

BIOMEDICAL AND VETERINARY MEDICAL SCIENCES GRADUATE PROGRAM HANDBOOK

Comparative Biomedical Sciences,
Pathobiological Sciences, and
Veterinary Clinical Sciences
School of Veterinary Medicine (LSU Vet Med)
Louisiana State University

A Supplement to the Louisiana State University General Catalog
Intended for Use by LSU Vet Med Graduate Students and Faculty

Approved by LSU Vet Med Graduate Faculty:

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Graduate Program Guidelines

A Supplement to the LSU Graduate Catalog

Table of Contents

1. GENERAL PROGRAM INFORMATION	5
1.1. Program Description	
1.2. Philosophy and Objectives	
1.3. Admissions	
1.3.1 Admissions Requirements & Qualifications	
1.3.2. Admissions Procedure	
1.4. Stipends and Financial Support	
1.5. Student Conduct and Safety	
1.6. Graduate Student Orientation	
2. RESPONSIBILITIES OF THE GRADUATE PROGRAM PARTICIPANTS	8
2.1. The Student	
2.2. The Graduate Advisor	
2.3. The Graduate Research Mentor	
2.4. Graduate Program Committee	
2.5. The Graduate Advisory Committee	
2.6. The Department Head	
3. RESIDENCY	11
4. GRADES	11
4.1. Grading Policy	
4.2. Good Academic Standing and Probation	
4.3. Transfer of Graduate Credit	

5. SEMINAR	12
5.1. Research Seminars	
5.2. Coursework Seminars	
6. RESEARCH	14
6.1. Graduate Research Mentor Choice and Selection Process	
6.2. Graduate Advisory Committee Selection Process	
6.3. Leave Policy	
6.3.1. Personal Days	
6.3.2. Leave of Absence	
7. MS DEGREE	16
7.1. Timeline	
7.2. Coursework	
7.2.1. CBS Course Requirements for MS Degree	
7.2.2. PBS Course Requirements for MS Degree	
7.2.3. VCS Course Requirements for MS Degree	
7.3. MS Research and Study Plan	
7.4. Thesis	
7.5. Recommendation for Direct PhD Study Plan	
8. PHD DEGREE	20
8.1. Timeline	
8.2. Lab Rotations	
8.3. Core Curriculum	
8.3.1. Coursework	
8.3.2. General Examination	
8.4. Additional Coursework	

8.4.1. CBS Advanced Coursework

8.4.2. PBS Advanced Coursework

8.4.3. VCS Advanced Coursework

8.5. Research and Study Plan

8.6. Teaching Requirement

8.7. Publication Requirement

8.8. Dissertation

Appendix A: Description of Courses

Appendix B: Checklist for Completion MS without Residency

Appendix C: Checklist for Completion MS with Residency

Appendix D: Checklist for Completion PhD without Residency

Appendix E: Checklist for Completion PhD with Residency

Appendix F: Format of Dissertation Proposal

Appendix G: Forms

Appendix H: Student Evaluation Form

Appendix I: Student Assessment Rubric

Appendix J: Assessment Scoring Criteria

Appendix K: Graduate Advisory Committee Form

1. GENERAL PROGRAM INFORMATION

1.1. Program Description

The School of Veterinary Medicine offers the Master of Science (MS) and Doctor of Philosophy (PhD) degrees in Biomedical and Veterinary Medical Sciences. Students can earn their degrees with a research focus in anatomy, anesthesia, bacterial and viral pathogenesis, basic and applied research in comparative orthopedics, cancer research, cardiovascular disease, cell and molecular biology, clinical disciplines (including surgery), dermatology, environmental health sciences, epidemiology and community health, immunology, internal medicine, laboratory animal medicine, molecular virology, neuroscience, oncology, ophthalmology, parasitology and parasite-induced diseases, pathology, pharmacology, physiology, radiology, theriogenology, toxicology, and zoological medicine.

1.2. Philosophy and Objectives

The graduate program in Biomedical and Veterinary Medical Sciences offers an interdisciplinary approach to the study of the biomedical sciences, pathobiological sciences, and veterinary clinical sciences. The goal of the program is to educate and prepare students for successful careers in academia, industry, government, or private non-profit environments. The faculty of the School of Veterinary Medicine are involved in research and teaching on topics such as toxicology & pharmacology, neuroscience, lung biology, pathogenesis of diseases in human and animals, and clinical sciences of small, large, and exotic animals. Graduate study programs will be tailored to satisfy the interests of individual students by providing guidance for formal instruction and experimental investigations pertinent to the student's chosen area of study, under the supervision and guidance of their Major Professor and Graduate Advisory Committee. Faculty areas of research emphasis are listed on the LSU Vet Med website (<http://www.lsu.edu/vetmed/>). PhD and MS students can focus on any aspect of the emphasis areas. Students in possession of their DVM degree (or equivalent) can pursue graduate studies as part of or alongside their internship and/or residency programs in the Pathobiological Sciences or Veterinary Clinical Sciences departments.

1.3. Admissions

1.3.1. Admissions Requirements and Qualifications

Students must meet the acceptance criteria outlined by the LSU Graduate School, including a minimum 3.0 GPA on a 4.0 scale and acceptable scores on any required tests

of English comprehension for students who do not speak English as a first language (see [LSU Graduate School](#) website for details). Most successful applicants will have completed courses in organic chemistry, inorganic chemistry, physics, and biological science. Also, introductory biochemistry, microbiology, and one year of calculus are recommended. Other courses may be recommended or required for admission; contact the admissions coordinator or graduate advisor for the department of interest for details.

Other requirements include: Letters of recommendation from three faculty members or other individuals familiar with the applicant's work, a personal statement from the applicant describing how their background prepares them for graduate study and what their research interests and career goals are, and an applicant interview with members of the Graduate Faculty in the relevant department(s). In cases of well-qualified students from locations that are a great distance from Louisiana, the interview requirement may be conducted online. A good "fit" of mentor and student is important and thus strong consideration is given to the student's stated professional goals.

After evaluation of the application by the departmental graduate faculty, the student will be informed of acceptance into the program in a timely manner. Applicants seeking LSU Graduate School-nominated fellowships should submit their application by October 15; applicants seeking regular fellowships should submit by December 15 for matriculation in the fall semester or June 1 for the following spring semester. A faculty member may appeal to the departmental graduate faculty at a scheduled meeting for the admission of a student who does not meet the acceptance criteria. After discussion of the student's application, the graduate faculty will vote on admission of that student, and the decision will be final.

Applicants having earned a DVM or equivalent degree can combine their clinical residency with a graduate program. They must be admitted into both the residency program and graduate program independently, but they will be permitted to pursue their MS or PhD degrees concurrent with their clinical training.

1.3.2. Admissions Procedure

The application for admission to the Graduate School is accessed online at <https://www.lsu.edu/graduateschool/admissions/apply.php>. Official transcripts, official test scores, and other materials that come from third-party sources must be mailed to: Graduate Admissions, 114 West David Boyd Hall, Baton Rouge, LA 70803. Applications are accepted at any time but are evaluated only after all supporting documents and credentials (official transcripts, Graduate School application for admission, application fee, etc.) have been received. It is recommended that the application be initiated at least six months prior to anticipated entry. Applicants who have questions concerning the

application and review process should address inquiries to the admissions coordinator or graduate advisor for the department of interest.

1.4. Stipends and Financial Support

Every effort will be made by the department, and should be made by the student, to obtain stipend support for the student's graduate program; however, stipend support cannot be guaranteed by the department and students should be aware that acceptance into the graduate program is independent of stipend support. A limited number of four-year stipend scholarships are available; these will be awarded on a competitive basis. Students receiving the scholarships will be expected to meet minimum performance standards set by the Vet Med Graduate Faculty. Students may be required to perform rotations through various Vet Med Mentors' labs. These students are eligible to receive funding for one-year from the School of Veterinary Medicine. Following lab rotations, students will choose a major professor who will accept responsibility for funding their students' stipends through research grants. Students are also encouraged to pursue externally funded individual research fellowships (e.g. NSF, NIH, AHA, NRSA). Teaching assistantships (in Anatomy) may be available to select students. Internal awards are at the discretion of the departmental faculty or individual research advisor. Graduate students hired as house officers will be engaged in an advanced clinical training program and will be funded through the Veterinary Teaching Hospital (VTH) or their academic department.

1.5. Student Conduct and Safety

All students will maintain a high degree of ethical standards in their personal conduct toward faculty, staff, and fellow students at LSU. All research data will be maintained in a dated hard copy or electronic notebook with a full explanation of the methods and procedures used. Notebooks should be available for inspection at any time by their Mentor or Graduate Advisory Committee members. Appropriate dress (lab coat and leather shoes with closed toes, gloves, and mask, depending on safety standards) should be worn in the laboratory. No eating or drinking is allowed in research labs at any time. Students should be familiar with and follow all safety regulations of the working environment.

1.6. Graduate Student Orientation

All incoming MS and PhD graduate students are required to attend an orientation session. This orientation will be held prior to start of fall semester classes (a spring semester orientation could also be scheduled, if needed). The orientation will include ethics, code of conduct, security, lab safety, and other necessary information. In addition to a group orientation for students in all Vet Med departments, department-

specific orientations will be conducted, including a tour of departmental facilities and other areas of school that pertain to their training. In addition, faculty may present an overview of their current research, as well as available stipend support for graduate students. The orientation will provide contact opportunities to graduate students who will participate in the laboratory rotation program.

2. RESPONSIBILITIES OF THE GRADUATE PROGRAM PARTICIPANTS

2.1. The Student

The student has the primary and ultimate responsibility for the success of their graduate program. The student is responsible for initiating contacts to identify a Graduate Research Mentor (GRM) and the members of the student's Graduate Advisory Committee (GAC) whose academic interests and research programs coincide with the student's goals. The student is responsible for writing the proposed plan of study and conducting the research necessary to successfully complete the degree requirements. Continued updating of the GRM and the GAC on the research progress is the responsibility of the student. Students are required to develop an individual development plan (IDP) by the end of the first year of their enrollment in the graduate program. The plan will be implemented by the student and discussed/revised at least once a year with his/her GRM. Discussion and updates of the IDP will be performed as part of the GRM mandatory annual evaluation.

A checklist of degree requirements that the student should follow is included in the Appendices. The student and GRM shall organize a meeting with the GAC (once formed) on an annual basis to discuss the student's progress. The student will meet with his/her GRM so that an annual, written report on the student's degree progress can be prepared and submitted to the GA. The student must follow the checklist of degree requirements (see Appendices B through E) and meet annually at the start of fall semester with the GA to update his/her status in completing the appropriate checklist. Time limits outlined by the LSU Graduate School must be followed.

2.2. The Graduate Advisor (GA)

The GA is a member of the departmental graduate faculty who acts as administrator for the graduate program and advisor for rotating graduate students. Departmental GAs are also liaisons to the LSU Pinkie Gordon Lane Graduate School. They oversee all aspects of the graduate program, from admission to awarding of stipends, annual student progress reviews, filing of all requisite forms and records, through application for graduation and the final defense. Graduate Advisors serve as ex officio members of the LSU Vet Med Graduate Education Committee (GEC), which is responsible for the graduate curriculum and policies.

2.3. The Graduate Research Mentor (GRM, Mentor)

The Graduate Research Mentor must be a member of the graduate faculty of the student's department. It is expected that all students will have identified their Graduate Research Mentor after completion of their laboratory rotations, where applicable, within one year of admission (Section 9.2). The Mentor is responsible for guiding the student through the graduate program. The Mentor advises the student on choosing the membership of their Graduate Advisory Committee (GAC), excluding the Dean's Representative, who is independently assigned for PhD students. The Mentor conducts annual evaluations of the student's research, coursework, and other progress; chairs their GAC for the General Examination (PhD only) and Final Defense; and acts as a liaison between the Graduate School and the student. It is the Mentor's responsibility, with the cooperation of the student and the GAC, to identify and help rectify any coursework deficiencies pertinent to the student's degree. The Mentor and student will organize a meeting with the student's GAC on an annual basis to discuss the student's progress. Following this meeting, the Mentor will prepare and submit a written report documenting the student's progress over the previous year and noting where any deficiencies or problems have been identified. This report should include an individual development plan for the following year and will become part of the student's file.

2.4. The Graduate Program Committee (GPC)

The GPC consists of members of the departmental graduate faculty who assist the Department Head in administering the graduate program. They are appointed or elected from the membership of the departmental graduate faculty to serve multi-year terms. The GPC oversees the departmental graduate program, including recruitment, curriculum, admission, policies, and nomination of awards for outstanding thesis and dissertation, which are then sent to the GEC for review. They are also responsible for reviewing requests for course exemptions submitted by the GA or Mentor.

2.5. The Graduate Advisory Committee (GAC)

The Graduate Research Mentor and the Graduate Student, together, should propose the membership composition of the Graduate Advisory Committee, which must be approved by the Department Head and the Dean of the Graduate School through appropriate and timely submission of documents preceding the General Examination (PhD students) or Final Defense (MS students). The Graduate Advisory Committee will consist of at least three members, including the Graduate Research Mentor, who acts as chair or co-chair. The student's committee should be composed of those faculty members best qualified to direct and evaluate the student's program of study and research. The members may be from any department pertinent to the student's area of concentration; however, two of them must be full members of the graduate faculty, and

two must be from the student's primary department. If the student and Mentor feel that an individual from outside of LSU would be a valuable addition to a student's committee, a formal Administrative Approval Request that justifies the selection of the non-LSU member must be made in advance. This official request must be signed by the Department Head and the Dean of LSU Vet Med before it is transmitted to the Graduate School for final approval. For PhD students, a Dean's Representative will also be appointed to the committee by the Graduate School as an additional member. The Dean's Representative is a graduate faculty member who will serve on the committee for both the General Exam and Final Defense.

The student and the GAC are responsible for formulating the study and research plan. The study plan for students should be based on the student's academic background, area of specialization, graduate/departmental core requirements, and recommendation of the GAC. The GAC is chaired by the student's GRM and bears responsibility for monitoring the student's progress through their program and for determining whether the student has met the standards of the department and the university for the degree. The GAC should provide a written summary report of research plans to the GA and Department Head (DH) by the end of the second year and annually thereafter. The report will be in the form of a letter by the chair of each committee outlining major findings and future plans. It is the obligation of each member of a GAC to insist on an adequately designed and rigorous program for the graduate student. The GAC will determine when the student is ready for the Final Defense and whether the student has met the standards required for graduation.

2.6. The Department Head (DH)

The Department Head serves as the chief academic officer for the department. The DH may serve as a Graduate Research Mentor and/or as a member of a Graduate Advisory Committee. Additionally, the DH may request to attend a meeting that involves student evaluations, student conduct, student-mentor relationships, and other relevant matters to ensure that departmental guidelines are followed. The specific responsibilities of the Department Head regarding graduate studies are as follows:

- The Department Head will appoint the members of the GPC from the departmental graduate faculty.
- The Department Head will approve admissions chosen by the GPC and oversee the use of department-funded stipends for graduate students.
- The Department Head must approve the selection of the Mentor and membership of Graduate Advisory Committee.
- The Department Head must approve all requests for part-time status in the MS and PhD programs.

– For conflicts between graduate students or graduate students and faculty, the Department Head will serve as mediator if the Graduate Advisor and/or GAC are unable to resolve the issue or are party to the complaint.

3. RESIDENCY

LSU Vet Med offers residency programs for veterinarians in a number of areas, e.g., anesthesia and pain management, zoological medicine and surgery, equine medicine, equine surgery, small animal surgery, pathology, laboratory animal medicine, and theriogenology. A DVM degree or equivalent is required for this program. Some of these programs require students to complete their MS degree; check individual residency programs for requirements. Acceptance into the residency programs is separate from acceptance into the graduate program, and residents must apply to and be accepted into a graduate program. Residents are encouraged to explore all the options available through LSU Vet Med before choosing their Mentor. Students should meet with and discuss the graduate opportunities available with departmental GAs and/or Department Heads as well as with potential Graduate Research Mentors. The faculty recognizes that time demands on residents are different from time demands on full-time graduate students who do not carry clinical responsibilities, and that the timeline should be adjusted accordingly. The Appendices C and E provide guidelines for students in combined Resident-MS and Resident-PhD programs, respectively. The goals of combined residency training and graduate work include:

- To provide post-DVM students coursework and advanced training in specialty areas of veterinary medicine to augment the clinical training for certification by one of the veterinary specialty boards
- To provide post-DVM students advanced training in clinical instruction and to allow students to perform some didactic instruction in preparation for a faculty position in a veterinary school
- To provide post-DVM students seeking specialty board certification advanced training in applied research in veterinary medicine so that graduates have skills necessary to conduct independent research.

4. GRADES

4.1. Grading Policy

LSU Graduate School policies state that cumulative grade point average is the average based only on graduate work graded "A," "B," "C," "D," and "F" ("A" = 4, "B" = 3, "C" = 2, "D" = 1, "F" = 0). The letter grades "A", "B", "C", and "D" have the suffix plus (+) or minus (-) included to distinguish higher and lower performances within each of these

letter grades, which add or subtract 0.3 points to the letter grade. The letter grade F does not include the plus/minus distinction.

- No letter grade will be given for research or seminar courses but will be allowed for special topics or methods courses. For research or seminar courses, “satisfactory” will be indicated by “S” and “unsatisfactory” by “U.”
- An “I” “incomplete” grade indicates that course performance was satisfactory, but because of circumstances beyond the student’s control, all requirements were not met. Authorization from the Dean of the Graduate School is not required to assign an “I” grade to a graduate student.
- A “W” “withdrawn” grade indicates that a course has been dropped between the dates specified on the academic calendar. In extraordinary cases, the Dean of the Graduate School may authorize a resignation and/or course drop after the last date specified.

4.2. Good Academic Standing and Probation

Graduate students are considered to be in good academic standing (making satisfactory academic progress) if they maintain a 3.00 cumulative grade point average on all graduate course work and a 3.00 semester average on all course work and earn a grade of “S” in research. A student whose cumulative grade point average is below 3.00 will be placed on academic probation. A graduate student on academic probation must maintain a grade point average of 3.00 or higher for each term on probation with no course grades of “C” or below. If the student scores below a 3.00 average for any semester while on probation, that student may be dropped from the program. Probationary status is removed when the student raises his or her cumulative grade point average to 3.0 or better. Applicants admitted on probation and students placed on probation may not be appointed to a graduate assistantship.

4.3. Transfer of Graduate Credit

Upon request, a student may transfer up to a maximum 6 credit hours from other schools and/or credit taken while classified as an LSU extension or non-matriculating student towards the required courses, as described in the Graduate School catalog. This transfer of credit would need the approval of the departmental GPC, the Department Head, and the Dean of the Graduate School. See the LSU General Catalog for details.

5. SEMINAR

5.1. Research Seminars

A seminar is the one occasion at which all faculty, post-doctoral researchers, and graduate students meet regularly and discuss research findings and new developments

in the disciplines of biomedical and veterinary medical sciences. It is a unique opportunity for a graduate student to demonstrate his/her abilities as a teacher and biomedical scientist, to learn how to present and discuss experimental data, and to think on his/her feet. A seminar program in which all researchers within the department participate fosters unity and mutual respect among the participants and provides an atmosphere that promotes research and collaborative investigations. Attendance at scheduled departmental seminars and seminars given by visitors to the department is mandatory, as possible. Students are expected to participate actively in a seminar by contributing to the discussion. All graduate students are required to present their independent research. Typically, this seminar comes after the General Exam. Opportunities to present include departmental seminar series/work-in-progress series, annual departmental retreats/symposia, monthly Breakfast Break for Science events, research proposals, and the Final Defense.

A typical research seminar will start with an introduction to state the questions being asked and to provide background information for the audience. The body of the seminar concerns the experimental rationale and methodology being employed to answer the questions, followed by the data presentation. The summary should contain the conclusions reached by the student from the presented data as well as a discussion of further studies to be conducted. It is expected that the student has practiced his/her seminar presentation and has prepared audiovisual aids to enhance the exchange of information. The student is encouraged to practice the seminar with advanced students/postdoctoral fellows and/or Mentors.

5.2. Coursework Seminars

In addition to independent research seminars, students are required to take departmental seminar and journal club courses as specified by their home department (see specific departmental requirements). A typical journal club seminar will be a presentation of research data from a carefully selected paper and should be presented in a critical and informative manner such that the audience can appreciate the state of the art of the research. The student is expected to read a considerable body of literature so that he/she has a good understanding of the field, techniques, and experimental approaches being used to address the fundamental questions. The seminar, however, is not a lecture or an overview. It is a highly focused presentation of the experimental design and results to further our knowledge about a specific question. During the seminar, the student is expected to discuss the limitations, strong points, and problems of interpretation of the data.

6. RESEARCH

6.1. Graduate Research Mentor (GRM) Choice and Selection Process

The student is responsible for initiating contacts to identify a GRM whose academic interests and research programs coincide with the student's goals. The GRM must be a member of the departmental graduate faculty. Typically, MS students are admitted after they have chosen a GRM with whom to conduct thesis research. For PhD students, a GRM may be chosen in advance or following completion of lab rotations in the student's first year of study. The GRM should be chosen by the end of the spring semester of the first academic year. The selection is made by listing a first choice and an alternate selection in a letter to the Department Head and the GPC. Every effort is then made to place the student in the laboratory of his/her first choice, provided that the faculty member is agreeable, and that space and funds are available to support student research.

6.2. Graduate Advisory Committee Selection Process

A Graduate Advisory Committee should be established soon after the selection of the Graduate Research Mentor and must be established in advance of the request for Degree Audit and General Exam (PhD students only). The anticipated timeline for the selection is the end of the first year of attendance for MS students, and the beginning of the second year for PhD students. The Graduate Research Mentor and the graduate student should propose the membership composition of the Graduate Advisory Committee together. The members of the committee should be graduate faculty members who have expertise in research, especially in the areas related to the student's interests. Should the student declare a minor, one member of the committee must be in that field or department. A Dean's Representative will also be appointed to the committee by the Graduate School as an additional member. The Dean's Representative is a graduate faculty member who will serve on the committee for both the general and final exams. The Dean's representative should be invited to attend scheduled meetings with the student and the GAC to evaluate progress towards completion of the PhD degree. The committee provides advice and support on the student's research, monitors the development of the student into a productive and competent investigator, and evaluates the student's progress. Any additions to or changes in the makeup of this committee must be approved in advance by the Dean of the Graduate School. The Dean of the Graduate School may serve as a member of any committee or may appoint additional members.

6.3. Leave Policy

6.3.1. Personal days

Graduate students* are entitled to 10 working days (80 hours) of personal time, vacation, or sick time per year in addition to university holidays as defined in PM-5 (e.g., Christmas and New Year's Day). Annual leave can be carried over between years for a maximum of 20 working days (160 hours). However, no more than 20 working days (160 hours) of leave can be taken in a single year. Unused time has no monetary value, cannot be transferred to another LSU College or School, and will be forfeited upon separation from the university (e.g., graduation). The request for annual leave must be submitted to the student's major professor (or Graduate Advisor (GA) for students without a major professor), their department coordinator, and the department head at least two weeks prior to the desired start date. For unexpected absences, e.g., illness, the student should inform their major professor (or GA) as soon as possible. Appropriate forms must be completed immediately upon the student's return. Students are also permitted 2 days of funeral leave per academic year to attend services or burial rites for immediate family members (father, mother, sibling, spouse, child, spouse's parent, spouse's sibling, grandparents, grandchild, and step-father, step-mother, step-child, and step-siblings). The reason for funeral leave must be documented, and an obituary/funeral program will be filed with the leave request. PTO can be used to extend funeral leave beyond the allocated 2 days. The student should submit a leave request indicating the desired dates for funeral leave prior to taking leave when reasonable. Requests for leave beyond the maximum 20 working days may be submitted by the same methods as for annual leave for a maximum of 8 weeks. Once accrued leave is expended, the leave will be unpaid. Students will be responsible for making arrangements with instructors to continue course work as necessary to avoid jeopardizing their academic standing.

*This policy does not apply to Graduate Students who are classified as full-time employees (Residents, Interns, or similar appointments). Leave for those students is guided by the terms of their employment appointment.

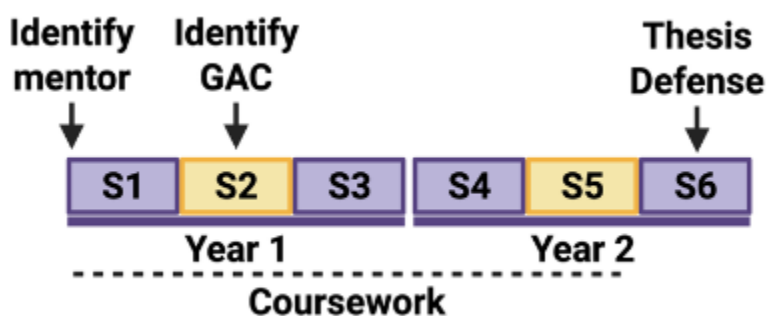
6.3.2. Leave of Absence

Students experiencing a major life event (e.g., major illness or injury, including recovery; birth or adoption of a child; active military duty) are permitted to request a leave of absence. Requests for leaves of absence should be sent in writing to the student's major professor, the department GA, and the department head. A leave of absence will effectively pause a student's degree progress, allowing them time to manage the life event before returning to the program to continue progress toward degree completion. The leave of absence cannot be for longer than one calendar year,

and the time limit for graduation will remain in effect and unchanged, unless a formal request to extend the time to degree is approved by the Graduate School. Time off will not be accrued during a leave of absence. International students need to check with the appropriate offices to make sure that their visa status will not be affected by a leave of absence.

7. MS DEGREE

7.1. Timeline



Full-time MS students should complete their study plan and research within two academic years with an accumulation of 30 semester credit hours (Appendix B). Students combining an MS with a DVM residency program should complete their study plan and research within three academic years (Appendix C). All students must complete their MS degree within five calendar years after matriculation.

7.2. Coursework

Minimal course loads are determined by the student with the approval of the Graduate Advisory Committee and to meet Graduate School requirements. Students who are graduate assistants (research or teaching) must maintain full-time enrollment status to be eligible to retain their assistantship, including summer enrollment for 12-month graduate assistants. Master's graduate students must complete a minimum of 30 hours of graduate work, 24 hours of which must be in coursework and 6 hours in thesis research (VMED 8000). At least one-half (12 hours) of the minimum required credit in the student's coursework (24 hours) must be in 7000-level courses. Research and thesis credits (VMED 8000) do not count toward the 7000-level requirement. Note that a limit of 6 hours of Research Techniques (7002 - any department) and 8 hours of Special Topics (7003 - any department) may be used toward any graduate degree. Courses taken to correct a deficiency must be graduate-level courses taken at LSU and may be applied to the total hours of credit described above. Each department has a set of core

coursework that is required in addition to elective courses. Individual department guidelines are listed below.

7.2.1. CBS Course Requirements for MS Degree

1. CBS 7104 Biomedical Cell and Molecular Biology (4 Credits, Fall Year 1)
2. VMED 7004 Introduction to Research (2 Credits, Fall Year 1)
3. Statistics (e.g., EXST 7003 or PBS 7312, 4 Credits, Spring Year 1)
4. CBS 7108 Critical Analysis in Molecular Biology/Medicine (3 Credits, Fall Year 2)
5. CBS 7005 Seminar Series & Publications Student in Comparative Biomedical Sciences (1 Credit, repeatable, up to 6 Credits total)

Elective courses can be used to fill the remaining requirements as approved by a student's GRM and GAC. Students are required to register and attend CBS 7005 in all spring and fall semesters unless there are schedule conflicts with other classes; students who receive a "U" grade will not be eligible to receive funding from the CBS department for conference travel. Course descriptions are listed in Appendix A.

7.2.2. PBS Course Requirements for MS Degree

1. CBS 7104 Biomedical Cell and Molecular Biology (4 Credits, Fall Year 1)
2. VMED 7004 Introduction to Research (2 Credits, Fall Year 1)
3. PBS 7312 Concepts in Epidemiology (4 Credits, Spring Year 1)
4. PBS 7389 Fundamental Immunology (3 Credits, Spring)
5. PBS 7007 Seminar Series in Pathobiological Sciences (1 Credit, repeatable, 2 Credits required)
6. PBS 7004 Current Literature in PBS (1 Credit, repeatable, 2 Credits required)
7. And at least ONE of the following elective courses:
 - PBS 7005 Grant Writing (2 Credits, Spring)
 - PBS 7003 Parasitic Effects on Animal Performance (3 credits)
 - PBS 7538 Advanced Immunology (3 credits)
 - PBS 7003 Pathogenic Mechanisms of Bacteria (3 credits)
 - PBS 7003 Molecular mechanisms of Viral Pathogenesis (3 credits)

Incoming students who have successfully completed (grade B or above; within the previous 3 years) courses in a U.S. graduate program (MS or PhD) may be exempted from required courses of the corresponding subjects. All exemption(s) must be applied for in writing with a signature of the GRM (and/or the resident mentor for students in

Resident-MS or Resident-PhD) and approved by the GPC. Course descriptions are listed in Appendix A.

7.2.3. VCS Course Requirements for MS Degree

1. VMED 7004 Introduction to Research (2 Credits, Fall Year 1)
2. Statistics (e.g., PBS 7312, VCS 7004, 3 Credits)
3. VCS 7001 Seminar (1 Credit, repeating, 2 Credits minimum, 4 Credits maximum)
4. VCS 7210 Journal Review (1 Credit, repeating, 2 Credits minimum, 4 Credits maximum)

At least three credit hours of 7000-level elective courses must be completed. The courses should be chosen in line with the student's interests along with the approval of the student's GRM and GAC. Recommended courses include the following:

- VCS 7003 Special Topics (8 Credits maximum)
- VCS 7201 Veterinary Gastroenterology
- VCS 7202 Veterinary Surgical Techniques
- VCS 7204 Advanced Veterinary Orthopedics
- VCS 7205 Advanced Veterinary Clinical Neurology
- VCS 7206 Advanced Veterinary Urogenital Disease
- VCS 7208 Advanced Veterinary Cardiovascular Disease
- VCS 7209 Advanced Veterinary Respiratory Disease
- VCS 7211 Advanced Veterinary Cardiorespiratory Disease
- VCS 7212 Biomechanics of Fractures and Fracture Fixation
- VCS 7213 Advanced Veterinary Diagnostic Imaging Interpretation: Small Animal
- VCS 7214 Advanced Veterinary Diagnostic Imaging Interpretation: Large Animal
- VCS 7215 Advanced Veterinary Diagnostic Imaging: Interventional Techniques Laboratory
- CBS 7104 Biomedical Cell and Molecular Biology
- CBS 7109 Advanced Macroscopic Anatomy
- PBS 7417 Pathogenesis of Infectious and Parasitic Agents
- CBS 7631 Biomedical Neuroscience
- CBS 7637 Biomedical Physiology 1

Course descriptions are listed in Appendix A.

7.3. MS Research and Study Plan

The MS study plan involves coursework providing a broad background as well as specialization in the student's area of emphasis and the completion of an original research project resulting in an acceptable thesis. The study plan and research proposal should be submitted to the student's Graduate Advisory Committee by the end of the second semester. The plan consists of courses taken, grades received in these courses, courses planned to finish the degree program, and a brief research proposal as outlined in the Appendices. The emphasis should be on a clear, concise document. This plan will be discussed, amended (if necessary), and approved by the student's GAC. The program of study proposal should include the student's program objectives, course schedule, teaching responsibilities, if any, and their clinical responsibilities, if any.

7.4. Thesis

All MS degree students must write a hypothesis-based thesis on their original scientific research with one of the approved departmental faculty. The Graduate Research Mentor and Graduate Advisory Committee must deem the research as publishable in scientific literature. The student should work closely with the Mentor to identify a thesis project and to select a Graduate Advisory Committee. The committee must meet at least once before the final defense of the thesis and must approve the progress of the student's research project for continuation in the program.

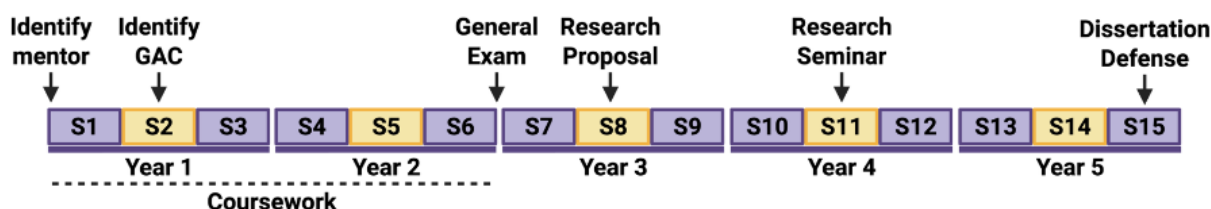
Upon completion, the student will submit the completed thesis to the GAC at least two (2) weeks before the scheduled final seminar and defense of the thesis. Following the presentation of data in a seminar to the department, the candidate will undergo an oral defense to the Graduate Advisory Committee. The committee will assess the student's knowledge of the general area of the thesis and courses that pertain to the research. After the student has answered all questions about the thesis, the committee will discuss the thesis and revisions that may be necessary and vote on whether the student has passed. The outcome of the Final Defense is assessed according to the Graduate School guidelines (<https://catalog.lsu.edu/content.php?catoid=27&navoid=2434#comprehensive-final-examination>). Voting to accept the thesis (with all recommended revisions) will be by ballot, with no more than one negative vote permitted. After passing the Final Defense, the student will be certified to the graduate faculty and Dean for Graduate Studies as having met all requirements for the degree of Master of Science in Biomedical and Veterinary Medical Sciences. Hard copies of the thesis may be required to be submitted to the department for archival.

7.5. Recommendation for Direct PhD Study Plan

A student enrolled in the MS program may request that the MS degree be bypassed and that the student be allowed to pursue a PhD program. The Graduate Advisory Committee will evaluate the performance and progress of the student to determine whether the request is justified by the student's performance. If so, the student's GRM should inform the GPC, GA, and the Department Head in writing. This privilege cannot be extended to a student without successful completion of two semesters in the graduate program. LSU School of Veterinary Medicine MS students can petition to transfer credits to the PhD degree pending approval from the Associate Dean for Research and Graduate Education and the GEC.

8. PHD DEGREE

8.1. Timeline



It is recommended that full-time PhD students complete their study plan and research within four to five academic years. Students combining a PhD in Biomedical and Veterinary Medical Sciences with a residency program should complete their study plan and research within six academic years. They must complete their PhD degree within seven calendar years after matriculation. Extension requests must go through the LSU graduate school with the agreement of the student's GRM and GAC. No less than 90 calendar days may elapse between the passing of the General Exam and the completion of all requirements for the doctoral degree. Continuous enrollment is required following completion of the General Exam, including a minimum of 3 credit hours registration in the semester during which the Final Defense is completed.

8.2. Lab Rotations

Students who are not direct recruits to the lab of their GRM will complete research rotations during their first year of study. A minimum of three research rotations (VMED 8900) will be completed. The labs included in the rotations will be based on the list of faculty members who are, at that time, available to accept students with stipends from the School of Veterinary Medicine or their respective department in their

laboratory. Each rotating student must provide their Graduate Advisor with a list of faculty members with whom he or she would like to conduct research rotations, for consideration by the GPC. Investigators interested in accepting students on rotation will make this known prior to Graduate Student Orientation. No more than one graduate student per professor will be funded on a School of Veterinary Medicine stipend. Each research rotation should last approximately eight weeks. They provide first-hand knowledge of specific faculty research among a diverse field, and they serve as a basis for choosing a Graduate Research Mentor. Students are expected to be active participants in the laboratory, working on either independent projects or ongoing studies, gaining insight into both laboratory techniques and experimental design. Expectations from the Mentor and grading criteria should be discussed with the student at the start of the rotation. The student should communicate the course schedules with the investigator and define the time committed to the bench work, with a minimum of 18 h/week. Faculty should recognize the demands of the student's course load and consider a reasonable amount of flexibility. At the end of each rotation, the student should expect to prepare a brief report summarizing experiments and results. Each faculty rotation Mentor will also prepare a short report for the GPC about the student's progress during the rotation.

8.3. Core Curriculum

8.3.1. Coursework

1. CBS 7104 Biomedical Cell and Molecular Biology (4 Credits, Fall Year 1)
2. VMED 7004 Introduction to Research (2 Credits, Fall Year 1)
3. PBS 7005 Grant Writing (2 Credits, Spring)
4. Biostatistics course - Complete one of the following:
 - PBS 7312 "Concepts in Epidemiology," which includes biostatistics (or equivalent graduate level course in Statistics) (4 credits) – Spring first year

OR

- VCS 7004 Clinical Biostatistics I (4 Credits, Fall); AND
- VCS 7005 Clinical Biostatistics II (3 Credits, Spring)

OR

- Equivalent graduate level course in statistics (pending departmental approval).

Exemption from core courses can be petitioned for by either the GRM or GA if the petitioning student does not have a GRM yet. The onus is on the petitioners to

provide all of the requisite documentation in support of the exemption petition. Exemption must first be approved by the relevant departmental process. Once approved at the departmental level, the petition for exemption will be submitted to the GEC for final approval by a simple majority vote. If the GEC is tied, the three departmental GAs will provide the tie breaking vote. Exemption from a course will not provide the petitioning student with credit for the course.

8.3.2. General Examination

Doctoral students are required to pass a rigorous qualifying examination (General Exam) within three calendar years (36 months)—or a period deemed equivalent for part-time students—of their classification as doctoral students. The General Exam should be regarded as the culmination of a student's program in coursework. In most cases, the remaining time spent obtaining the degree is to be devoted to concentrated work on the dissertation and preparation for the final defense. A student becomes eligible to take the General Exam after demonstrating to the GAC adequate academic and professional aptitudes.

Passage of the General Exam demonstrates the student has acquired a broad-based scientific knowledge and a detailed understanding of their area of expertise and can formulate a hypothesis and design an experimental approach to address the problem. The General Exam will include both written and oral portions and will be administered as follows:

- A. Written Exam: The written exam will consist of a research proposal in a format agreed upon by the student's GAC. This proposal should convey an original research idea with full description of the need, expected impact, hypothesis, objectives, and materials and methods. A sample proposal to familiarize the student with the format will be distributed in advance. The proposal will be submitted to members of the GAC at least 7 days prior to the date of the General Exam.
- B. Oral Exam: The oral exam and the written exam are assessed independently. During the oral exam, the student must be able to explain and expand on the concepts of their research proposal and completed course work up to that point. The GAC may provide specific topics for the student to prepare prior to the oral exam.

Failure of the General Exam requires more than one dissenting vote. Based on the results of the General Exam, the GAC can recommend additional course work or other remediation. If the student fails the General Exam, he/she may retake the written component, the oral component, or both parts of the General Exam depending on the

decision of the GAC. Should the student choose to retake the General Exam, the examination must be completed within three calendar months and will be based on the original proposed research topic. Should two members of the GAC fail the student again, the student will be dismissed from the PhD Program. If deemed appropriate and worthy, the option to complete an MS may be given but is not guaranteed.

8.4. Additional Coursework

A minimum of 54 graduate-level hours of credit beyond the baccalaureate or professional degree (in courses numbered 4000 or above) must be earned. Students are required to complete at least 27 credit hours in courses at the 7000-level, excluding dissertation research (VMED 9000), including the core curriculum (12-15 credits). All students are required to earn at least 12 credit hours in VMED 9000 Dissertation Research. The remaining coursework requirements are dependent on a student's primary department. A maximum of 6 hours of 7002 Research Techniques (any department) and 8 hours of 7003 Special Topics (any department) may be used. If the student declares a minor, the student must fulfill the requirements as defined by the minor department in addition to the primary department requirements. Students in other departments who declare a minor in the Biomedical and Veterinary Medical Sciences will be required to take nine credits of graduate courses, 7000-level, in that department. See below for departmental requirements.

8.4.1. CBS Advanced Coursework

1. CBS 7108 Critical Analysis in Molecular Biology/Medicine (3 Credits, Fall Year 2)
2. CBS 7637 Biomedical Physiology 1 (2 Credits, Spring Year 1)
3. CBS 7005 (1 hour repeating, up to 6 hours total) Seminar Series & Publications Study

The Graduate Advisory Committee can recommend that a graduate student take other courses at the 7000- (and approved 4000-) level. Courses at the 4000-level must be approved by the LSU Graduate School as being acceptable for graduate credit. Elective courses must be approved by the GAC, as well. Course descriptions are included in Appendix A. All students that are not direct recruits must complete 3 lab rotations (VMED 8900, 1 credit each).

8.4.2. PBS Advanced Coursework

1. PBS 7389 Fundamental Immunology (3 Credits, Spring)

2. PBS 7007 Seminar Series in Pathobiological Sciences (1 Credit, repeatable, 4 Credits required)
3. PBS 7004 Current Literature in PBS (1 Credit, repeatable, 4 Credits required)
4. VMED 8900 Pre-dissertation Research (3 credits) (*See Exceptions Below)
5. And at least ONE of the following elective courses:
 - PBS 7435 Structural Biology and Drug Discovery
 - PBS 7003 Parasitic Effects on Animal Performance (3 credits)
 - PBS 7538 Advanced Immunology (3 credits)
 - PBS 7003 Pathogenic Mechanisms of Bacteria (3 credits)
 - PBS 7003 Molecular mechanisms of Viral Pathogenesis (3 credits)

* VMED 8900 Exceptions: Graduate students supported by extramural funds obtained by an identified GRM are exempt. A PhD student's residency program director, GRM, or GAC may require the student to take VMED 8900 as part of their program of study.

8.4.3. VCS Advanced Coursework

1. VCS 7001 Seminar (1 Credit, repeating; 3 Credits minimum, 4 Credits maximum)
2. VCS 7210 Journal Review (1 Credit, repeating; 3 Credits minimum, 4 Credits maximum)
3. At least six credit hours of 7000-level elective courses must be completed. The course should be chosen in line with the student's interests along with the approval of the student's GRM and GAC. Recommended courses include the following:
 - VCS 7003 Special Topics (8 Credits maximum)
 - VCS 7201 Veterinary Gastroenterology
 - VCS 7201 Veterinary Gastroenterology
 - VCS 7202 Veterinary Surgical Techniques
 - VCS 7204 Advanced Veterinary Orthopedics
 - VCS 7205 Advanced Veterinary Clinical Neurology
 - VCS 7206 Advanced Veterinary Urogenital Disease
 - VCS 7208 Advanced Veterinary Cardiovascular Disease
 - VCS 7209 Advanced Veterinary Respiratory Disease
 - VCS 7211 Advanced Veterinary Cardiorespiratory Disease
 - VCS 7212 Biomechanics of Fractures and Fracture Fixation

- VCS 7213 Advanced Veterinary Diagnostic Imaging Interpretation: Small Animal
- VCS 7214 Advanced Veterinary Diagnostic Imaging Interpretation: Large Animal
- VCS 7215 Advanced Veterinary Diagnostic Imaging: Interventional Techniques Laboratory
- VCS 7216 Surgical Techniques in Herpetological Medicine
- VCS 7217 Herpetological Medicine Morbidity and Mortality
- CBS 7109 Advanced Macroscopic Anatomy
- PBS 7417 Pathogenesis of Infectious and Parasitic Agents
- CBS 7631 Biomedical Neuroscience
- CBS 7637 Biomedical Physiology 1

8.5. Research and Study Plan

The research component of the doctoral program consists of original research, presentations at departmental seminars and scientific meetings, publication of papers, and the preparation and defense of a dissertation. Students are expected to conduct laboratory and library research even when courses are in progress because learning how to apportion their effort is a key element of the training. The emphasis will be on research, however, and the time available for research will increase each year.

To ensure a timely progression to graduation, a study plan and research outline should be submitted to the student's GAC by the start of their second year. Students must provide an outline of the courses taken, grades received in these courses, future courses, and a research proposal as outlined in Appendix F. Additionally, the program of study proposal should include the student's program objectives, course schedule, and teaching and clinical responsibilities, if any. The research proposal is not anticipated to be a polished document at this stage but will serve as a guide for future research and practice for preparation of the written portion of the General Exam. This plan will be discussed, amended (if necessary), and approved by the student's GAC.

Each PhD student should receive exposure to the basic area of knowledge necessary for his/her future performance as a well-trained Doctor of Philosophy, including adequate knowledge in the field of biomedical and veterinary medical sciences as well as in-depth knowledge in the selected areas of specialization. The research emphasis will be directed towards the area of expertise of the Graduate Research Mentor and members of the Graduate Advisory Committee.

8.6. Teaching Requirement

Currently, there are no teaching requirements for obtaining a PhD in biomedical and veterinary medical sciences. However, whenever possible, students are encouraged to obtain teaching experience in one of the professional courses administered by the department or other opportunities if they become available.

8.7. Publication Requirement

All candidates for the PhD degree must have at least one primary authored, peer-reviewed research publication prior to scheduling the Final Defense. The manuscript must be "*Published*," "*Accepted*," "*Minor revision*," or "*In Press*". Research publications that are not focused primarily on the research project covered by the dissertation, review articles, and commentaries are not acceptable to fulfill this requirement. In cases of sponsor limitations or embargo, publication requirements can be appealed with documentation to the GPC with final approval from the GPC and Department Head.

8.8. Dissertation

A clear, well-written dissertation based on the student's original research is part of the requirement for a PhD. The dissertation is prepared by the student with guidance and advice from the GAC. Upon completion of writing the dissertation, the student should provide copies to all members of the GAC. The dissertation must demonstrate a contribution to the student's major field of study and a mastery of research techniques. It is expected that the primary substance of the study will be published in a journal of international repute and that the student will present his/her research findings at regional, national, or international meetings. The format of the dissertation must be in accordance with the instructions available on the LSU website (https://www.lsu.edu/graduateschool/current_students/theses_and_dissertations/index.php).

Upon approval by the student's GAC, the Request for Final Doctoral Defense will be filed following the deadlines listed on the Graduate School calendar. At least three weeks prior to the scheduled date of the examination, the request for the student's final examination must be submitted by the graduate student to the GA for signature. The student will then send the signed application to the Graduate School and copy the GA and Mentor. Before the Final Defense, the student is required to present a final research seminar open to all faculty, students, and staff of the institution. In this seminar, the student will present an overview of his/her doctoral research. The Final Defense will focus on the dissertation research and the dissertation itself. The student is expected to

answer questions about the work, defend the validity of the conclusions, and discuss suggestions for revisions to improve clarity.

The Final Defense examines the procedure, content, and student's understanding of the work presented in the dissertation. This examination may extend into subject matter related to or distant from the dissertation. The final examination must be advertised to the university community. The formal presentation and question session are open; however, the oral exam following the end of the open examination is only open to the student's GAC and graduate faculty. After the student has answered questions about the dissertation, the GAC will meet in a closed session to discuss and evaluate the disposition of the degree, including any revisions that may be necessary. The outcome of the Final Defense is assessed according to the Graduate School guidelines (<https://catalog.lsu.edu/content.php?catoid=27&navoid=2434#final-examination>). Voting to accept the dissertation (with all recommended revisions) will be by ballot, with no more than one negative vote permitted. Once the student has passed the Final Defense, he/she will be certified to the Graduate Faculty and Dean of Graduate Studies as having met all requirements for the degree of Doctor of Philosophy in Biomedical and Veterinary Medical Sciences.

APPENDIX A: DESCRIPTION OF COURSES

CBS Department

CBS 7002 Research Techniques in Comparative Biomedical Sciences (1-4) F,S,Su. May be taken for a maximum. of 8 hours of credit when topics vary. Specialized research techniques related to selected scientific disciplines in the department.

CBS 7003 Special Topics in Comparative Biomedical Sciences (1-4) F,S,Su. May be taken for a maximum. of 8 hours of credit when topics vary. Specialized coverage of a variety of topics related to selected scientific disciplines in the department. (i.e. Immunotoxicology, Inhalation Toxicology. Taught on an as-needed basis)

CBS 7005 Seminar Series & Publications Study in Comparative Biomedical Sciences (1) F,S. Combines seminars by invited speakers from various biomedical fields with journal club discussions/presentations of the guests and other assorted writings. Presentations will focus on context of the published studies, methods used, major (significant) findings, authors' conclusions, strengths and limitations of the research, and opportunities for further investigation.

CBS 7104 Biomedical Cell and Molecular Biology (3) F. Prerequisite: Consent of instructor. Essential concepts of cell and molecular biology; cellular ultrastructure and function; basic genetic mechanisms in normal and transformed cells; methods of gene analysis; proteomics; molecular therapy and molecular approaches to disease diagnosis.

CBS 7108 Critical Analysis in Molecular Biology/Medicine (3) F. Prerequisite: Consent of instructor. Formal presentations of research data. Discussion and presentations are drawn from landmark biomedical publications.

CBS 7109 Advanced Macroscopic Anatomy (1-3) V. Prerequisite: Consent of instructor. May be repeated for credit when topics vary. Specialized dissection of one or more of the following: dog, horse, ruminants, laboratory, exotic, or avian species.

CBS 7112 Advanced Microscopic Anatomy (1-3) V. Prerequisite: Consent of instructor. May be repeated for credit when topics vary. Comparative or systemic microscopic anatomy of selected organs or organ systems of domestic, laboratory, or exotic species.

CBS 7200 Basic and Applied Anatomy 1 (4) F. Permission of department. Principles of macroscopic anatomy, basic structure, and applied anatomy of the bones, muscles, and joints of the thoracic limb, pelvic limb, and trunk; dissection of the dog, with relevant comparisons to the horse and domestic ruminants.

CBS 7201 Basic and Applied Anatomy 2 (3.5) F. Permission of department.

Introduction to the nervous system; anatomy of the blood vessels and nerves of the thoracic and pelvic limb, the equine digit; comparative anatomy of the head, including the skull and mandible, nasal cavity and paranasal sinuses, ear, oral cavity, teeth, larynx, cranial nerves, surface of the brain and its coverings, and blood supply.

CBS 7202 Basic and Applied Anatomy 3 (4) S. Permission of department. Anatomy of the neck and trunk, thoracic and pleural cavities, thoracic viscera; introduction to the autonomic nervous system; the abdominal wall, abdominal viscera, pelvic cavity, and viscera of the urinary and reproductive systems of domestic animals.

CBS 7205 Cell Biology (2) F. The molecular and cellular basis of animal health and diseases, and how the structure and functions of cells may be inherently related to those of tissues and organs.

CBS 7206 Microscopic Anatomy (4) F. The histology of the basic tissues of the body and the microscopic anatomy of the organ systems in domestic mammals with consideration of the organ-specific microscopic structures covering the respiratory and urogenital organs, digestive system, defense and sensory organs, and skin.

CBS 7207 Developmental Morphology (1) S. The pre- and postnatal development of tissues, primitive transient and permanent structures, and the organ systems in domestic mammals (primarily cat, dog, horse, and domestic ruminants) starting at fertilization; including applied developmental knowledge of problems the mother and newborn might encounter after birth.

CBS 7208 Responsible Conduct of Research (1) F. Permission of Instructor. Instruction in Responsible Conduct of Research (RCR) that focuses on research misconduct.

CBS 7209 Discussions in Air Pollution (1) F, S. Review of recent advances in the scientific literature in air pollution research, with special emphasis on particulate matter, environmentally persistent free radicals (DFPRs) and other forms of air pollution. Students will be expected to make presentations of current literature related to the field of study.

CBS 7210 Inhalation Toxicology (1) S. Permission of Instructor. The students will learn about the major lung diseases caused by inhaled environmental pollutants and their physico-chemical properties, allowing for a better understanding of the current methods in inhalation toxicology, including study design and inhalation toxicity assessment. Students will be expected to participate in group activities during class and to take the written exams.

CBS 7603 Clinical Toxicology (3) F. Prerequisite: CBS 7630 and consent of instructor. Pathophysiology of various clinically important toxicants; prevention, diagnosis, and treatment of common intoxications in domestic animals.

CBS 7630 Biomedical Pharmacology (4) F. Prerequisite: vertebrate physiology, biochemistry, or equivalent; consent of instructor. 4 hours lecture. Comparative study of the pharmacodynamics, disposition, kinetics, and therapeutic utility of drugs in animals.

CBS 7631 Biomedical Neuroscience (3) S. Prerequisite: consent of instructor. 1 hour lecture; 2 hours lab. Physiological and anatomical mechanisms underlying the nervous system.

CBS 7637 Biomedical Physiology 1 (1) S. Focuses on the physiology of Skeletal Muscle, Cardiovascular and Respiratory System. Section 1 introduces basic concepts in cellular physiology and skeletal muscle physiology. Section 2 introduced students to different parts of the cardiovascular system including blood and its constituents. Section 3 deals with respiratory gas exchange and how this is regulated during homeostasis and how it is altered in disease.

CBS 7638 Biomedical Physiology 2 (2) F. In-depth exploration of endocrinology, gastrointestinal (GI, renal, and reproductive systems, crucial for students aiming to develop a profound understanding of these vital aspects of human and animal physiology. This course is an essential stepping stone for students aspiring to careers in health, medicine, and related scientific fields. This course provides the foundational knowledge necessary for advanced study and biomedical research in these areas.

F-Fall; S-Spring; Su-Summer; V-Varies

PBS Department

PBS 7002 Pathobiological Sciences Research Techniques (1-4) Specialized research techniques related to a specific discipline of pathobiological sciences.

PBS 7004 Current Literature in Pathobiological Sciences (1) F,S. Review of the literature in areas of pathobiological sciences presented in a discussion format.

PBS 7005 Grant Writing (2) S. This course will provide an introduction to the basic skills, principles and techniques of successful grant writing.

PBS 7007 Seminar (1) F,S. Research presentations by visiting scientists. Presentations center around infectious disease research in the fields of bacteriology, virology, immunology, parasitology and pathology.

PBS 7103 Advanced Microscopy (2) Course covers transmitted and reflected light, confocal, spinning disc, 2-photon and TEM and SEM electron microscopy. Lecture knowledge followed by practical lab.

PBS 7310 Zoonotic Infectious and Parasitic Diseases (3) Epidemiology, ecology and control of major infectious and parasitic zoonoses.

PBS 7312 Concepts in Epidemiology (4) S. Introduction to the basic concepts of epidemiology with emphasis on the appropriate use and interpretation of epidemiological methods.'

PBS 7389 Fundamental Immunology (3) S. This course is designed to provide the student with fundamental concepts of immunology, with a focus on molecular and cellular biology.

PBS 7413 Techniques in Flow Cytometry (1) Instruction and laboratory practices in principles and applications of flow cytometry; topics include cell processing and staining with fluorescent probes as a measurement of immunophenotyping, DNA and functional assays as well as computer generated data analysis.

PBS 7415 Current Experimental Methods in Parasitology (1-4) Specialized laboratory methods used to produce experimental infections, diagnose parasitism and recover and identify protozoan and helminth parasites of ruminants, horses, pigs and companion animals.

PBS 7417 Pathogenesis of Infectious and Parasitic Agents (1-4) Introduction to the mechanisms of pathogenesis, pathology and host immune interactions of viral, bacterial and parasitic disease agents.

PBS 7419 Population Dynamics and Ecology of Parasitic and Vector-Borne Diseases (3) Population regulation and distribution of parasitic and vector-borne diseases of veterinary and medical significance; disease risk in populations and control strategies based on population models, transmission dynamics, climate, nutrition, immunity, geographic information systems and herd health programs.

PBS 7424 Diseases of Aquatic Animals (3) Basic microbiology and/or parasitology strongly recommended.

PBS 7435 Structural Biology and Drug Discovery (3) F. This course covers fundamental information needed for drug design based on the structure of macromolecules. Course coverage will include structural determinants, the relationship of structure to function, and the thermodynamics of protein interactions. Advanced

computational methods, including docking, protein-protein interactions, and protein modeling, will be covered. Different drug design approaches are covered, such as enzyme-based, receptor-based, and protein-protein interaction inhibitors. This course is intended to provide in-depth knowledge of protein structure, function, and its relevance to drug design and discovery.

PBS 7501 Veterinary Cellular Pathology (3) Basic mechanisms of pathogenesis and morphogenesis of disease at the cellular level; encompasses ultrastructural to functional pathologic changes in cells and extracellular matrix.

PBS 7502 Advanced Systemic Veterinary Pathology (5) Study of diseases by organ systems, using electron and light microscopy; pathogenesis of specific diseases.

PBS 7508 Histopathology Slide Conference (1) Histopathological aspects of diseases in various animal species; direct student participation in morphological description and literature review.

PBS 7509 Surgical Pathology (1-2) Gross and microscopic examination of surgery-derived specimens of diseased tissues from various animals; clinical case interpretation, histopathological description, diagnosis, prognosis and consultation techniques.

PBS 7514 Laboratory Animal Pathology (2) Macroscopic, microscopic and pathogenetic study of the infectious, nutritional, degenerate and toxic diseases that affect the commonly used species of laboratory rodents, rabbits and primates.

PBS 7515 Veterinary Dermatopathology (2) Histopathological evaluation of integumentary system, tissue response and diseases of various animal species of veterinary importance.

PBS 7516 Advanced Diagnostic Pathology of Animals (1-2) Necropsy of various animals submitted for postmortem examination: gross, light and electron microscopy; and immunohistochemistry; correlation and synthesis of clinical information, anatomical findings and other ancillary laboratory results, for an accurate determination of disease diagnosis and pathogenesis.

PBS 7525 Advanced Veterinary Clinical Pathology (1-2) Diagnosis and pathogenesis of hematological and clinical chemistry changes in blood from various animal species; understanding the applicable instrumentation and methodologies of assays and quality assurance; interpretation of cytological specimens (tissue and fluids) and correlation with clinical and histopathological findings.

PBS 7530 Laboratory Animal Science I (2) Biology, husbandry, diseases, medical care, regulations and experimental uses of the commonly used laboratory animal species; courses need not be taken in sequence.

PBS 7531 Laboratory Animal Science II (2) Biology, husbandry, diseases, medical care, regulations and experimental uses of the commonly used laboratory animal species; courses need not be taken in sequence.

PBS 7535 Introduction to Bioinformatics and NGS Data Analysis (2) This course introduces bioinformatics for biomedical sciences, with a focus on the analysis of Next-Generation Sequencing (NGS) data. Students will learn to analyze genomics and transcriptomics data, including techniques such as RNA-Seq (bulk RNA-seq, single-cell RNA-seq, and spatial transcriptomics), ChIP-Seq, and multi-omics sequencing. They will also develop programming skills using R, Bioconductor, and Python for advanced NGS data analysis.

PBS 7538 Advanced Immunology (3) F. The course covers central topics in immunology for students who already have basic knowledge of immunology. Advanced immunology topics are integrated to understand the innate and adaptive immune processes based on the current cellular and molecular mechanisms modulating the host defense. The course material is based on relevant research.

VCS Department

VCS 7001 - Seminar: Veterinary Clinical Sciences (1) New developments in veterinary internal medicine, surgery, dermatology, ophthalmology, cardiology, neurology, theriogenology and laboratory/exotic animal medicine.

VCS 7002 - Research Techniques in Veterinary Clinical Sciences (1-4) Specialized research techniques related to a specific discipline of veterinary clinical sciences.

VCS 7004 Clinical Biostatistics for the Animal Scientist I (4) F. The biostatistics courses provide graduate students in veterinary medicine and animal sciences with an opportunity to learn common tools used in epidemiology and biostatistics to answer the questions posed by their research. The material is focused on animal-related examples to ensure the material is relevant to the studies of the graduate students. Clinical Biostatistics for the Animal Scientist 1 will focus on nonparametric statistics. The course will have the students bring their own research examples into the course so that they can build confidence analyzing their data and presenting it to their peers. This course is open to any student who may benefit from its content.

VCS 7005 Clinical Biostatistics for the Animal Scientist II (3) S. The biostatistics courses provide graduate students in veterinary medicine and animal sciences with an opportunity to learn common tools used in epidemiology and biostatistics to answer the questions posed by their research. The material is focused on animal-related examples to ensure the material is relevant to the studies of the graduate students. Clinical Biostatistics for the Animal Scientist 2 will focus on parametric statistics. The course will have the students bring their own research examples into the course so that they can build confidence analyzing their data and presenting it to their peers. This course is open to any student who may benefit from its content.

VCS 7201 Veterinary Gastroenterology (2) Gastrointestinal diseases and related conditions; emphasis on diagnostics, pathophysiology and management options.

VCS 7202 Veterinary Surgical Techniques (1) Advanced surgical and experimental techniques related to an organ system.

VCS 7204 Advanced Veterinary Orthopedics (2) Bone, muscle, tendon, and ligament diseases with emphasis on pathophysiology, diagnostics and management options.

VCS 7205 Advanced Veterinary Clinical Neurology (2) Diseases of the central and peripheral nervous system with emphasis on pathophysiology, diagnostics, neurosurgery and other management options.

VCS 7206 Advanced Veterinary Urogenital Disease (2) Urinary and reproductive tract diseases and related conditions with emphasis on pathophysiology, diagnostic and management options.

VCS 7208 Advanced Veterinary Cardiovascular Disease (2) Cardiovascular diseases and related conditions with emphasis on pathophysiology, diagnostic and management options.

VCS 7209 Advanced Veterinary Respiratory Disease (2) Respiratory diseases and related conditions with emphasis on pathophysiology, diagnostic and management options.

VCS 7210 Veterinary Scientific Journal Review (1) In depth critique of current veterinary journals with emphasis on appraising experimental design and analysis; and interpretation and application of results.

VCS 7211 Advanced Veterinary Cardiorespiratory Disease (3) Cardiovascular and respiratory diseases and related conditions with emphasis on pathophysiology, diagnostic and management options.

VCS 7212 Biomechanics of Fractures and Fracture Fixation (3) Principles of biomechanics as applied to fractures and fracture fixation, including design and biomechanical testing devices for fixation of bone fractures arising in veterinary orthopedic surgery.

VCS 7213 Advanced Veterinary Diagnostic Imaging Interpretation: Small Animal

(3) Advanced training in radiographic, ultrasonographic, computed tomographic and magnetic resonance imaging examination interpretation in common small animal diseases.

VCS 7214 Advanced Veterinary Diagnostic Imaging Interpretation: Large Animal

(3) Advanced diagnostic imaging interpretation of radiographic, computed tomography, ultrasonographic, scintigraphic and magnetic resonance imaging examinations in large animals.

VCS 7215 Advanced Veterinary Diagnostic Imaging: Interventional Techniques

Laboratory (2) Interventional tissue sampling and therapeutic guided procedures performed with fluoroscopy, computed tomography (CT), and ultrasonography (US) in animals.

VCS 7216 Surgical Techniques in Herpetological Medicine (3) The course will combine didactic lectures with hands on laboratory sessions in herpetological medicine with primary focus on surgery and endoscopy. This course will provide exposure to the most relevant reptile and amphibian groups.

VCS 7217 Herpetological Medicine Morbidity and Mortality Review (2) The course will provide a mentored forum for students to discuss and review clinical cases in herpetological medicine. An in-depth analysis and discussion of case examples in herpetological medicine will be carried out with the goal of ensuring that students can perform a critical review of cases, determine alternative pathways for each case and review the case outcomes.

VCS 7300 How People Learn (3) Emphasis on social and psychological factors affecting adult motivation and learning; defining techniques for adult learning experiences.

VCS 7301 Curriculum Design and Program Evaluation for Healthcare Education

(3) Create and evaluate curriculum for a healthcare education program. Emphasis on principles of evaluation, curriculum design, and continuous quality improvement.

VCS 7302 Student Assessment in Healthcare Professions Education (3) Analyze principles for design and management of learner assessment in healthcare education.

Emphasis on healthcare education assessment, analysis and organization of assessment data as aligned with program evaluation.

VCS 7303 Pedagogical Principles and Best Practices of Teaching and Learning in Healthcare Education (3) Evaluate foundational principles of learning theory and criteria for research and scholarship in healthcare education.

VCS 7304 Educational Technology in Healthcare and Education (3) Evaluate foundational principles of learning theory and criteria for research and scholarship in healthcare education.

VCS 7305 Education Practicum and Current Issues in Healthcare Education: Capstone Project (1) Demonstration of the application of knowledge and skills acquired throughout the THCP program.

[COURSES AVAILABLE IN OTHER DEPARTMENTS (This is not an exhaustive listing of all courses)]

ANTH 4010 Human Osteology (3)

ANTH 4040 Physical Anthropology (3)

ANTH 2014 Introduction to Forensic Anthropology (discussion to be developed into the graduate course) (3)

BE 4337 Regenerative Medicine (3)

BIOL 3152/7152 Advanced Comparative Anatomy (4)

BIOL 3156/7156 Developmental Zoology (4)

BIOL 4087 Basic Biochemistry (4)

BIOL 4093 General Biochemistry I (3)

BIOL 4094 General Biochemistry II (3)

BIOL 4097 Biochemistry of Aging (3)

BIOL 4110 Introductory Microbial Physiology (3)

BIOL 4141 Mammalogy (4)

BIOL 4142 Ornithology (4)

BIOL 4145 Ichthyology (4)
BIOL 4146 Herpetology (4)
BIOL 4170 Comparative Animal Physiology (3)
BIOL 4160 Vertebrate Physiology (3)
BIOL 4161 Vertebrate Phyl Lab (1)
BIOL 4177 Neurobiology (3)
BIOL 4400 Molecular Genetics Laboratory (3)
BIOL 4596 Biophysics of Macromolecules (3)
BIOL 4800 Introductory Bioinformatics (3)
BIOL 7284 Chemistry of Proteins (3)
BIOL 7800 Neurophysiology (2-4)
BIOL 7800 Cell Biol of Nucleus (2-4)
BIOL 7800 Epigenetics (2-4)
BIOL 7901 Sem Neuroscience (1)
BIOL 7901 Microbiology Topics Seminar (1)
CHEM 7750 Introduction to Chemical Biology (3)
ENVS 4477 Envir Tox: Intro & A (3)
ENVS 7110 Toxiclgy Aquatc Envr (3)
ENVS 7626 Genetic Toxicology (Toxicology IV) (3)
KIN 3514 Biomechanical Basis of Kinesiology (3)
KIN 4519 Cadaver Dissection (3)
KIN 7501 Advanced Research Methods (3)
KIN 7504 Tests and Measurements in Kinesiology (3)

APPENDIX B: CHECKLIST FOR COMPLETION MS WITHOUT RESIDENCY

(BASED ON 2 YEAR COMPLETION)

MATRICULATION DATE: _____

TO MEET GUIDELINES:

BY THE END OF SEMESTER 1

____ Choose Graduate Research Mentor

____ Written request to the Department Head and Graduate Program Committee for Graduate Research Mentor assignment.

BY THE END OF SEMESTER 1

____ Choose Graduate Advisory Committee

____ Written request to the Department Head and Graduate Program Committee of formal Graduate Advisory Committee assignment.

BY THE END OF YEAR 1

____ Identify a research problem

____ Prepare a research proposal

____ File a study plan with the Graduate Program Committee

____ Have research proposal approved by Graduate Advisory Committee

____ Present first seminar

COMPLETION OF CORE REQUIREMENTS:

VMED 7004 (semester): _____

PBS 7003 (semester): _____

CBS 7104 (semester): _____; _____

STATISTICS (semester): _____

SEMINARS (dates): _____; _____

ANNUAL MEETINGS WITH Graduate Advisory Committee (dates): _____;

TO PREPARE FOR GRADUATION:

CHECK WITH THE GRADUATE SCHOOL FOR DATES AND TIMES OF DEADLINES:

Deadline for application for degree: _____

Deadline for request for final examination: _____

Deadline for Examination Report and

Submission of Approved Thesis: _____

Graduation: _____

GRADUATION CHECKLIST:

____ Complete course work and get approval from Graduate Advisory Committee and the Graduate School

____ Complete research project

____ Set date for final examination with Graduate Advisory Committee

____ Set date for final seminar with department Seminar Advisor

____ File *Application for Degree* with the Graduate School

____ File *Request for Final Exam* with Department Head and the Graduate School

____ Complete thesis and distribute to members of Graduate Advisory Committee three weeks before examination

____ Present Thesis Seminar

____ Defend thesis

____ Make all thesis corrections and submit thesis and *Committee Examination Report* to the Graduate School

____ Submit four hard copies of thesis to department for binding

APPENDIX C: CHECKLIST FOR COMPLETION MS COMBINED WITH DVM RESIDENCY

(BASED ON A 3 YEAR COMPLETION)

MATRICULATION DATE: _____

TO MEET CBS GUIDELINES:

BY THE END OF SEMESTER 1

____ Choose Graduate Research Mentor (written request to both the Department Head and the Graduate Program Committee for assignment of a Graduate Research Mentor.)

____ Choose Graduate Advisory Committee (inform both the Department Head and the Graduate Program Committee of the Graduate Advisory Committee membership in writing.)

BY THE END OF YEAR 1

____ Identify a research problem

____ Prepare a research proposal

____ File a Program of Study with the Graduate School

____ Have research proposal approved by Graduate Advisory Committee

____ Present first seminar

ANNUAL MEETINGS WITH Graduate Advisory Committee (dates): _____;
_____;

COMPLETION OF CORE REQUIREMENTS:

VMED 7004 (semester): _____

CBS7108 (semester): _____

CBS7104 (semester): _____

SEMINARS (dates): _____;

ANNUAL MEETINGS WITH Graduate Advisory Committee (dates): _____;

TO PREPARE FOR GRADUATION:

CHECK WITH THE GRADUATE SCHOOL FOR DATES AND TIMES OF DEADLINES:

Deadline for application for degree: _____

Deadline for request for final examination: _____

Deadline for Examination Report and Submission of Approved Thesis: _____

Graduation: _____

GRADUATION CHECKLIST:

____ Complete course work and get approval from Graduate Advisory Committee and the Graduate School

____ Complete research project

____ Set date for final examination with Graduate Advisory Committee

____ Set date for final seminar with CBS Seminar Advisor

____ File *Application for Degree* with the Graduate School

____ File *Request for Final Exam* with Department Head and the Graduate School

____ Complete thesis and distribute to members of Graduate Advisory Committee three weeks before examination

____ Present Thesis Seminar

____ Defend thesis

____ Make all thesis corrections

____ Submit thesis and *Committee Examination Report* to the Graduate School

____ Submit four hard copies of thesis to department for binding

APPENDIX D: CHECKLIST FOR COMPLETION PhD WITHOUT RESIDENCY
(BASED ON A 4 YEAR COMPLETION)

MATRICULATION DATE: _____

TO MEET GUIDELINES:

BY THE END OF YEAR 1

____ Choose Graduate Research Mentor

Student sends a written request to the Department Head and informs the Graduate Program Committee of formal Graduate Research Mentor assignment

BY THE END OF YEAR 1

____ Choose Graduate Advisory Committee

Student sends a written request to the Department Head and informs the Graduate Program Committee of formal Graduate Advisory Committee assignment.

BY THE END OF YEAR 2

____ Identify a research problem

____ Prepare study and research proposal and have both approved by Graduate Advisory Committee

____ File a *The Program of Study for the Doctoral Student* form with the Graduate School

____ Present first seminar

____ Complete course requirements

____ Submit "*Request for General Examination*" to Department Head 4 weeks before the examination date

____ Complete General Examination

Note: The Graduate School requires that the General Examination be taken within 36 months of matriculation and at least two semesters before graduation. Check with the Graduate School for deadlines.

COMPLETION OF CORE REQUIREMENTS:

VMED 7004 (semester); _____

CBS 7108 (semester): _____

PBS 7005 (semester): _____

Statistics (semester): _____

CBS 7104 (semester): _____

SEMINARS (dates): _____; _____

TO PREPARE FOR GRADUATION:

CHECK WITH THE GRADUATE SCHOOL FOR DATES AND TIMES OF DEADLINES:

Deadline for application for degree: _____

Deadline for request for final examination: _____

Deadline for Examination Report and

Submission of Approved Dissertation: _____

Graduation: _____

GRADUATION CHECKLIST:

____ Complete course work and get approval from Graduate Advisory Committee and the Graduate School

____ Complete research project

____ Set date for final examination with Graduate Advisory Committee

____ Set date for final seminar with CBS Seminar Advisor

____ File *Application for Degree* with the Graduate School

____ File *Request for Final Exam* with Department Head and the Graduate School

____ Complete thesis and distribute to members of Graduate Advisory Committee three weeks before examination

____ Present Dissertation Seminar

____ Defend dissertation

____ Make all dissertation corrections

____ Submit dissertation and *Committee Examination Report* to the Graduate School

APPENDIX E: CHECKLIST FOR COMPLETION PhD WITH RESIDENCY
(BASED ON A 5 YEAR COMPLETION)

MATRICULATION DATE: _____

TO MEET GUIDELINES:

BY THE END OF THE YEAR 1

____ Choose Graduate Research Mentor (written request to both the Department Head and the GA for assignment of a Graduate Research Mentor).

____ Choose Graduate Advisory Committee (inform both the Department Head and the Graduate Program Committee of the membership in writing).

BY THE END OF YEAR 2

____ Identify a research problem

____ Prepare a research proposal

____ File a Program of Study with the Graduate School

____ Have research proposal approved by Graduate Advisory Committee

____ Present first seminar

____ Complete course requirements

____ Submit "Request for General Examination" to Department Head 4 weeks prior to examination date

____ Schedule General Examination

COMPLETION OF CORE REQUIREMENTS:

VMED 7004 (semester): _____

CBS 7108 (semester): _____

PBS 7005 (semester): _____

Statistics (semester): _____

CBS 7104 (semester): _____

SEMINARS (dates): _____; _____

TO PREPARE FOR GRADUATION:

CHECK WITH THE GRADUATE SCHOOL FOR DATES AND TIMES OF DEADLINES:

Deadline for application for degree: _____

Deadline for request for final examination: _____

Deadline for Examination Report and

Submission of Approved Dissertation: _____

Graduation: _____

GRADUATION CHECKLIST:

____ Complete course work and get approval from Graduate Advisory Committee and the Graduate School

____ Complete research project

____ Set date for final examination with Graduate Advisory Committee

____ Set date for final seminar with department Seminar Advisor

____ File *Application for Degree* with the Graduate School

____ File *Request for Final Exam* with Department Head and the Graduate School

____ Complete dissertation and distribute to members of Graduate Advisory Committee four weeks before examination

____ Present Dissertation Seminar

____ Defend dissertation

____ Make all dissertation corrections

____ Submit dissertation and *Committee Examination Report* to the Graduate School

____ Submit four hard copies of the dissertation to CBS for binding

APPENDIX F: FORMAT OF DISSERTATION PROPOSAL

The study plan, which includes a brief biographical sketch, publications, courses taken and grades, proposed course work, and dissertation research proposal should be presented to the Graduate Advisory Committee as early in the program as possible. The research proposal should follow NIH R21 format. A copy of the study plan should be provided to the Graduate Student Affairs Committee and each member of the Graduate Advisory Committee at least two (2) weeks before the Graduate Advisory Committee meeting and should use the following format:

1. Title page
2. Brief biographical sketch (1 page)
3. Publications and presentations
4. List of courses taken and grades or a copy of transcript(s)
5. Planned course schedule
6. Proposal

6.1. *Project Summary* - The proposal must contain a project summary (abstract). The project summary itself should be approximately 250 words. The project summary should be a self-contained, specific description of the activity to be undertaken and should focus on:

- Overall project goal(s), hypothesis and supporting objectives
- Plans to accomplish project goal(s).

6.2. *Specific Aims (1 page)* - State concisely the goals of the proposed research and summarize the expected outcome(s), including the impact that the results of the proposed research will exert on the research field(s) involved. List succinctly the specific objectives of the research proposed, e.g., to test a stated hypothesis, create a novel design, solve a specific problem, challenge an existing paradigm or clinical practice, address a critical barrier to progress in the field, or develop new technology.

6.3. *Research Strategy (6 pages)*

6.3.1. *Review of the Literature.* A concise summary of the historical and current literature pertinent to the research project should be included. The most significant published work in the field under consideration should be reviewed. The current status of research in this field of science should also be described.

Preliminary data pertinent to the proposed research should be included in this section. All work cited should be referenced.

6.3.2. Rationale and Significance. Concisely present the rationale behind the proposed research. Any novel ideas or contributions that the proposed project offers should also be discussed in this section.

6.3.3 Research Methods. This section must include:

- A clearly stated hypothesis
- A description of the investigations and/or experiments proposed in the sequence in which the investigations or experiments are to be performed
- Techniques to be used in carrying out the proposed project, including the feasibility of the techniques
- Results expected
- Means by which experimental data will be analyzed or interpreted
- Pitfalls and limitations of proposed procedures, with alternative procedures identified
- A tentative schedule for conducting major steps involved in these investigations and/or experiments

6.4. References – The proposal should contain the complete citations for all references, including titles, and should conform to an accepted journal format.

APPENDIX G: STUDENT EVALUATION FORM

Student Name: _____

Research Mentor: _____

Date: _____

Degree Sought: _____

Overall Progress (Circle one):

Satisfactory

Needs Improvement

Unsatisfactory

Academic Progress:

Research Progress:

Presentations Given:

Student Graduate Research Mentor

Graduate Student Affairs Committee Department Head

APPENDIX H: STUDENT ASSESSMENT RUBRIC

Assessment Rubric for MS

Student: _____ **Department:** _____ **Date:** _____

For This Assessment Type:	Complete These Objectives:				
	Objective 1	Objective 2	Objective 3	Objective 4	Objective 5
Final Exam-Defense of Thesis (MFE)	X	X	X	X	X
Comprehensive Research Plan (CRP)	X	X	X	X	X
Research Discussions (RD)	X	X	X	X	X
Oral Presentation/Seminar (OP)	X	X	X	X	X

Assessment scale: 0=Unacceptable; 1=Below Average; 2=Average; 3=Good; 4=Superior (upper 5%); NA

Objective 1. Level of Knowledge

- _____ 1a. Basic background understanding
 _____ 1b. Depth of understanding
 _____ 1c. Level of critical thinking

Objective 2. Research Technology

- _____ 2a. Understanding of technology used
 _____ 2b. Mastery of technology used

Objective 3. Development of Research Plan

- _____ 3a. Completeness of the background
 _____ 3b. Soundness of the rationale for the study
 _____ 3c. Uniqueness of the question
 _____ 3d. Hypothesis is clear
 _____ 3e. Experimental plan is complete
 _____ 3f. Statistical analysis is appropriate
 _____ 3g. Feasibility of the research

Objective 4. Communication

- _____ 4a. Oral communication skills
 _____ 4b. Written communication skills

Objective 5. Professionalism and Ethics

- _____ 5a. Exhibition of professional courtesy
 _____ 5b. Understanding ethical aspects of profession

Comments:

Faculty Evaluator:_____

Please return to the department Graduate Advisor or Program Office.

Student: _____; **Department:** _____; **Date:** _____

This assessment is for Type: _____ (choose from GE, FE, MFE, CRP, RD, OP)

Assessment Type:	Complete These Objectives:				
	Objective 1	Objective 2	Objective 3	Objective 4	Objective 5
General Exam (GE , PhD)	X			X	X
Final Exam-Defense of Dissertation (FE , PhD)	X	X	X	X	X
Final Exam-Defense of Thesis (MFE , MS)	X	X	X	X	X
Comprehensive Research Plan (CRP)	X	X	X	X	X
Research Discussions (RD)	X	X	X	X	X
Oral Presentation/Seminar (OP)	X	X	X	X	X

Assessment scale: 0=Unacceptable; 1=Below Average; 2=Average; 3=Good; 4=Superior (upper 5%);
NA

Objective 1. Level of Knowledge (GE, FE, MFE, CRP, RD, OP)

	Basic background understanding
	Depth of understanding

Objective 2. Development of Research Plan (FE, MFE, CRP, RD, OP)

	Completeness of the background
	Soundness of the rationale
	Uniqueness of the question
	Hypothesis is clear
	Experimental plan is complete
	Statistical analysis is appropriate
	Feasibility of the research

Objective 3. Research Technology (FE, MFE, CRP, RD, OP)

	Understanding of technology used
	Mastery of technology used

Objective 4. Communication (GE, FE, MFE, CRP, RD, OP)

	Oral communication skills
	Written communication skills

Objective 5. Professionalism and Ethics (GE, FE, MFE, CRP, RD, OP)

	Exhibition of professional courtesy
	Understanding ethical aspects of profession

Comments:

Evaluator: _____; **Signature:** _____

Printed name:

APPENDIX I: ASSESSMENT SCORING CRITERIA

	Score			
Measure	1	2	3	4
Knowledge base	Demonstrates a beginning level of knowledge of the field of research with little evidence of relevant factors.	Demonstrates a limited level of knowledge of the field of research with some evidence of relevant factors.	Demonstrates an advanced level of knowledge of the field of research with evidence of most relevant factors.	Demonstrates a clear and in-depth level of knowledge of the field of research with evidence of all relevant factors.
Research plan	Proposes a solution and/or hypothesis that is difficult to evaluate and which indirectly addresses the problem.	Proposes a solution and/or hypothesis that is predetermined (not individually designed) and indicates a comprehension of the problem including an understanding of logical, scientific and ethical aspects.	Proposes solutions and/or hypotheses that are individually designed and indicate advanced comprehension of the problem including an understanding of logical, scientific and ethical aspects.	Proposes solutions and/or hypotheses that are individually designed and indicate a deep comprehension of the problem including sound understanding of logical, scientific and ethical aspects.
Laboratory methodology	Demonstrates a lack of knowledge and ability to implement laboratory methods and techniques.	Demonstrates a limited knowledge of and ability to implement some laboratory methods and techniques.	Demonstrates a knowledge of and ability to implement most relevant laboratory methods and techniques.	Demonstrates a clear knowledge of and ability to implement all relevant laboratory methods and techniques.

Results presentation	Dissertation/Thesis requires major revision extensive editing. Results are presented orally at a departmental venue. Poster may be acceptable for presentation at Phi Zeta Research Emphasis Day or other professional venue. Results are not publishable.	Dissertation/Thesis requires revision and extensive editing. Results are presented orally at departmental or professional venues. Poster is presented at Phi Zeta Research Emphasis Day or other professional venue. Results may be considered for publication.	Dissertation/Thesis is well written with substantial editing required. Results are presented orally at departmental and professional venues. Poster is presented at Phi Zeta Research Emphasis Day or other professional venue. Results are being submitted for publication in a professional journal.	Dissertation/Thesis is very well written with little need for editing. Results are presented orally at departmental and professional venues. Poster is presented at Phi Zeta Research Emphasis Day or other professional venue. Results are published in a professional journal.
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APPENDIX J: GRADUATE ADVISORY COMMITTEE FORM

Required Members: The Graduate Advisory Committee will consist of at least four (4) members including the Graduate Research Mentor, two of whom must be full members of the graduate faculty, and two of whom must be from the student's primary department. The Graduate Research Mentor must be a member of the departmental graduate faculty.

Additional Members: At least one member must be from outside the student's primary department. Non-department members of a committee may be from any department pertinent to the student's area of concentration. If the student and mentor feel that an individual from outside of LSU would be a valuable addition to a student's committee, a formal Administrative Approval Request that justifies the selection of the non-LSU member must be made in advance.

Student:

Name _____

Graduate Research Mentor: (must be a member of the departmental Graduate Faculty)

Name _____ Graduate Faculty Yes No

Rank _____ Full ____ Associate Member ____

Department _____ Chair ____ Co-chair

Graduate Advisory Committee Members:

Name _____ Graduate Faculty Yes No

Rank _____ Full ____ Associate Member ____

Department _____ Chair ____ Co-chair

Name _____ Graduate Faculty Yes No

Rank _____ Full ____ Associate Member ____

Department _____

Name _____ Graduate Faculty Yes No

Rank _____ Full ____ Associate Member ____

Department _____

Institution (if non-LSU) _____

Graduate Advisor _____

Signature

Date

Department Head _____

Signature

Date