an appropriate plan for the student based on their performance.

In the event of receiving remediation status:
- The student will be required to remediate the responses that earned a score under 75%, but may not be required to re-take the complete examination.
- If the overall grade is less than 75% or if there are multiple remediation and/or failing grades, then a new examination may be administered after a period of time to study.
- Remediation should proceed without delay in a manner agreed upon and approved by ACB graduate faculty.
• The student must successfully complete remediation, as determined by the question graders, before proceeding to the research proposal component of the Comprehensive Examination. In the event of a conflict between interested parties (student and graders or graders themselves), the Anatomy and Cell Biology departmental graduate faculty will determine and enact a fair and binding resolution.

• It is expected that students pass a remediation or failing question(s) upon the next exam attempt. Failure to do so will result in a meeting of the Anatomy and Cell Biology departmental graduate faculty to decide on dismissal from the graduate program.

In the event of receiving a “failure,” the student will be given the opportunity to take a new test of knowledge examination. A student who does not pass for the second time will be dismissed from the graduate program.

E. Format and nature of the research proposal and oral examination

1. The written proposal will be submitted to the student’s graduate advisory committee 6 weeks after getting notification that they have passed the “test of knowledge” examination.

2. The proposal will be written following the NIH format with a page limit of 12 pages. NIH form pages can be used and the format will include an Abstract, Specific Aims, Background and Significance, Preliminary data if available, Research Plan (consisting of experimental design and methods), and References.

3. The proposal will be related to the student’s research project. The student will have already developed the abstract with specific aims with the advice of their major advisor and had it approved by the Faculty Advisory Committee prior to taking the written “test of knowledge” portion of the exam. The abstract will be placed in the student’s file. It is expected that the full written proposal will originate independently from the student with no written guidance from his/her advisor or graduate faculty.

4. Once the committee members have received the proposal (not a draft), they will have 1–2 weeks to review it and then an oral examination of the proposal will be undertaken.

5. The nature of the oral examination will be as follows:
   a. The student will present a 30 minute presentation on their proposal to the department and graduate advisory committee with the intent of informing the committee and the department about the nature of the problem or question being investigated (background, statement of hypotheses, significance, any preliminary data), the specific aims of the project and the approaches to be taken.
   b. The general audience will be given some time to ask questions.
   c. Following the presentation and open question period, the student’s graduate advisory committee will convene with the student to continue the examination. The student will be asked to discuss topics relevant to the research background, the significance of their hypothesis, the appropriateness of the approaches, knowledge of the approaches,
alternative approaches, the appropriateness of the techniques, knowledge of the techniques, and knowledge of the literature related to the proposal.

F. Evaluation of the proposal and oral examination

1. Evaluation of the proposal and oral examination will be based on (a) the clarity, organization and cohesiveness of the written proposal, (b) the students’ knowledge of topics relevant to the research background, (c) the student's ability to analyze and integrate information, and (d) the student's knowledge of the tools and techniques proposed in the research proposal. Within reason, the significance of the proposed research and the likelihood of success will not constitute part of the evaluation. In addition, the extent of preliminary data will not be a factor in the evaluation. However, if preliminary data is included, it should be related to the proposal.

2. Action to be taken in the event of failure:
   a. If the written proposal is found to be grossly deficient (lacking background, lacking hypotheses, illogical development of aims, etc.), the student will be asked to revise the proposal and resubmit it to the advisory committee. In the event that the revision is inadequate, the student's likelihood of success in the program will be considered and the committee will decide on dismissal from the graduate program.
   b. If the oral examination is found to be deficient, the student will be asked to remediate the deficient areas either through coursework or through a program of study that is followed by either a written report or an additional oral examination. If these conditions are not satisfactory then the committee will decide on dismissal from the graduate program.
   c. If both the written proposal and oral examination are grossly deficient, the student will be required to repeat these components of the comprehensive examination. A student who fails for the second time will be dismissed from the program.

ADVANCEMENT TO CANDIDACY FOR THE PHD DEGREE

A student can be advanced to candidacy for the PhD degree when the following have been accomplished:

A. Must be in “Approved Status.”

B. A five-member Faculty Advisory Committee has been set up through the Director of Graduate Training.

C. A Program of Study has been approved by the Committee and filed with the Graduate School.

D. Scholarly Tools have been completed.

E. Most of the coursework has been completed with a graduate GPA of no less than 3.00 for all coursework completed.
F. The Comprehensive Examination has been completed successfully and the examination report has been signed and filed with the Graduate School.

G. The Topic Proposal for the dissertation has been approved and filed.

**TOPIC PROPOSAL FOR THESIS OR DISSERTATION**

One of the last steps before advancement to candidacy for the degree is the filing of a Topic Proposal. This includes the subject and title, a brief description of the nature of the problem or study, the procedure or methodology to be followed and the anticipated results. The Topic Proposal must be approved by the student’s Faculty Advisory Committee. Instructions for filing and samples of the forms are included in Graduate Student Handbooks published by the Graduate School. The forms themselves are to be found on the Graduate School website home page.

**DEFENSE OF THESIS/DISSERTATION**

When the student has completed the writing of the thesis or dissertation, incorporating appropriate criticisms and corrections by the Faculty Advisor, the document must be given Preliminary Approval by the Faculty Advisory Committee. Deadlines and appropriate time lines are given in the Academic Catalog. The formal Defense of Thesis or Defense of Dissertation will be conducted and graded by the Faculty Advisory Committee with the Faculty Advisor presiding.
APPENDIX A

FACULTY RESEARCH ACTIVITIES
FACULTY RESEARCH ACTIVITIES

Basic Science Research Faculty:

Edward C. Carlson, Professor, PhD, University of North Dakota, 1970.
Research in the Carlson laboratory centers on light and electron microscopy studies of tissues derived from normal and transgenic diabetic mice. Detailed morphometric analyses are carried out in an effort to identify significant changes in the renal cortex and retinas of diabetics. Other animals that overexpress antioxidants in specifically targeted kidney tissues are bred to diabetics in an effort to show renoprotection in the progeny.

Jane R. Dunlevy, Associate Professor, PhD, University of Alabama-Birmingham, 1994.
The focus of the Dunlevy Lab is on the cell biological changes that occur when normal cells are transformed into metastatic cancer cells by heavy metals such as cadmium or arsenite. The laboratory mainly focuses on the changes that occur in the extracellular matrix, cell surface receptors and the cytoskeleton during the transformation process in a bladder cancer model system. In this system, normal bladder cells that cannot form tumors were transformed into cancer cells that do form tumors by exposure to low levels of cadmium and arsenite. The cell biological changes in extracellular matrix proteins are characterized and then determined if they translate to changes that occur in actual human bladder tumors. The Dunlevy Lab collaborates closely with Drs. Sens, Somji, and Garrett in the Department of Pathology.

Bryon D. Grove, Associate Professor, PhD, Clemson University, 1985.
Dr. Grove is investigating the role of the A-kinase anchoring protein, AKAP12, in regulating PKA dependent signaling events within a variety of cell and tissue types. This work utilizes molecular and imaging approaches to understand the influence of AKAP12 dynamics on signaling pathways and cellular events that are regulated by PKA. Through the efforts of students and collaborators, investigations into the role of AKAP12 in regulating intracellular signal compartmentalization, sensory neuron function, endothelial wound healing, and the response of endothelial cells to hypoxia and inflammation are underway.

Sergei Y. Nechaev, Assistant Professor, PhD, State Research Institute of Genetics and Selection of Industrial Microorganisms, 2001.
Dr. Nechaev is interested in answering a question of how every cell in an organism, despite containing the same genome, can selectively activate genes that are relevant to their cell type. The broad answer to this question lies in the field of epigenetics. The focus or Dr. Nechaev's laboratory is on a recently characterized phenomenon of promoter-proximal RNA polymerase II pausing and in particular, on exploration of its role as a novel epigenetic factor. In addition to advancing basic understanding of gene regulation and cell fate specification, this research will have practical applications in diagnosis of diseases that result from dysregulation of gene expression including cancer.

John A. Watt, Associate Professor, PhD, Montana State University, 1993.
Research focuses primarily on neuroimmune interactions, particularly in the context of brain repair mechanisms and axonal sprouting. Using a rat model of axonal degeneration the response to both endogenous (axonal degeneration) and endogenous (non-self) stimuli are compared in identified brain cells (both glia and neurons). Studies are focused on synthesis and
regulation of specific cytokines (IL-1B), neurotrophins (CNTF), and several antigen presentation-related membrane proteins during the CNS response to pathological challenge. Results will indicate which cytokines and neurotrophins affect neuronal-glial interactions and the CNS response to denervating injury.

Educator-Scholar Faculty:

Patrick A. Carr, Associate Professor, PhD, University of Manitoba, 1992.
Professional development using distance learning techniques and alternative educational paradigms for the instruction of gross anatomy and neuroscience within a medical curriculum. Dr. Carr is heavily invested in the administration and delivery of the first year medical curriculum. As Assistant Dean for Faculty Development for the School of Medicine and Health Sciences, he is also involved in providing professional development opportunities for faculty throughout our geographically diverse campuses.

Jon A. Jackson, Assistant Professor, PhD, University of North Dakota, 1989. Anatomical instruction for undergraduates and History of Anatomy.
Dr. Jackson’s scholarly activities are in the sphere of scholarship of teaching and learning—with a focus on the anatomical sciences and on the technologies of teaching anatomy in science classrooms and laboratories in particular.

Mandy M. Meyer, Assistant Professor, PhD, University of North Dakota, 2006. Joint appointment with the Department of Occupational Therapy.
Dr. Meyer’s scholarly activities are in the sphere of scholarship of teaching and learning—with a focus on the anatomical sciences and on the technologies of teach anatomy in science classrooms and laboratories in particular.

Kenneth G. Ruit, Associate Professor, PhD, Loyola University of Chicago, 1989.
Dr. Ruit’s scholarly work centers on education with emphasis on medical curriculum innovation and program evaluation, assessment of student learning, and faculty development. His specific areas of interest include integration of the anatomical sciences into a “Patient-Centered Learning” medical curriculum, constructing and administering valid and reliable examinations, remediation of academic deficiency and promotion of student academic success, and the role of basic scientists in educating medical students as professionals.

Chernet B. Tessema, Assistant Professor, MD, PhD, Addis Ababa University, 1984, PhD, University of Leipzig, 1993.
Dr. Tessema provides unique expertise in all areas of anatomy instruction and works with students in lecture and laboratory instruction.
TASKS TO COMPLETE FOR DEGREE COMPLETION

Checklist for Semester to Advancement to Candidacy

______  1. Select an advisor.
______  2. Faculty Advisory Committee set up.
______  3.* Scholarly Tool requirement is completed.
______  4. Program of Study signed and file, using appropriate forms.
______  5. Most of coursework has been completed.
______  6.* Teaching requirement is fulfilled.
______  7. In “Approved Status” (3.0 grade point average)
______  8.* Application made to Graduate School for Comprehensive Exam.
______  9.* Complete and pass Comprehensive Exam.
______ 10.* Comprehensive Exam report filed with Graduate School.
______ 11. Topic Proposal or thesis or dissertation prepared, signed and filed, using appropriate form (at least six months before degree expected).
______ 12. Receive Notice of Advancement to Candidacy for degree. This must occur no later than the semester before graduation is expected.

Checklist for Final Semester and Graduation

______ 13. Apply for degree near beginning of session in which the degree will be awarded (see deadline in Academic Calendar). Failure to graduate necessitates reapplication.
______ 14. Formatting of the dissertation or thesis should be done following Graduate School guidelines.
______ 15. A draft of the complete dissertation or thesis must be presented to the Faculty Advisory Committee in advance (at least 2 weeks) of the Preliminary Approval Deadline. The Approval form must be signed and submitted to the Graduate School by the deadline stated in the Academic Calendar.
______ 16. The final form of the thesis or dissertation must be presented to the members of the Committee in time to allow them to read it thoroughly before the defense.
______ 17. The final examination (defense of thesis or dissertation) must be scheduled 2 weeks in advance of date of exam with the Faculty Advisory Committee and Graduate School.
______ 18. Final approval of the defense and thesis or dissertation by the Faculty Advisory Committee must occur in time so that the approval by the Graduate Dean will meet the deadline stated in the Academic Calendar (2 weeks before graduation).

*PhD Students only
COMPREHENSIVE EXAM CHECKLIST

1. Meet with the Graduate Director to discuss timeline for comps, format, and forms.
   a. Written comprehensive exam sample questions and answer guide
   b. Grant guide for the oral exam

2. Apply to take comprehensive exams with the graduate school by filling out Part I of the "doctoral comprehensive examinations" form before you take your written comprehensive exam.
   a. Write your abstract and Specific Aims for your written proposal and distribute to your PhD Faculty Advisory Committee.
   b. Meet with your Faculty Advisory Committee and obtain their permission to continue your comprehensive exam process.
   c. Set dates for the written exam with the Graduate Director via e-mail.

3. At the start of each day you will be provided the computer with the questions for the day on the hard drive, a jump drive for backup, color pens/pencils, and paper. You are encouraged to take at least a 1 hour lunch break during which you are on the “honor code” to not look at text books, material on the internet or computer, etc. At the end of each exam day the Graduate Director or Administrative Assistant will collect the computer, figures you have drawn, the jump drive containing the backup copy of your answers, and all paper scrap work you have generated.

4. The Graduate Director will meet with you after your written exam has been graded and discussed with the faculty. Once you have passed your written comprehensive exam, you will have 6 weeks to generate and handout the proposal for your oral comp exam to your PhD committee.

5. Set oral exam date with your PhD Committee. Inform the Graduate Director of this date and provide her with a copy of your proposal title and abstract.

6. Sign up for the computer of your choice (if needed) and room in which you would like to take your oral exam blocking off a total of 4 hours for the exam.

7. Inform the Administrative Assistant of proposal title, room, date/time you will start your exam presentation.

8. Bring the Graduate School “doctoral comprehensive exam” form with Parts I and II already completed to your oral exam.

9. After your oral exam, your advisor should email the results of the comprehensive exam to the Graduate Director and/or give the Graduate Director a copy of the “doctoral comprehensive exam” form.