

GRADUATE STUDENT HANDBOOK

COMPARATIVE AND EXPERIMENTAL MEDICINE

an intercollegiate graduate program at the University of Tennessee, Knoxville

2020–2021 ACADEMIC YEAR



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WELCOME

Welcome to the Comparative and Experimental Medicine (CEM) graduate program. We are pleased that you are interested in this exciting and unique multi-disciplinary graduate program at the University of Tennessee, Knoxville. The CEM program offers MS and PhD degrees in preparation for careers in the health sciences. It actively promotes the concept of “One Health, One Medicine” by emphasizing the comparative approach to the study of biomedical science.

The program is open to approved graduate students seeking biomedical training and is especially useful for individuals with, or working toward, professional degrees in the health sciences. The CEM program provides an opportunity to study disease processes common in animals and humans from a multi-disciplinary perspective. The scope of this intercollegiate program, which pools faculty resources from both veterinary and human medicine, is broadened by faculty members representing wide-ranging interests in biomedical disciplines and areas of the life sciences and forensic science. The interdisciplinary training environment includes such diverse support as facilities and personnel at the College of Veterinary Medicine, UT Medical Center at Knoxville, life sciences departments, Herbert College of Agriculture, College of Engineering, the Department of Nutrition, and the Department of Public Health.

I hope you will find this handbook useful if you are planning to pursue or are already pursuing a graduate degree in Comparative and Experimental Medicine. It contains basic information about policies and procedures in the graduate program, including curricula and degree completion requirements. We update this document periodically in light of changes instituted by the program or other administrative units.

We invite inquiries from individuals interested in being involved with the program as students, collaborators, faculty, or sponsors.



Stephen A. Kania, MS, PhD
Professor and Assistant Dean for Research & Graduate Studies

“We are committed to supporting the creation of equitable and inclusive spaces for students, faculty, and staff, with a focus on removing structural barriers and fostering an atmosphere in which every member of the campus community matters and belongs. We work to advance access, accountability, an inclusive campus climate, and equity while combating racism, bias, and discrimination.” [UT Division of Diversity and Engagement](#)

INTRODUCTION

In order to serve the mission and vision of the Graduate School and preserve the integrity of graduate programs at the University of Tennessee, Knoxville, information related to the process of graduate education in each department is to be provided for all graduate students. Based on best practices offered by the Council of Graduate Schools, it is important that detailed articulation of the information specific to the graduate degrees offered in each department/program be disseminated. The CEM Graduate Student Handbook does not deviate from established Graduate School policies noted in the [Graduate Catalog](#) but rather provides the specific ways in which those policies are carried out.

Purpose of the Handbook

The purpose of this handbook is to provide detailed information to graduate students and faculty on the degree program requirements, policies, and procedures within the Comparative and Experimental Medicine graduate program. Graduate students are expected to be aware of and satisfy all regulations governing their work and study at the university. More information on university regulations can be found in the [Graduate Catalog](#), [Hilltopics](#) university student handbook, and [Graduate Council Appeal Procedure](#).

Terms and Abbreviations

AAPC: Admissions and Academic Progress Committee for the CEM program

CC: Curriculum Committee for the CEM program

CEM: Comparative and Experimental Medicine Graduate Program

CGE: Center for Global Engagement at the University of Tennessee, Knoxville. Located at 1620 Melrose Avenue, Knoxville, TN 37996-3531, USA.

Credit Hours: the number of contact hours per week in a given course in a given semester

Director of Graduate Studies: Dr. Stephen A. Kania, Professor and Assistant Dean for Research & Graduate Studies

Major Professor: the main advisor/mentor on the student's faculty committee

Semester: the UT-established period for the duration of a course (normally fall, spring, and summer)

UT: University of Tennessee

UTCVM University of Tennessee College of Veterinary Medicine

UTIA: University of Tennessee Institute of Agriculture

UT Graduate School: the University of Tennessee Graduate School. The CEM program operates under the umbrella of the UT Graduate School, located at 111 Student Services Building, Knoxville, TN 37996-0211, USA.

Administration of the Program

Dr. James P. Thompson, Dean of the College of Veterinary Medicine, has executive administrative responsibility for the CEM program; Dr. David Anderson, Associate Dean for Research & Graduate Studies, provides oversight of the program; and Dr. Stephen Kania, Assistant Dean for Research & Graduate Studies, is the director of the program and is responsible for the program administration. As director, Dr. Kania holds the following responsibilities:

- Administering the CEM graduate program
- Serving as the contact person with the Graduate School
- Monitoring program admission and policies
- Working with program faculty on recruitment efforts
- Updating department graduate handbook yearly
- Tracking assistantships (types, amounts, and responsibilities for each position)
- Following up on CEM program/Graduate School/university awards and fellowships

Standing Committees

Admissions and Academic Progress Committee (AAPC)

The AAPC develops and applies standards for admitting and retaining well-qualified students who will benefit from graduate education, advance the interests of the degree program, and who will likely make important contributions to biomedical science. The specific responsibilities of the AAPC include:

- Annually review program-specific admissions requirements.
- Review applications and make applicant admission recommendations to the MS, PhD, and DVM-PhD CEM programs.
- Review student annual progress reports and make decisions regarding necessary corrective actions, probation, or dismissal from the program.

Curriculum Committee (CC)

The CC represents the CEM faculty. The purpose of the committee is to develop and maintain a curriculum and standards for performance evaluation that facilitate the training of scientists fully prepared for careers in biomedical science. The specific responsibilities of the CC include:

- Perform an annual evaluation of the curriculum examining individual course content, catalog descriptions, and core course requirements. Identify curricular redundancies and deficiencies.
- Consider requests for new courses and present requests to CEM faculty for approval.
- Identify courses not taught in four or more years, identify reasons for this hiatus, and either vote to remove the course from the catalog or seek CEM faculty input/participation to reengage the course.
- Establish syllabus requirements.
- Recommend examination formats and procedures for comprehensive examinations and thesis and dissertation defenses.

Contact Information

CEM Program Office:

A102 Veterinary Teaching Hospital
2407 River Drive
Knoxville, TN 37996-4550

Director: Dr. Stephen Kania, Professor and Assistant Dean for Research & Graduate Studies

Phone: (865) 974-5576

E-mail: skania@utk.edu

Contact: Kim Rutherford, Administrative Specialist

Phone: (865) 974-0227

Fax: (865) 974-4773

E-Mail: kimruth1@utk.edu

Guidelines for Students

Commitment to Program

Students are expected to fully participate in professional activities related to the program.

Adequate Preparation

With regard to learning in their respective courses, students have the responsibility to seek the information necessary to participate in classroom activity. Students should accept responsibility for adequate preparation for each class meeting, arriving for all classes able and willing to interact through classroom participation, testing, writing, in-class exercises, and other methods provided by the instructor. Basic to these activities is the need for students to employ appropriate resources, as assigned by the instructor, such as textbooks, other supplies, and outside reading materials.

Satisfying University Requirements

It is the student's responsibility to be aware of and follow guidelines, schedules, and deadlines provided by the CEM program, the Graduate School, the university, and instructors. All regulations must be satisfied in a timely fashion.

Guidelines for Faculty

Atmosphere for Teaching and Learning

It is important that the faculty member create from the beginning, and preserve, an atmosphere conducive to learning. Both teacher and student should feel that they have come together in the common cause of the pursuit of learning. Faculty members should ensure that their students are progressing through their course of study in a timely fashion.

Conducting a Course

It is the instructor's responsibility to organize class material as efficiently and effectively as possible at the beginning of each term of instruction. At the beginning of the semester, faculty members will distribute to students a syllabus that makes clear the basis of the final grade with regard to the value placed on each component of the course. The faculty member should set an example for students in being faithful in attendance and punctual in starting and ending classes. Students should be informed of all planned instructor absences as early as possible.

In presenting course content, the faculty member should endeavor at all times to adhere to the subject; the classroom should not be used as a theater for expression of personal views that are not germane to the course.

Guidelines for Major Professor (Primary Advisor/Mentor)

The major professor, in conjunction with the graduate committee, is primarily responsible for supervising and guiding the student's graduate program. This includes ensuring adequate funding for the student's research, stipend, and/or tuition; compliance with Graduate School and CEM program requirements and deadlines; timely progress through the student's program of study; and successful completion of the student's thesis/dissertation, with publication of the student's work as the first author in peer-reviewed scientific journals before or shortly after graduation. The major professor will act to best serve the research, education, and career development of the student.

ADMISSION REQUIREMENTS

Admission Types

UT offers several admission types. When applying to the Graduate School, students need to be certain they understand which type of admission applies to their situation. More detail is provided on the [Graduate Admissions](#) web page and in the [Graduate Catalog](#). Regardless of type, all applicants must apply through the [Office of Graduate Admissions](#).

- **Degree** – for those pursuing a graduate or professional degree.
- **Non-degree** – for those interested in taking graduate courses but not in a particular degree program.
- **Graduate Certificate** – for those pursuing a graduate certificate.
- **Transient** – for those enrolled in a graduate program at another institution and wishing to use UT classes in their program of study.
- **Postdoctoral** – for those holding a doctoral degree who wish to continue taking graduate courses.
- **Faculty and Staff** – for members of the faculty or staff located in Knoxville.
- **English Proficiency Conditional** – for degree-seeking international graduate students who have not satisfied the English certification requirement.
- **Change of Program** – for currently enrolled graduate students seeking a change of major, concentration, degree, campus location, or delivery mode; or moving from non-degree to degree seeking (or vice-versa).
- **Readmission** – for graduate students with an interruption in enrollment who seek readmission.

Requirements for Admission to the CEM Master of Science Degree Program

Applicants to the MS degree program must have a baccalaureate degree with coursework in chemistry, including organic; mathematics, including calculus; physics; and basic biology. More advanced study in biology, such as biochemistry, mammalian anatomy, histology, cell biology, or other appropriate biomedical courses from an accredited university is recommended.

Applicants who do not have a professional degree from an accredited institution must have a combined score of at least 300 on the quantitative and verbal sections of the Graduate Record Examination (GRE).

Requirements for Admission to the CEM Doctor of Philosophy Degree Program

Applicants generally will be expected to have

- a professional degree from an accredited institution in one of the medical sciences (e.g., DVM, MD, DDS)
- OR
- a master's degree in one of the biomedical sciences and a GRE score of at least 300 on the quantitative and verbal sections.

An individual having a baccalaureate degree with a strong background in the physical and biological sciences may be admitted to the PhD program upon presenting evidence of exemplary performance on the GRE.

Selection of a Major Professor

Students who meet the minimum requirements for admission to the CEM program need to identify a major professor who will sponsor them before full admission to the program will be considered. Participating [graduate faculty](#) are listed in this handbook. The major professor advises the student about courses, supervises the student's research, and facilitates communication within the CEM program.

APPLICATION PROCEDURE

All applications to the CEM program must be submitted online to the [Office of Graduate Admissions](#).

Materials to Submit

1. APPLICATION*: [Submit online](#)
*Be sure to select **Comparative and Experimental Medicine** as your major.
2. TRANSCRIPTS: One unofficial* transcript from ALL former schools submitted online.
*Official transcripts must be received before the student will be allowed to register for a second term.
3. GRE SCORES: Submit if you do not have a professional degree (e.g., DVM, MD, DDS) from an accredited institution.
4. LETTERS OF RECOMMENDATION (3): Referees should fill out the online recommendation form produced when that portion of your online application is completed.
5. APPLICATION FEE: Pay the non-refundable application fee by credit card or electronic check.

International Students

- Review the [admissions information](#) for International Students.
- Include your TOEFL or IELTS score.
- Pay particular attention to all deadlines; **there are no extensions.**

Term of Entry	Application Deadline	File Completion Deadline
Fall	February 1	May 15
Spring	June 15	October 1
Summer	October 15	February 15

FINANCIAL SUPPORT

Assistantships and Fellowships

The College of Veterinary Medicine offers a limited number of graduate research assistantships within the CEM program. This and other methods of support may be arranged with individual investigators. Successful pairing with a major professor does not guarantee funding support. The following assistantships are awarded as funds become available:

Graduate Research Assistantships

Assistantships are awarded as funds are available. Persons with a professional degree in the health sciences who wish to pursue a PhD program are given priority. Awards are renewable up to 4 years for the PhD and up to 2 years for the MS. Awards typically include a stipend, health insurance, and tuition waiver.

How to Apply: Requests must come through the major professor addressed to the Director of Graduate Studies.

Notification of Award: Awardees are notified by a letter from the Director of Graduate Studies.

Requirements for Maintaining an Assistantship

- Students holding a one-half time (20 hours per week) assistantship normally should enroll in at least 6 credit hours during the semesters of the assistantship. A one-fourth time (10 hours per week) graduate assistant normally should take at least 9 credit hours during the semesters of the assistantship. A student must be enrolled in at least 9 credit hours to be considered full-time for federal financial aid purposes, even if the student has an assistantship. Summer enrollment must be at least 3 credit hours in order to maintain student health insurance.

For **international students**, the minimum enrollment may be different. International students should always check with the [Center for Global Engagement](#) (CGE) to determine the number of credit hours needed to satisfy the requirements of their specific visa.
- Students must make timely and satisfactory progress as described in the [Degree Requirements](#) and [Academic Standing](#) sections of this handbook.
- Assistantships are not automatically renewed. Funding assistance is dependent on the availability of funds and satisfactory performance of the student's assigned duties. Students must submit a [yearly progress report](#) to the Director of Graduate Studies each academic year. In cases where corrective measures must be taken to remediate deficiencies, the CEM program will follow procedures as outlined in the [Policy for the Administration of Graduate Assistantships](#) in the [Graduate Catalog](#).
- Instances in which a graduate assistant wishes to take a leave of absence will be handled on a case-by-case basis between the student, the student's major professor, the CEM program office, and the Graduate School. No guarantee can be made that a student's position will be available upon their return. The [leave of absence](#) form must be filled out and submitted to the Graduate School for approval.

Workload for an Assistantship

As student employees, graduate assistants are balancing professional development through work experience with progress toward their degree in academic experiences, such as courses, theses, or dissertations. To encourage that balance, graduate assistants may not exceed 20 hours of work per week without specific permission from the Graduate School. Appointments are normally on a one-half time (20 hours per week) or one-fourth time (10 hours per week) basis. However, the normal number of hours for conducting an assignment should be mutually understood by the student and the major professor.

Graduate School Fellowships

The Graduate School offers and administers various fellowships. These awards are for full-time study at UT and awardees are selected on the basis of high achievement, broad intellectual ability, and potential for significant career contributions. Students do not apply for fellowships; they are nominated by the department. More detailed information can be found on the Graduate School's [fellowships webpage](#).

On-Campus Employment

The Office of Financial Aid and Scholarships coordinates the [Federal Work Study Program](#) (FWS), which provides part-time off- and on-campus jobs for U.S. citizens or permanent residents who have demonstrated financial need by completing the Free Application for Federal Student Aid (FAFSA). A wide range of jobs is available in academic units, administrative offices, and non-profit agencies. Students must be admitted into a degree program and be enrolled for a minimum of 6 credit hours each semester to receive federal financial aid, including FWS.

Loans

Students must apply through the [Office of Financial Aid and Scholarships](#) for all loan programs. Loans are limited to U.S. citizens and certain permanent residents. Additional paperwork is required on unsubsidized Federal Direct Stafford Loans, including the Free Application for Federal Student Aid (FAFSA). Students must be admitted into a degree program and be enrolled for a minimum of 6 credit hours each semester to receive federal financial aid, including federal student loans.

Health Insurance

The university makes available group health insurance expressly for students who do not have a graduate assistantship. The program is designed to supplement the care provided by the campus Student Health Center and provide basic benefits at low group premium rates. Primary emphasis is placed on hospitalization benefits, since in-patient care is not provided on campus. Students not otherwise covered are urged to avail themselves of this or comparable insurance, since paying for hospital care is the student's responsibility.

Enrollment in the insurance plan (or alternative coverage) is **mandatory for international students**. Students may obtain applications online or in person from the [Student Health Center](#).

All graduate assistants on at least a one-fourth time (10 hours per week) appointment are automatically enrolled in the Graduate Assistant Health Insurance Program. These students will have 100% of the premium paid by the university. If students already have insurance coverage through another insurance carrier, this policy functions as additional coverage.

GSS Travel Support

The Graduate Student Senate (GSS) administers [travel awards](#) for graduate students attending professional meetings to present original research. These awards are based on both need and merit and help defray expenses for transportation, lodging, and registration fees.

To request a travel award, students must complete an [online application](#). All applications require electronic signatures from the advisor/major professor, department head, and college dean and must be submitted no later than 5 p.m. on the day of the [deadline](#).

If you have any questions about the travel award application process, please contact gsstravel@utk.edu.

REGISTRATION AND ADVISING

The minimum number of credit hours for registration is 1 credit hour (for students who must register for course 600 Dissertation, the minimum is 3 credit hours). Registration allows use of services such as library checkout, laboratories, and recreation facilities not open to the public.

Information concerning registration is available on the [One Stop Student Services](#) web page. Registration is accomplished via the web through the [MyUTK](#) student portal (you will be asked to login using your UT NetID and password).

Payment of Registration Fees

During priority registration, the VolXpress statements are delivered electronically (e-VolXpress). Students will receive an email at their UT email address indicating their e-VolXpress statement is available for viewing at [MyUTK](#). Payment is due by the deadline noted on the bill. A graduated late fee is assessed to any student who fails to register during priority registration. Additional information can be obtained online at [One Stop Student Services](#), or by calling (865) 974-1111, or in person at Hodges Library.

Failure to pay tuition and fees before the deadline, as noted each semester on the VolXpress statement, will result in the student being dropped from all courses. Students may not attend and credit cannot be earned for classes without proper enrollment registration.

Change in Registration (Adds, Drops, Withdrawals)

The permanent record will show all courses for which the student has registered, except those audited and those from which the student has withdrawn on or before the "Drop Course without W" deadline. Students who fail to attend the first class meeting, without prior arrangement with the instructor, may be dropped from the course to make space available to other students; **but it is the responsibility of the student to drop the course from their own schedule.** Students have the responsibility to assure that courses have been dropped; otherwise, a grade of F will be received for the course. If the student drops all courses for the semester, that is considered [Withdrawing from the University](#). Students called to active military duty during enrollment should contact [Veterans Resource Center](#) for assistance with withdrawal and readmission procedures.

Type of Change for Full Term Classes (fall/spring)	Deadline
Add or Drop a course without a W or change credit/grading	1 st thru 10 th day of class
Add a course or change credit/grading with instructor/advisor permission	11 th thru 42 nd day of class
Drop a course with a W	11 th thru 84 th day of class

For summer semester, that includes full, first, and second terms, and for mini-term, the periods for add, drop, change of credit/grading are determined based on a percentage of the equivalent deadline for a full semester. See the Timetable/Financial Deadline Calendar for Summer Semester available at the Office of the Registrar website under [Calendars](#). Within the change of registration period, a student may change registration on [MyUTK](#). If additional permission is necessary, a student must execute a [Change of Registration](#) at the Graduate School with approval of the instructor and the Director of Graduate Studies.

500- and 600- Level Course Distinction

Graduate courses offered through the CEM graduate program provide information and training at both fundamental and advanced levels. Offerings at fundamental levels present information and challenges for which the foundations have been set at the undergraduate level. In the CEM, these courses are listed as 500-level courses. CEM courses listed at the 600-level are advanced presentations based on foundations provided at 500- and lower levels. Guidelines and requirements for 500- and 600-level CEM courses are provided. These guidelines and requirements are primarily for the multi-student courses offered in the program; however, aspects of the guides and requirements are also applicable to the variable credit, special, and advanced topics courses offered in the program.

500-level

Course description: Information presented in these courses is foundational for the disciplines represented in comparative and experimental medicine. Courses at this level may be core courses for both MS and PhD programs and may be required by student committees for both MS and PhD curricula.

These courses are typically lecture-based with examinations as the grading mechanism; however, grading may also be based on written papers and oral presentations. Credit hours are based on contact hours with students. As examples, a 1-credit-hour course must meet the equivalent of one 50-minute session per week during a semester whereas a 4-credit course must meet the equivalent of 4 sessions per week (2,800 minutes) during a 14-week semester.

Faculty: The responsible faculty member must be at least an assistant professor, and all invited lecturers must have at least a master's degree or professional medical degree (DVM, MD, DDS, or equivalent).

600-level

Course Description: Information presented in these courses is advanced beyond the fundamental information presented in courses at the 500 level. Courses at the 600 level may be presented in traditional or non-traditional formats, including interactive and group or individual learning activities. Depending on the course format, grading may be based on examinations, written papers, oral presentations, or defined participation.

Course credit is determined from a combination of lectures, group learning activities, and interactive and individualized learning activities.

Faculty: The responsible faculty member must be at the rank of assistant professor or above and must have previously taught in at least one graduate-level course (500-level graduate course or 800-level veterinary course).

Special and Advanced Topics and Variable Credit Courses

The CEM offers different courses titled as either special or advanced topics. These courses are individualized to meet specific needs of students. Credit hours are variable, and the courses may be repeated with different subject matter. Approval to offer special and advanced topics courses must be requested prior to the semester in which the course is proposed to be offered. CEM faculty should submit requests to the Director of Graduate Studies using the [Course Request Form](#), accompanied by a course syllabus.

CEM 501 and 515 provide opportunities for specialized experiences in comparative and experimental medicine. These courses should be used to meet the specialized needs of students and for projects appropriate for 500-level credit. Examples include research papers and analytical techniques and instrumentation involving established technologies.

CEM 510 provides opportunities for students to learn advanced research techniques while conducting individual research projects under supervision of faculty. This course should be used to meet the specialized needs of students and for projects appropriate for 500-level credit.

CEM 610 and 618 are advanced or special topics in comparative and experimental medicine, and medical science, respectively. These courses are intended primarily as specialized experiences for doctoral students in the CEM program and address new and developing topics in research and technology that may be applicable to doctoral-level research and/or clinical medicine.

CEM 620 can be a specialized, in-depth experience in various disciplines, such as current and future research methodology, and recent advances in instrumentation in analytical techniques for comparative medicine. This course is intended primarily as a specialized experience for doctoral students in the CEM program and addresses topics that may be applicable to doctoral-level research and/or clinical medicine.

CEM 650 is a variable credit, surgical pathology course intended primarily for pathology residents pursuing graduate degrees. The Director of Graduate Studies must grant approval to offer this course for greater than 2 credit hours. The written request should be submitted to the CEM program office prior to the semester the course is to be offered and must justify the proposed credit hours.

Proper Use of Courses 502 and 500/600

Course 502: Use of Facilities is for students who are not taking coursework and do not wish to register for thesis or dissertation hours. Registering for this course will permit borrowing privileges in the University Libraries or use of computer labs, other labs, and other university resources. **NOTE: Credit hours taken in course 502 may not be used toward degree requirements.**

Course 500 Thesis is for the master's-level student working on a thesis. Six credit hours of course 500 Thesis must be taken for the degree, and students must register for course 500 each semester during work on the thesis. At least 3 credit hours of course 500 must be taken during the semester in which the student plans to graduate.

Course 600 Dissertation is for the doctoral-level student working on a dissertation. Twenty-four credit hours of course 600 Dissertation must be taken for the degree, and students must register for course 600 when work toward the dissertation begins. Continuous registration of at least 3 credit hours in course 600 (including summer semester) is required thereafter until graduation.

Full-Time Status

The maximum load for a graduate student is 15 credit hours during fall and spring semesters. While 9 credit hours are considered full time, the typical full academic load varies by discipline. For the summer semester, graduate students may register for a maximum of 12 credit hours in an entire summer semester or for a maximum of 6 credit hours in a five-week summer session. Students may enroll in only one course during a mini-term session.

Students holding a one-half time (20 hours per week) assistantship normally should enroll in at least 6 credit hours during the semesters of the assistantship. A one-fourth time (10 hours per week) graduate assistant normally should take at least 9 credit hours during the semesters of the assistantship. **A student must be enrolled in at least 9 credit hours to be considered full-time for federal financial aid purposes, even if the student has an assistantship.**

Registration for more than 15 credit hours during any semester, or for more than 12 credit hours in the summer semester, is not permissible without prior approval. Students wishing to take course hours beyond the standard credit hours for a single term must submit a [Graduate Course Overload](#) request to the Director of Graduate Studies.

Selection of an Advising Committee

Students who are notified of having met the minimum requirements for admission to the CEM program should determine a major professor assignment before full admission to the program will be granted. Participating [graduate faculty](#) are listed in this handbook. The major professor advises the student about courses, supervises the student's research, and facilitates communication within the CEM program.

After one semester of graduate-level coursework has been completed, the student should work with the major professor to establish the advising committee. The major professor must approve the student's program each semester; therefore, the student is expected to maintain close consultation with the major professor and other members of the advising committee with regard to progress in the program. See [Degree Requirements](#) in this handbook for more information about choosing an advising committee.

DEGREE REQUIREMENTS

Master of Science

14 credit hours in Core Coursework

8 credit hours in Research Emphasis Area

2 credit hours of Electives

6 credit hours in CEM 500 (Thesis Option) or CEM 501/510/515 (Course Only with Comprehensive Exam Option)

30 credit hours total

Core Courses:

- 504 Descriptive and Applied Epidemiology (3 credit hours)
- 541 Cellular and Molecular Basis of Disease (3 credit hours)
- 616 Comparative & Experimental Medicine Seminar (1 credit hour)
- Journal Clubs 500- or 600-level (4 credit hours)
- Statistics 500- or 600-level (3 credit hours)

In addition to core courses, students must complete 8 credit hours of coursework in a research emphasis area (except for those in the [Dual DVM-MS degree program](#)), 2 credit hours of electives, and 6 credit hours in either CEM 500 (Thesis option) or CEM 501/510/515 (Course Only with Comprehensive Exam option). The research emphasis area may include epidemiology, imaging, immunology, infectious diseases, medicine, molecular and cellular biology, nutrition and metabolism, oncology, parasitology, pathology, pharmacology, regenerative medicine and tissue regeneration, surgery, or toxicology. Exceptions to accommodate students with interests not listed above must be approved by the Director of Graduate Studies after application, in writing. The purpose of the research emphasis area is to focus the student's final examination.

400-level courses: A maximum of 6 credit hours at the 400 level (in which graduate credit is offered) may be counted toward candidacy. **In order to receive graduate credit**, students must select "graduate" level upon registration AND inform the course instructor on or before the first day of class that graduate credit is being sought. Course requirements for graduate credit will be more rigorous and will exceed the expectations for undergraduates. Petitions for retroactive changing of undergraduate to graduate credit will not be accepted.

Transfer credits: A majority of the total credit hours required for a master's degree must be taken at UT. Official transcripts from all institutions previously attended must be sent directly to the Graduate School before any credit will be considered. Courses transferred will not be counted in determining the student's grade-point average. Credits transferred from universities outside the UT system cannot be used to meet thesis requirements or 600-level coursework requirements. Credit for extension courses taken from other institutions is not transferable, nor is credit for any course taken at an unaccredited institution. No graduate credit is accepted for work done by correspondence study. Transferred courses must have been completed within the six-year period prior to receipt of the degree. The courses must be listed on the [Admission to Candidacy](#) form and will be placed on the student's UT transcript only after admission to candidacy.

Additional requirements: Master's students are required to present at least once in the annual UTCVM Research Day event. Students who have been in the program for at least two semesters are required to complete a [yearly progress report](#). All students must complete an approved [responsible conduct of research](#) training program.

Degree Time Limit

Master's students have six calendar years to complete the master's degree, starting with the semester of the first course counted toward the degree. Students who change degree programs during this 6-year period may be granted an extension after review and approval by the Dean of the Graduate School. In any event, courses used toward a master's degree must have been taken within six calendar years of graduation.

Master's Committee

The master's committee is composed of the student's major professor and at least two other faculty members, all at the rank of assistant professor or above. At least one faculty member must be from the College of Veterinary Medicine (which can include the major professor), and at least one faculty member must be from outside the major professor's academic unit. If the student is pursuing a minor, one faculty member should be from the minor department.

After one semester, the student should consult with the major professor concerning the formation of the master's committee. **By the end of the second semester, the master's committee must be chosen.** The student must submit a [Masters Committee Appointment Form](#) to the Director of Graduate Studies for approval.

The committee will assist the student in planning a program of study, formulating and completing an appropriate research project, developing a thesis or project proposal, and ensuring the achievement of degree requirements. The committee may require and/or recommend specific courses (in addition to those required by the program).

The student is responsible for coordinating meetings of the master's committee at least twice per year and obtaining and/or preparing required materials for the meetings, such as appropriate Graduate School forms, transcripts, yearly progress reports, and research proposals. Student progress will be monitored by the Director of Graduate Studies. It is incumbent upon students to promptly honor requests for progress reports.

Admission to Candidacy

Application for Admission to Candidacy is made after the student has completed prerequisite courses and at least 9 credit hours of graduate coursework with an overall GPA of 3.00 or higher. The [candidacy application](#) must be signed by the student's committee and the Director of Graduate Studies. All courses to be used for the degree must be listed, including transfer coursework. The student must submit the application to the Graduate School no later than the last day of classes of the semester preceding the semester in which the student plans to graduate.

Thesis Option

Registration in course 500 Thesis

Students register for course 500 Thesis each semester that work is done on the thesis (continuous registration is not required). A minimum of 6 credit hours of 500 Thesis is required for the thesis option, including a minimum of 3 credit hours in the semester in which the thesis is accepted by the Graduate School. After receiving the master's degree, a student is no longer permitted to register for 500 Thesis.

Thesis preparation

The thesis represents the culmination of an original research project completed by the student and is submitted in electronic format to the Thesis Consultant in the Graduate School for examination, final approval, and acceptance. It must be prepared according to guidelines provided on the [Theses and Dissertations](#) webpage, including the requirement to use university-approved [plagiarism detection software](#) prior to the thesis defense.

An electronic copy of the thesis must be accompanied by one **original** [approval form](#). The approval form must have the [original signatures](#) of the members of the master's committee. The approval form certifies that the committee members have examined the final copy of the thesis and judged it to be satisfactory.

Final Examination (Defense of Thesis)

Candidates must present a thesis seminar and pass a final oral examination. This examination, which covers both coursework and the thesis, measures the candidate's ability to integrate material in the research emphasis area and related fields. A final draft of the thesis must be distributed to all committee members at least two weeks prior to the date of the final examination. All committee members must be present for the examination. If remote participation is necessary, the student is required to submit a [Remote Participation Notification](#) form to the Graduate School as soon as the defense is scheduled. The Director of Graduate Studies is also invited to attend the oral defense.

The student schedules the final examination by submitting the [Scheduling Defense of Thesis/Project/Capstone](#) form to the CEM program office. The examination must be held at least two weeks before the final date for acceptance and approval of the thesis by the Graduate School. This is an official university academic activity – pets (with the exception of service animals) and young children are not permitted to attend. Students should not bring refreshments to the defense.

Following the oral defense, the [Report of Final Examination](#) with **original signatures** must be submitted to the Graduate School by the deadline date for that semester. In case of failure, the student may not apply for re-examination until the following semester. The result of the second examination is final. Information on the appeals process is located in the [Grievances and Appeals](#) section of this handbook.

Course Only with Comprehensive Exam Option

This non-thesis option would normally be elected by students who desire advanced didactic training at the master’s level without performing an extensive research project. It is useful for students employed within the field of biomedical science or engaged in resident training. Students must meet all [requirements](#) for the MS degree in CEM.

Final Examination (Seminar and Oral Defense)

In lieu of a thesis, 6 credit hours in CEM 501, 510, or 515 are required in which the student prepares an analytical research paper that thoroughly identifies and explores a scientific, technical, or social science issue associated with the field. **This paper will be presented as a public seminar, followed by an oral comprehensive examination (defense) by the student’s committee.**

The student schedules the final examination by submitting the [Scheduling Defense of Thesis/Project/Capstone](#) form to the CEM program office. The examination must be held at least two weeks before the final date to submit the Report of Final Examination to the Graduate School. All committee members must be present for the examination. If remote participation is necessary, the student is required to submit a [Remote Participation Notification](#) form to the Graduate School as soon as the defense is scheduled. The Director of Graduate Studies is also invited to attend the oral defense. This is an official university academic activity – pets (with the exception of service animals) and young children are not permitted to attend. Students should not bring refreshments to the defense.

Following the oral defense, the [Report of Final Examination](#) with **original signatures** must be submitted to the Graduate School by the deadline date for that semester. In case of failure, the student may not apply for re-examination until the following semester. The result of the second examination is final. Information on the appeals process is located in the [Grievances and Appeals](#) section of this handbook.

Example Timetable for Completion of MS Degree

Semester*	Year 1			Year 2		
	Fall	Spring	Summer	Fall	Spring	Summer
Entry into program	→					
Establish advising committee		→				
Submit progress report			→			
Submit admission to candidacy form					→	
Thesis/Project credit hours				→		
Final exam						→

*Assumes entry to program during fall semester and graduation during summer semester. Semesters should be adjusted according to when individual students entered program.

Dual DVM-MS

The College of Veterinary Medicine and the CEM program offer a coordinated accelerated dual program leading to the conferral of both the Doctor of Veterinary Medicine and the Master of Science degrees in less time than would be required to earn both degrees independently. This accelerated program is designed for students who wish to obtain advanced research training to complement their veterinary knowledge and clinical skills.

For the MS degree, an overall minimum of 30 credit hours are required. This includes 14 credit hours in CEM core courses, 2 credit hours of electives, and 6 credit hours of CEM 500 Thesis or CEM 501/510/515 for students who elect the Course Only with Comprehensive Exam option. The CEM program will award up to 8 credit hours of DVM coursework toward the MS in approved **preclinical** courses offered by the College of Veterinary Medicine. These courses must be graded A-F, with an earned grade of at least a B. Courses eligible for dual credit will be at the recommendation of the student's CEM major professor in consultation with the student's master's committee.

Students entering the dual degree program must meet the minimum admission requirements for both the DVM and MS programs. Applicants for the dual program must make separate application to, and be competitively and independently accepted by, the College of Veterinary Medicine for the DVM and the CEM program for the MS. Students who have been admitted to the College of Veterinary Medicine may apply for approval to pursue the dual program at any time prior to or after matriculation. Such approval will be granted, provided that dual program studies are started prior to entry into the fourth semester of DVM coursework.

Students enrolled in the dual program will be officially classified as primarily veterinary students until the DVM coursework is completed, with the following exception: dual program students will typically enroll as primarily MS students during the summer semesters following completion of their first and second years in the veterinary curriculum. After the DVM is conferred, the student's primary major will be CEM.

Degrees do not need to be awarded simultaneously. If a dual student has not completed the requirements for the MS, the student may still be awarded the DVM. If the student completes the MS requirements, but does not complete the DVM, the student may still be awarded the MS. Students must satisfy the graduation requirements of each program.

Master of Science – Forensic Odontology Concentration

This three-semester concentration is designed for anthropologists, dentists, registered dental hygienists, biologists, crime scene specialists, detectives, and medico-legal death investigators wishing introduction and formalization to skills in the search, recovery, and collaborative identification of compromised human head and neck remains, and recognition of human and nonhuman bite marks at autopsy. This concentration is founded on the standards and guidelines established by the American Board of Forensic Odontology in the endeavors of human identification, bite mark investigation and analysis, dental age estimation, missing and unidentified persons, and mass fatality incident dental identification team development.

Training involves search, recovery, identification, and processing of fresh, mutilated, and decomposing and skeletal remains as evidence that has been exposed to many post-mortem environments from scattered and clandestine burials to aquatic and thermal contexts. Training will continue to include examination of those remains in the autopsy setting. Twice-monthly laboratory sessions at the Knox County Medical Examiner's Office – East Tennessee Regional Forensic Center will provide casework exposure. Training also involves recovery of relevant head and neck remains at an outdoor decomposition facility and processing for examination and report writing for submission as a defensible court document.

Applicants for the MS with a Forensic Odontology concentration must meet the minimum requirements for admission for the CEM program. For some students, prerequisite or concurrent coursework will likely be necessary to succeed in the course of study.

Students must meet all requirements for the MS degree in Comparative and Experimental Medicine. This includes courses CEM 504, CEM 541, 4 credit hours of 500- or 600-level journal clubs, and 3 credit hours of 500- or 600-level statistics. The CEM 504 course may be substituted with another relevant and appropriate course, as approved by the student's committee and the director of the program. The CEM 616 course is encouraged, but not required, for forensic odontology students.

In lieu of a thesis, at least 1 credit hour in CEM 535 Capstone Experience is required in which the student prepares an analytic [research paper](#) that thoroughly identifies and explores a scientific, technical, or social science issue associated with the field. This paper will be presented as a seminar, which is followed by an oral comprehensive exam by the student's committee.

Forensic Odontology Course of Study		
Semester	Course	Credit Hours
Fall	CEM 504: Descriptive and Applied Epidemiology (optional)	3
	CEM 541: Cellular and Molecular Basis of Disease	3
	CEM 550: Introduction to Forensic Odontology	3
	CEM 554: Dental and Maxillofacial Anatomy/Histology	4 (3 lecture, 1 lab)
	Journal Club (1 or 2)	1 or 2
Spring	CEM 552: Head and Neck Anatomy	4 (1 lecture, 3 lab)
	Statistics (500- or 600-level)	3
	Journal Club (1 or 2)	1 or 2
Summer	CEM 556: Head and Neck Osteology and Trauma	4 (2 lecture, 2 lab)
	CEM 558: Laboratory Methods in Forensic Odontology	4 (1 lecture, 3 lab)
	Journal Club (1 or 2)	1 or 2
	CEM 535: Capstone Experience	1
Minimum 30 credit hours required for the degree		

Capstone Experience

The capstone requirement must be met by passing the **CEM 535 Capstone Experience** course with a B grade or better. What constitutes a sophisticated, integrative experience will vary with each student. Examples of capstone experiences include an independent project, integrated case study or simulation, internship, practicum, original research project, or literature meta-analysis or systematic review. Planning for this project should occur during the first semester and with consultation of the committee, which must approve the project before work begins.

The capstone should capture the spirit of the program in the form of either an original, applied primary research project; a theoretical or secondary research project; or a systematic review. It must be finalized during the last semester of study. Through this experience, the student will demonstrate skills associated with the degree program, such as applied performance and critical analysis. Students must demonstrate their abilities to:

1. Gather material independently, as needed.
2. Think critically about and integrate the theoretical and/or practical knowledge that they have acquired throughout their studies.
3. Reflect on the ethical issues that are implicit in their project and/or their project's design.

Research Paper: The research paper portion of the **Capstone Experience** should have a minimum length of 8 double-spaced pages (excluding figures and references). Choose a topic about which you care deeply. You have the resources of a major research university at your disposal and you are mentored by a faculty committee. Think of the capstone experience as an exciting, pivotal project that might launch the next stage of your academic or professional life. **This paper will be presented as a public seminar, followed by an oral comprehensive examination (defense) by the student's committee.**

Final Examination (Seminar and Oral Defense)

The student schedules the final examination by submitting the [Scheduling Defense of Thesis/Project/Capstone](#) form to the CEM program office. The examination must be held at least two weeks before the final date to submit the Report of Final Examination to the Graduate School. All committee members must be present for the examination. If remote participation is necessary, the student is required to submit a [Remote Participation Notification](#) form to the Graduate School as soon as the defense is scheduled. The Director of Graduate Studies is also invited to attend the oral defense. This is an official university academic activity – pets (with the exception of service animals) and young children are not permitted to attend. Students should not bring refreshments to the defense.

Following the oral defense, the [Report of Final Examination](#) with **original signatures** must be submitted to the Graduate School by the deadline date for that semester. In case of failure, the student may not apply for re-examination until the following semester. The result of the second examination is final. Information on the appeals process is located in the [Grievances and Appeals](#) section of this handbook.

Comparative Aspect	Capstone Project vs.	Master's Thesis
Time Frame	Two or three semesters	Three to six semesters
Length of Written Product	~8 pages	75–150 pages (typically appx. 100 pages)
Nature of Project	Work-product demonstrates expertise in a narrow area. Should say much about a narrow topic.	Considers the topic in greater depth, more completely, and always involves basic or applied primary research.
Oral Presentation/ Defense	Neither the seminar nor the oral comprehensive exam should be a traditional defense of the paper.	Defense by committee and open to public
Professional Considerations	<ul style="list-style-type: none">• Simulates settings often found on the job• Highlights an area of practical or theoretical importance to the field	<ul style="list-style-type: none">• Helpful for students who intend to enter a PhD program and/or conduct individual research• Generally more rigorous; can be a good resume builder
Required Course & Credit Hours	1 credit hour in CEM 535 Capstone Experience in one semester	6 credit hours in CEM 500 Thesis over two or more semesters

DEGREE REQUIREMENTS

Doctor of Philosophy

Core Courses:

- 504 Descriptive and Applied Epidemiology (3 credit hours)
- 541 Cellular and Molecular Basis of Disease (3 credit hours)
- 616 Comparative & Experimental Medicine Seminar (1 credit hour)
- Journal Clubs 500- or 600-level (6 credit hours)
- Statistics 500- or 600-level (3 credit hours)

Required coursework

In addition to core courses, students (except for those in the [Dual DVM-PhD degree program](#)) must complete 8 credit hours of coursework in a research emphasis area. This area may include epidemiology, imaging, immunology, infectious diseases, parasitology, medicine, molecular and cellular biology, nutrition and metabolism, pathology, pharmacology, regenerative medicine and tissue regeneration, surgery, or toxicology. Exceptions to accommodate students with interests not listed above must be approved by application, in writing, to the Director of Graduate Studies. The purpose of the research emphasis area is to focus the student's comprehensive and final examinations.

Students with a master's or professional degree (e.g., DVM, MD, DDS) must complete a minimum of 24 credit hours of graduate coursework (exclusive of course 600 Dissertation). A minimum of 6 credit hours must be taken in UT courses at the 600 level (exclusive of course 600 Dissertation), and at least 12 credit hours must be graded A-F. In addition, 24 credit hours of course 600 Doctoral Research and Dissertation are required.

Students without a master's or professional degree must complete a minimum of 48 credit hours of graduate coursework (exclusive of course 600 Dissertation). A minimum of 6 credit hours must be taken in UT courses at the 600-level (exclusive of course 600 Dissertation), and at least 24 credit hours must be graded A-F. In addition, 24 credit hours of course 600 Doctoral Research and Dissertation are required.

400-level courses: A maximum of 6 credit hours at the 400 level (in which graduate credit is offered) may be counted toward candidacy. **In order to receive graduate credit**, students must select "graduate" level upon registration AND inform the course instructor on or before the first day of class that graduate credit is being sought. Requirements for these courses will be more rigorous and will exceed the expectations for undergraduates. Petitions for retroactive changing of undergraduate to graduate credit will not be accepted.

Transfer credits: At the doctoral level, courses are not officially transferred, although they may be used to meet degree requirements. If a requirement has been met through coursework in another program, the student, in consultation with the committee, may petition the Director of Graduate Studies for a waiver of this requirement. Courses taken at universities outside of the UT system cannot be used to meet dissertation requirements or 600-level coursework requirements.

Additional requirements: PhD students are required to present at least twice in the annual UTCVM Research Day event. Students who have been in the program for at least two semesters are required to complete a [yearly progress report](#). All students must complete an approved [responsible conduct of research](#) training program.

PhD Residence Requirement

Residence is defined as intensive study over consecutive semesters (summer included). Doctoral students may satisfy the residence requirement by enrolling in 2 consecutive semesters of at least 9 credit hours or 3 consecutive semesters of at least 6 credit hours.

Degree Time Limit

Comprehensive examinations must be successfully completed within 5 years, and all requirements must be completed within 8 years from the time of a student's initial enrollment in the doctoral degree program.

PhD Committee

During the **first year** of graduate study, the student works with the major professor to identify a PhD committee. The committee, subject to Graduate Council policies and individual program requirements, must approve all coursework applied toward the degree, certify the student's mastery of the major field and any cognate fields, assist the student in conducting research, and recommend the dissertation for approval and acceptance by the Graduate School. The student should meet with their committee at least twice a year. At the time of the first meeting, with approval of the committee, the student shall declare a research emphasis area.

The committee must have at least four members. At least two members must be UT tenured or tenure-track faculty, at least one member must be from outside of the student's department/interdisciplinary program (this external member can be from outside of UT), and at least one member must be from the College of Veterinary Medicine (this can include the major professor). If a minor is declared, one member must have expertise in the minor discipline.

To officially establish the committee, the student must submit the [PhD Committee](#) form, with original signatures, **along with the CVs of any external members**, to the Graduate School for final approval by the Dean of the Graduate School. Changes in committee membership must be submitted for approval using the [Revise PhD Committee](#) form.

Comprehensive Examination

This examination should be taken when the student has completed, or nearly completed, all prescribed courses and should be completed before the end of the third year of the program (medical residents pursuing a PhD degree have until the end of their fourth year). Its successful completion indicates that, in the judgment of the faculty, the doctoral student can think analytically and creatively, has a comprehensive knowledge of the field and the specialty, knows how to use academic resources, and is deemed capable of completing the dissertation. The comprehensive exam should also be a learning experience in which specific skills are developed, including effective and comprehensive literature review, writing ability, experimental design for hypothesis-driven research, and oral presentation skills. **The comprehensive exam must be passed prior to admission to candidacy.** In case of failure, the candidate may not take the examination again until the following semester. The result of the second examination is final.

The exam shall consist of two parts: 1) a written research proposal/grant application (in the format outlined below) and 2) an oral exam that assesses the general knowledge of the student in the research emphasis area and serves as a defense of the written proposal. The exam should be carried out according to the following guidelines:

Part 1 – Written Examination: Submission & Approval of Research Proposal Topic

The student shall submit to their major professor a topic for a written grant proposal and a short statement defining the subject area (no more than 1 page in length). The proposal topic may be conceptually related to the student's intended doctoral research, but need not be identical in terms of experimental design. **Once approved, the student informs the committee of the topic and timeline.** The student will have 4 weeks to submit the written proposal to the members of the committee.

The proposal must be written completely independently by the student. The major professor should guide the student on the overall project idea, but the 4-week preparation and writing process should be independent of the major professor. In preparation for the written exam, students will need mentoring and/or coursework on how to prepare a compelling grant. This assistance should be provided well in advance of the 4-week writing period.

Format and submission of written research proposal

The proposal should adhere to the following guidelines (similar to an NIH R21 or equivalent grant mechanism), including page restrictions.

•Standard Project Timeline: 2 years

•Style: Arial, Helvetica, Palatino Linotype, or Georgia typeface; black font color; at least 11-pt font Margins and at least 0.5" on all sides Paper size 8.5 x 11" ; single spaced.

•Page Limits: Project Narrative 4 lines (1 short paragraph), Project Summary/Abstract 30 lines, Specific Aims and Hypothesis 1 page, Research Strategy 6 pages, Bibliography Unlimited, Biographical Sketch 2 pages.

- Face Page: Proposal title, investigator, committee members' names, and project start & end dates.
- Project Narrative: Describe the relevance of this research to public health or applied field. Use plain language that can be understood by a general, lay audience.
- Project Summary/Abstract: Meant to serve as a succinct and accurate description of the proposed work when separated from the application. This section should be informative to other persons working in the same or related fields and understandable to a scientifically or technically literate reader.
- Specific Aims: Briefly state the objectives of the research. List the specific goals and any hypotheses to be tested, and summarize expected outcomes and impact of the results.
- Research Strategy: Include significance, innovation, and approach sections.
 - A) Significance: Importance of the problem or critical barrier to progress in the field that the proposed project addresses. How the proposed project will improve scientific knowledge, technical capability, and/or clinical practice in one or more broad fields. How concepts, methods, technologies, treatments, services, or preventive interventions that drive this field will be changed if the proposed aims are achieved.
 - B) Innovation: How the application challenges and seeks to shift current research or clinical practice paradigms. Describe any novel theoretical concepts, approaches, or methodologies; instrumentation or interventions to be developed or used; and any advantage over existing methodologies, instrumentation, or interventions. Explain any refinements, improvements, or new applications of these approaches.
 - C) Approach: Describe the overall strategy, methodology, and analyses to be used to accomplish the specific aims. Include how the data will be collected, analyzed, and interpreted. Discuss potential problems, alternative strategies, and benchmarks for success anticipated to achieve the aims. If the project is in the early stages of development, describe any strategy to establish feasibility, and address the management of any high-risk aspects of the proposed work. Point out any procedures, situations, or materials that may be hazardous to personnel and precautions to be exercised. If there are multiple specific aims, you may address significance, innovation, and approach for each specific aim individually or for all specific aims collectively.
- Bibliography: List references cited in the text using a single, scientific journal format. Where appropriate, each reference must include the names of all authors (in the same sequence in which they appear in the publication), the article and journal title, book title, volume number, page numbers, and year of publication.
- Biographical Sketch: Student's biographical sketch in this format (limited to 2 pages). Do not include an eRA Commons user name. Following the educational block, complete only sections A and B, as described hereafter. A. Personal Statement. Briefly describe why you are well-suited for your role in the project. The relevant factors may include aspects of your training; your previous experimental work on this specific topic or related topics; your technical expertise; your collaborators or scientific environment; and your past performance in this or related fields. B. Positions and Honors. List in chronological order previous positions, concluding with your present position. List any honors.
- Project Budget: No written budget is expected. In lieu of a written NIH/NSF format modular/R&R budget, the student should be prepared to discuss, during the oral exam (Part 2), the budget needed to carry out the proposed project.

Part 2 – Oral Examination

Within 3 weeks after submitting the written examination, the student should sit for the oral examination with all of the committee members (the Director of Graduate Studies is also invited to attend). The oral examination should be scheduled as early in the process as possible, preferably when the student is notified to begin writing.

Students should prepare a summary of their grant proposal and give a brief (~10 minutes) presentation. They should also expect questions that probe their scientific knowledge as it relates to the subject matter of the research proposal. Although students are not expected to prepare a written, formal budget, they should be prepared to discuss, during the oral exam, the budget needed to carry out the proposed project.

Assessment of written proposal

Each member of the committee shall evaluate the proposal. The major professor should ensure that a copy of the written proposal is filed in the CEM Program Office.

Assessment of oral examination

The oral exam is intended to establish the student's ability to orally present and defend a research proposal as well as to survey the student's general breadth of knowledge in the research emphasis area and their scientific knowledge as it relates to the subject matter of the proposal.

The committee will convene immediately after the oral examination to determine if the student has successfully passed the oral exam. The student shall pass the examination provided it has been established that:

- a. A consensus exists among the examining committee members in favor of passing with at least a 2/3 majority on the committee (including the vote of the Director of Graduate Studies, if they choose to vote).
- b. An appropriate number of questions dealing with the declared research emphasis area were administered.
- c. The examination was fair and rigorous.

The major professor is to send a short summary of the oral exam with a record of its outcome to the Director of Graduate Studies no later than 2 weeks after the examination is completed.

If the committee decides against a grade of pass for the oral exam, a time for re-examination – not before the following semester and including a revision of the written proposal – should be scheduled before the end of the current semester.

Admission to Candidacy

A student may be admitted to candidacy for the doctoral degree after passing the comprehensive examination and maintaining at least a 3.00 GPA in all graduate coursework. Each student is responsible for submitting the [Admission to Candidacy](#) form, which must be signed by the PhD committee and the Director of Graduate Studies. Admission to candidacy must be applied for and approved by the Graduate School at least one full semester prior to the date the degree is to be conferred.

Dissertation

The dissertation represents the culmination of an original research project completed by the student. The organization, method of presentation, and subject matter of the dissertation are important in conveying to others the results of such research. The dissertation must be prepared according to the [guidelines](#) established by the Graduate School, including the requirement to use university-approved [plagiarism detection software](#) prior to the dissertation defense.

Upon successful defense of the dissertation, the final electronic copy must be submitted to TRACE and accepted by the Graduate School on behalf of the Graduate Council. It must be accompanied by one **original** [Thesis/Dissertation Approval](#) form with [original signatures](#) of all members of the PhD committee. The approval sheet certifies to the Graduate School that the committee members have examined the final copy and found that its form and content demonstrate scholarly excellence. The [Survey of Earned Doctorates](#) certificate of completion is also submitted at this time.

Dissertation Continuous Registration

Students who have started taking dissertation credit hours in course 600 Doctoral Research and Dissertation must **continuously register** for course 600 for a minimum of 3 credit hours every semester. This includes summer semester and the semester in which the dissertation is approved and accepted by the Graduate School.

Students who have started taking course 600 and wish to do an internship/practicum relevant to their degree can petition to be exempted from the continuous enrollment requirement for up to three semesters or 12 months (maximum) by submitting a [600 Continuous Enrollment Exemption](#) request form.

Final Examination (Defense of Dissertation)

A doctoral candidate must pass an oral defense of the dissertation. The dissertation, in the form approved by the major professor, **must be distributed to the committee at least two weeks before the examination**. The examination must be [scheduled](#) through the UT Graduate School at least one week prior to the examination and must be conducted in university facilities. Final examinations not properly scheduled must be repeated.

The examination is announced publicly and is open to all faculty members. The defense of the dissertation will be administered by ALL members of the PhD committee after completion of the dissertation and all course requirements. This examination must be passed by a simple majority at least two weeks before the date of submission and acceptance of the dissertation by the Graduate School. Results of the defense must be submitted by the dissertation deadline.

Failure to pass the oral defense of dissertation may constitute dismissal from the program. Requests for second attempts must be sent to the Director of Graduate Studies for approval/disapproval. In the case of failure, the candidate may not apply for re-examination until the following semester. The result of the second examination is final. Appeal information is located in this handbook under [Grievances and Appeal Procedures](#).

The final examination should also fulfill the following CEM guidelines:

- A draft of the dissertation, paper or electronic file, shall be placed in the CEM program office one week prior to the final examination and be available to all interested persons at UT.
- A seminar shall be [scheduled](#) and presented by the student. The seminar will be announced through the CEM program office and be open to all interested persons at UT. Seminar announcements should identify this as a dissertation defense.
- This is an official university academic activity; pets (with the exception of service animals) and young children are not permitted to attend.
- Students should not bring refreshments to the defense.
- At the end of the presentation, questions shall be open to the audience and be appropriate to that presentation.
- An oral defense of the dissertation, by the student, will be conducted by the PhD committee immediately following the seminar (the Director of Graduate Studies is also invited to attend the oral defense).

Example Timetable for Completion of PhD Degree

Semester*	Year 1			Year 2			Year 3			Year 4		
	Fall	Spr	Sum	Fall	Spr	Sum	Fall	Spr	Sum	Fall	Spr	Sum
Entry into program	→											
Establish advising committee		→	→									
Submit progress report			→			→			→			
Take comprehensive examination							→	→	→			
Submit admission to candidacy form										→	→	→
Dissertation credit hours									→	→	→	→
Schedule and take final exam												→

*Assumes entry to program during fall semester and graduation during summer semester. Semesters should be adjusted according to when individual students entered program.

PhD with Concurrent MS Degree

The CEM program offers a concurrent master's degree option for doctoral students who plan to complete the master's degree while maintaining enrollment in the doctoral program. **The concurrent master's degree is designed primarily for the benefit of those entering the PhD program with a baccalaureate degree only.** Students will gain experience working with a committee, performing research, and writing that will help prepare them for their PhD work. The degree requirements for the concurrent MS/PhD are integrated within the degree requirements for the PhD, with a common committee (except in special circumstances; i.e., when a student wishes to complete an MS in one research emphasis area [ex: immunology] and a PhD in another [ex: virology]). Students must submit a [Request for Concurrent Master's Degree](#) to the **Director of Graduate Studies** in accordance with the instructions on the form.

To earn the concurrent master's degree, **all requirements must be met at the University of Tennessee.** The student will decide the **path to degree** as outlined below. Concurrent master's students will be expected to follow all of the [requirements](#) for a CEM master's degree. This includes forming a master's committee and submitting a [Masters Committee Appointment Form](#) to the Director of Graduate Studies for approval.

Path 1: MS with thesis; PhD with dissertation

Students will progress through the MS program requirements and complete a thesis and oral defense before attempting the PhD comprehensive examination and completing the dissertation and dissertation oral defense. Six credit hours of 500 Thesis and 24 credit hours of 600 Dissertation are required. Students who have already started taking dissertation credit hours will need to register for both 500 Thesis and 600 Dissertation. **Note: Credit hours earned in 500 Thesis may not be counted toward PhD candidacy.**

Path 2: MS with project in lieu of thesis option; PhD with dissertation

Students will progress through the MS program requirements with 6 credit hours in CEM 501/510/515 completed under the supervision of the student's major professor and committee. The individual project will involve a literature survey, development of a pre-doctoral fellowship grant targeted toward a specific funding agency, or other comparable project deemed acceptable by the student's committee. The student will undergo an oral defense of the project before attempting the PhD comprehensive examination and completing the dissertation and dissertation oral defense.

Dual DVM-PhD

The College of Veterinary Medicine and the CEM program offer a coordinated accelerated dual program leading to the conferral of both the Doctor of Veterinary Medicine and the Doctor of Philosophy degrees in less time than would be required to earn both degrees independently. This accelerated program is designed to prepare highly motivated students for a career in veterinary research.

The CEM program will award up to 32 credit hours of DVM coursework toward the PhD in approved **preclinical** courses offered by the College of Veterinary Medicine. These courses must be graded A-F, with an earned grade of at least a B. Courses eligible for dual credit will be at the recommendation of the student's CEM major professor in consultation with the student's PhD committee (students in the dual program who also hold a master's degree may use up to 24 credit hours from their master's program as part of the 32 credit hours awarded toward the PhD, as approved by the student's committee). For the PhD degree, an overall minimum of 72 credit hours are required. This includes 16 credit hours in CEM core courses, 32 credit hours approved from the DVM program, and 24 credit hours of 600 Dissertation. The doctoral comprehensive examination must be successfully completed within 2 years of completing all DVM coursework.

Students entering the dual degree program must meet the minimum admission requirements for both the DVM and PhD programs. Applicants for the dual program must make separate application to, and be competitively and independently accepted by, the College of Veterinary Medicine for the DVM and the CEM program for the PhD. Students who have been admitted to the College of Veterinary Medicine may apply for approval to pursue the dual program at any time prior to or after matriculation. Students enrolled in the dual program will be officially classified as primarily veterinary students until the DVM coursework is completed, with the following exception: dual program students will typically enroll as primarily PhD students during the summer semesters following completion of their first and second years in the veterinary curriculum. After the DVM is conferred, the student's primary major will be CEM. Dual program students must satisfy the graduation requirements of each program.

ACADEMIC STANDING

Expectations for Good Standing

Students in the CEM program are expected to maintain a 3.00 cumulative grade-point average (GPA) on all graduate courses graded A–F. For all other courses, a grade of either P or S must be received. In addition, students are expected to make reasonable progress in their thesis/dissertation research projects. The CEM program has a formal process for annual evaluation of student progress in the form of a [yearly progress report](#). The process is designed to optimize the value of individual student programs and to ensure timely progression through degree requirements.

Grade of Incomplete

Under extraordinary circumstances the grade of I (Incomplete) may be awarded to students who have satisfactorily completed a substantial portion of the course requirements but cannot complete the course for reasons beyond their control. It is the responsibility of the student receiving an I grade to arrange with the course instructor whatever action is needed to remove the I grade at the earliest possible date. If the I grade is not removed within one calendar year or upon graduation, it shall be changed to an F and count as a failure in the computation of the GPA. **No student may graduate with an "I" grade on record** (see [Graduate Catalog](#) for additional information).

Repeating Courses

Graduate students may repeat up to two courses in which they earned a grade of D or F. The decision to repeat a course is made between the student and the major professor. Each course may be repeated only once. Both the original and repeat grades will be included in the calculation of the cumulative GPA. Credit hours will only be counted once towards meeting degree/program requirements.

To re-enroll in a class in order to improve an earned grade, the student must complete a [Permission to Repeat a Graduate Course](#) form and have it signed by their major professor. The form may be scanned and **emailed from the major professor** to the Graduate School, or it may be sent by campus mail or hand-delivered.

Academic Probation

Upon completion of 3 or more credit hours of graduate coursework, if a student's cumulative GPA falls below 3.00, the student will be placed on academic probation. The student will be allowed to continue graduate study in subsequent semesters if each semester's grade point average is 3.00 or greater. Upon achieving a cumulative GPA of 3.00, the student will be removed from probationary status.

Dismissal

If a student is placed on [academic probation](#), the degree status will be terminated by the Dean of the Graduate School if the student's semester GPA falls below 3.00 at the end of the next semester. When the particular circumstances are deemed to justify continuation, and upon recommendation by the Director of Graduate Studies and approval of the Dean of the Graduate School, a student on probation whose semester GPA is below 3.00 may be allowed to continue on a semester-by-semester basis. Other terms of dismissal are failure to pass the comprehensive or final examination (requests for second attempts must be sent to the Director of Graduate Studies and reviewed by the AAPC for approval/disapproval), failure to meet CEM program time limit requirements, violations of [academic honesty](#), research misconduct, or unsatisfactory progress. Unsatisfactory progress includes two consecutive grade reports of "No Progress" (NP) in 500 Thesis or 600 Dissertation. Dismissal of a graduate student from the CEM program is accomplished by written notice to the student, with a copy to the Graduate School. In those cases where the department's requirements for continuation are more stringent than university requirements for graduate programs, the Dean of the Graduate School will evaluate the student's record to determine whether the student is eligible to apply for a change of status and register in another area of study. Registration for courses in the CEM program by students dismissed from the program will not be permitted, except by written authorization from the Director of Graduate Studies.

LEGAL REQUIREMENTS FOR RESEARCH

Institutions of higher education have maintained a centuries-old tradition of integrity and objectivity. The University of Tennessee is pleased with the overall support given by its faculty, staff, volunteers, and students in upholding this tradition and wants to ensure that the highest level of integrity in all academic activities is continued. Therefore, any individual who has reason to believe that they have knowledge of an act of research misconduct, including fabrication of results, plagiarism, and/or misrepresentation of findings, should communicate this information to a supervisor or appropriate administrator. If an allegation of misconduct is substantiated, the chief administrative officer of the campus shall initiate the applicable disciplinary procedures, and sanctions, if appropriate, will be imposed under those procedures.

Responsible Conduct of Research and Compliance Training

All researchers at UT are expected to comply with the university's research policies, regulations, and guidelines. [Information](#) and required forms are available at the Office of Research. Regulations must be followed for all research, especially that involving animal care, biosafety, human subjects, and radiation.

It is recommended that all students in the CEM program complete training in the responsible conduct of research during their first year of study, and all students must complete this training within their first 2 years. Training may be acquired by completing one of the following options:

1. Satisfactory completion of approved online training module: [CITI - Collaborative Institutional Training Initiative](#)
2. Graduate course: **CEM 525 Research Ethics for the Life Sciences**

Additional opportunities for [responsible conduct of research training](#) may be available through the UTIA and UT Knoxville research offices, as well as through periodic training sessions from other campus groups.

Upon satisfactory completion of responsible conduct of research training, students should record the training as part of their [yearly progress report](#).

YEARLY PROGRESS REPORT

Following each spring semester, students who have been in the CEM graduate program for at least two semesters must meet with their major professor to discuss their progress and performance. The major professor is responsible for providing a written evaluation describing the student's accomplishments, strengths, and deficiencies and, if necessary, suggested corrective actions. In the event of an anticipated unsatisfactory evaluation, the major professor consults with the student's advising committee before preparing the evaluation.

Following the major professor's evaluation and prior to the start of fall semester, the student must submit a report packet to the CEM program office. The packet includes a detailed reporting form, a current curriculum vitae (CV), and a copy of the major professor's evaluation. The reporting form includes explanations and corrective actions to be taken in response to deficiencies or unsatisfactory progress reported in the major professor's evaluation. The packet will be available to the major professor and to members of the student's advising committee.

If warranted, the Director of Graduate Studies will notify the student, the major professor, and the student's advising committee that a report of unsatisfactory performance is being made to the AAPC. The AAPC will review the report and any additional materials provided by student's committee members and decide if there are grounds for probation or [dismissal](#) from the program. Should a progress report not be filed by the specified deadline, access to financial support may be jeopardized, and students may be restricted from registering for courses.

UTCVM Research Day Experience

Master's students are required to present at least once in the annual UTCVM Research Day event, prior to defense of the thesis. Doctoral students are required to present at least twice in this event, prior to defense of the dissertation. In exceptional circumstances, the Director of Graduate Studies may waive this requirement.

Conflict Resolution

If a conflict develops between a student and the student's major professor, both parties should work to correct the interfering issues. Conflicts may include issues of disruptive conduct and insubordination. If the conflict cannot be resolved, the professor or student should request mediation through the Director of Graduate Studies. If all efforts fail and the professor decides to stop serving as the student's major professor, that professor documents in writing all the problems and the attempts to make corrections to the student, the student's committee members, and the Director of Graduate Studies. Conversely, students may similarly request changes. Under either scenario, to remain in the program, the student must provide to the Director of Graduate Studies a written explanation and request to formally visit with other program faculty (as in laboratory rotations) or to associate formally with another faculty member (who must provide written agreement). The Director of Graduate Studies will notify the student, the major professor, and the student's advising committee of their decision. The CEM program is not responsible for replacing any stipend and tuition support provided by the first faculty mentor, and it is possible that stipend and tuition support for the student may be lost.

ACADEMIC HONESTY

Expectations

Plagiarism or academic cheating of any description (during closed-book examinations, thesis/dissertation preparation, manuscript preparation, and research) is considered a serious breach in academic honesty, as is falsification of data.

Violations

Violations of academic honesty by a student should be reported in writing to the Director of Graduate Studies. The student will be notified, in writing, of the charge(s) by the committee within 7 days of the latter receiving the charge. The Director of Graduate Studies will investigate the circumstances of the alleged offense by meeting with both the accuser and the accused and either impose a penalty or dismiss the charges within 30 working days of student notification of the charge (unless an extension requested by the student is approved).

Penalties

Appropriate penalties for violation of academic honesty are probation, suspension, or dismissal. The exact penalty will depend on the circumstances under which the violation was committed.

Appeals

After a hearing by a CEM appeals panel, a student dissatisfied with the decision rendered may appeal the decision to the [Appeals Committee](#) of the Graduate Council in the manner detailed in [Hilltopics](#) under [Student Code of Conduct](#).

CONFLICTS OF INTEREST

- Students are discouraged from providing food and refreshments for participating faculty during comprehensive examinations and thesis/dissertation defenses. The student being examined is not expected or required to do this, and the action may place examining faculty in an uncomfortable situation. Following a successful examination or thesis/dissertation defense, it is then acceptable for participating faculty to be invited to a celebration.
- Students are not required to provide food and refreshments at regular committee meetings, and providing anything beyond inexpensive snacks and coffee or soft drinks is strongly discouraged.
- Students should not give gifts to faculty in the CEM program, including their own major professor, before they have completed all requirements for their degree. Although gift giving is common in other cultures, this practice can be misinterpreted as creating or contributing to a conflict of interest, and is therefore strongly discouraged.

GRIEVANCES AND APPEALS PROCEDURES

Appeals may involve the interpretation of and adherence to university, college, and department policies and procedures as they apply to graduate education and the issuance of grades based on specific allowable reasons stipulated in the [Graduate Council Appeal Procedure](#).

Appeal procedures in regard to allegations of misconduct or academic dishonesty are presented in [Hilltopics](#) under [Student Code of Conduct](#).

An initial appeal at the lowest level must be filed no later than 30 days after the incident that occasions the appeal.

Graduate students and faculty should first try to resolve the matter through informal discussions. If a satisfactory resolution is not met, the individual should file a grievance in writing to the Director of Graduate Studies. If applicable, any person accused in the grievance must be notified, in writing, by the Director of Graduate Studies within 7 days of receiving the written allegation. The student must present details of the grievance in person and provide documentation of the issue. The Director of Graduate Studies shall work with the student to appoint a three-member panel composed of faculty who are not involved in the dispute. The panel shall render a decision within 30 working days of receiving the grievance, unless an extension requested by any of the parties involved is approved. If any party is not satisfied by the decision of the panel, further appeals may be made to the [Appeals Committee](#) of the Graduate Council.

Students with grievances related to race, sex, color, religion, national origin, age, disability or veteran status should file a formal complaint with the [Office of Equity and Diversity](#), 1840 Melrose Avenue.

For all other problems students may encounter related to their graduate studies that they feel cannot be addressed by or to their major professor and committee, students are strongly encouraged to seek guidance from Director of Graduate Studies.

Undergraduate students who wish to appeal a grade in a graduate course should follow the procedures outlined in the [Undergraduate Catalog](#). No appeal may be filed later than 90 days after the final grade has been issued.

CEM COURSE LISTINGS

CEM students are not restricted to registration only within the CEM course listings and are expected to enroll in courses outside the program.

Codes for course offerings:

E – offered every semester

FA – offered in fall semester only

SP – offered in spring semester only

SU – offered in summer semester only

Alt – offered in alternate years

Even – offered in even-numbered years (e.g., 2020)

Odd – offered in odd-numbered years (e.g., 2021)

411 – Undergraduate Research Participation (1-3). Experience in active biomedical research projects under supervision of faculty. Students in pre-medicine, biology, and related majors may conduct research projects within designated areas. Satisfactory/No Credit grading only. May be repeated with consent. Maximum 9 credit hours. Contact coordinator prior to registering. E

500 – Thesis (1-15). P/NP only. E

501 – Special Topics in Comparative and Experimental Medicine (1-6). Specialized experience in comparative and experimental medicine. May be repeated. Maximum 12 credit hours. Consent of instructor. E

502 – Registration for Use of Facilities (1-15). Required for the student not otherwise registered during any semester when student uses university facilities and/or faculty time before degree is completed. Satisfactory/No Credit grading only. May be repeated. May not be used toward degree requirements. E

504 – Descriptive and Applied Epidemiology (3). Principles of epidemiology as well as historic and modern applications to human and animal diseases. Host-agent relationships, measurement of disease frequency, disease monitoring and control in human and animal populations, field investigations, animal health economics and production. FA

506 – One Health (3). Will address the link between human, animal, and environmental health. Each online module focuses on some aspect of “One Health” and may include topics such as emergency preparedness, zoonotic diseases, antibiotic resistance and food safety, responsible pet ownership and the human-animal bond, and the effects of climate on disease prevalence. Methods of intervention and problem solving such as research design, program evaluation, community education, and policy analysis are also incorporated. This is an online course. SU

507 – Epidemiology of Vector-Borne, Bacterial, and Viral Zoonotic Diseases (3). Emphasis is placed on understanding the host, agent, and environmental factors that determine the distribution of selected diseases of importance to both human and animal populations. Selected topics include vector-borne zoonoses, rabies, brucellosis, and psittacosis. This is an online course. Recommended Background: Public health, veterinary medicine, nursing courses, or students in these programs. Comment(s): Graduate or professional veterinary students at UTK and personnel employed by the Tennessee Department of Health and enrolled in the Applied Epidemiology Certificate Program. Consent of instructor. SU–Odd

508 – Epidemiology of Parasitic, Foodborne, and Bacterial Zoonotic Diseases (3). Emphasis is placed on understanding the host, agent, and environmental factors that determine the distribution of diseases of importance to both human and animal populations. Selected topics include anthrax and leptospirosis, in addition to parasitic and foodborne zoonoses. This is an online course. Consent of instructor. SU–Even

510 – Graduate Research Participation (1-3). Advanced research techniques while conducting individual biomedical research projects under supervision of faculty. May be repeated. Maximum 12 credit hours. Consent of instructor. E

515 – Current Topics in Comparative and Experimental Medicine (1-6). Specialized experience in comparative and experimental medicine. May be repeated. Maximum 12 credit hours. Consent of instructor. E

525 – Research Ethics for the Life Sciences (1). Cross-listed: (Plant Sciences 525). How good research conduct and knowing the rules of science can enable success in life science research. Bioethics is not a focus. FA

530 – Wildlife Diseases (2). Cross-listed: (Wildlife and Fisheries Science 530). Necropsy of birds and mammals. Recognition of various diseases and methods of preparing pathological materials in field and lab. Investigative procedures concerning wildlife diseases. FA–Even

531 – Wildlife Medicine: Conservation and Policy (2-3). Cross-listed: (Veterinary Medicine 875). Both online and in-person study abroad components. The online portion of the course will explore policy and economics of wildlife medicine as well as address human health concerns in developing nations. A clinical component abroad will allow students to learn to handle and treat medical and surgical conditions in wild animals. Students must satisfactorily complete online modules and associated assignments, participate in didactic and clinical activities while abroad, and write a reflective paper upon completion of the course. Contact Hour Distribution: 1 hour online, 1–2 hours off campus. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated. Maximum 6 credit hours. Comment(s): Veterinary Medicine students may count the course only once (either 2 or 3 credit hours) toward degree requirements. Registration Permission: Consent of instructor. SP

535 – Capstone Experience (1-3). Capstone experience completed under the supervision of the student’s major professor and master’s committee. Individual project involving a literature survey, development of a white paper, or other suitable project. Grading Restriction: Satisfactory/No Credit grading only. Repeatability: May be repeated once. Registration Restriction: Master of Science - Forensic Odontology concentration. Registration Permission: Consent of instructor. E

541 – Cellular and Molecular Basis of Disease (3). Disease at the molecular level. Changes in molecular events in cells that lead to disease and occur as a result of disease. Correlation with clinical and pathological states. Systems covered: neurological, structural, respiratory, circulatory, metabolic, endocrine, reproductive, and immunological. Prerequisite: Biochemistry and Cellular and Molecular Biology 419, or equivalent. FA

544 – Cancer Cell Biology (3). Comprehensive discussion of the major mechanisms of cancer initiation, promotion, and progression. Emphasizes experimental approaches, signaling pathways, technology, and animal models that are employed to study cancer. Students are expected to learn about common laboratory techniques in cancer research, apoptosis/cell cycle, and the following as they relate to cancer: alternative splicing, signaling pathways, inflammation, chemo/dietary prevention, animal models, pathobiology, PET/CT imaging, genetics, lipids, radio-oncology, metastasis/angiogenesis, and obesity. Recommended background: Advanced biology, including cell biology, molecular biology, biochemistry, microbiology, or genetics. FA–Odd

550 – Introduction to Forensic Odontology (3). Development of the discipline within a medico-legal context. From crime scene to positive identification to courtroom, dental remains as evidence are studied from a historic to current approach using taphonomic, radiographic, histologic, pathologic, and anthropologic perspectives. Consent of instructor. FA

552 – Head and Neck Anatomy (4). Detailed gross dissection of the human head and neck with traditional musculo-skeletal and neuro-vascular emphasis. 1 hour lecture and 3 hours lab per week. Consent of instructor. SP

554 – Dental and Maxillofacial Anatomy/Histology (4). Human dento-facial embryology, odontogenesis, mineralized tissue histology and dental morphology. 3 hours lecture and 1 hour lab per week. Consent of instructor. FA

556 – Head and Neck Osteology and Trauma (4). Detailed neuro- and viscerocranial osteology, including embryology, post-natal facial growth and development, aging and degenerative pathology, and perimortem trauma. 2 hours lecture and 2 hours lab per week. Prerequisite: CEM 552. Consent of instructor. SU

558 – Laboratory Methods in Forensic Odontology (4) Instruction in oral autopsy procedures, preparation of crime scene or autopsy-related evidence, preparation of gross specimens and analysis, charting of dentitions, photography and radiography of dentitions, report writing for legal medicine, and dissection and light microscopy of tissues for reports and courtroom testimony. 1 hour lecture and 3 hours lab per week. Consent of instructor. SU

600 – Doctoral Research and Dissertation (3–15). P/NP only. E

601 – Advanced Epidemiology (3). Epidemiological study design, data analysis, and model building. Emphasis placed on using, understanding, and making inferences based on least squares, logistic, Poisson, survival, and mixed models. STATA will be used as the basic computing language for all analyses. Recommended Background: Graduate-level epidemiology or statistics course. SP–Odd

602 – GIS and Geographical Epidemiology (3). Principles and applications of Geographical Information Systems (GIS) and geographical epidemiology in human and animal health research and practice. Exposure to a wide range of spatial analysis techniques useful in the investigation of human and animal disease problems as well as vector dynamics. The knowledge gained is useful in guiding disease prevention and control strategies. Recommended Background: Graduate-level epidemiology or statistics course. SP–Even

603 – Advanced Veterinary Hematology (1-2). Topics related to veterinary hematology at an in-depth level. The 1-credit-hour class consists of weekly discussions on a specific hematology topic. The 2-credit-hour class includes a second weekly session for microscopic evaluations of blood smears and bone marrow slides. May be repeated. Maximum 4 hours. Consent of instructor. SP

- 604 – Principles of Comparative Pharmacokinetics (3).** Addresses the fundamental principles of absorption, distribution, metabolism, and elimination of xenobiotics in animals and humans. Quantitative aspects will include basic study design as well as mathematical modeling of plasma concentration vs time data. Hands-on sessions will include basics of pharmacokinetics and modeling, case studies in clinical patients, bioequivalence studies, pharmacokinetic linearity, and the effect of factors on the fate of chemicals in the body of animals and humans. 2 hours and 1 lab. Recommended background: Previous academic exposure in physiology, biostatistics, or mathematical modeling. Consent of instructor. FA
- 605 – Resident Systems Seminars (1).** Topics related to the various body systems or to medical information systems, including Oncologic, Cardiovascular, Musculoskeletal, Dermatologic, Endocrine, Digestive, Urinary, Ophthalmologic, Infectious, Respiratory, Nutritional, Neurologic, Reproductive, and Statistics and Writing. May be repeated. Maximum 12 credit hours. Recommended background: Professional degree. Consent of instructor. E
- 606 – Advanced Large Animal Internal Medicine (2).** Topics related to large animal internal medicine, including basic physiology, pathophysiology, and systems-based coursework. May be repeated. Maximum 8 hours. Recommended background: Professional degree. Consent of instructor. FA, SP
- 607 – Diagnosis and Pathogenesis of Virus Diseases of Domestic Animals (3).** Advanced study of virus diseases important to domestic animals: virus biology, pathogenesis, pathology, and diagnosis technical training in virus diseases diagnosis. 2 hours and 1 lab. Consent of instructor. SU–Alt
- 610 – Advanced Topics in Comparative and Experimental Medicine (1–3).** Specialized, in-depth experience in various disciplines. Current and future research methodology, recent advances in instrumentation in analytical techniques for comparative medicine. May be repeated. Maximum 12 credit hours. E
- 611 – Journal Club in Emerging Infectious Diseases (1).** Readings and discussions based on current literature. May be repeated. Maximum 12 credit hours. FA, SP
- 612 – Journal Club in Biomedical and Diagnostic Sciences (1).** Readings and discussions based on current literature. May be repeated. Maximum 12 credit hours. E
- 613 – Journal Club in Large Animal Clinical Sciences (1).** Readings and discussions based on current literature. May be repeated. Maximum 12 credit hours. E
- 614 – Journal Club in Small Animal Clinical Sciences (1).** Readings and discussions based on current literature. May be repeated. Maximum 12 credit hours. Must have DVM or equivalent degree. E
- 615 – Journal Club in Comparative and Experimental Medicine (1).** Readings and discussions based on current literature. May be repeated. Maximum 12 credit hours. E
- 616 – Comparative and Experimental Medicine Seminar (1).** Research seminars pertinent to disciplines within the program. Satisfactory/No Credit grading only. May be repeated. Maximum 12 credit hours. Maximum 3 credit hours may be applied toward degree requirements. FA, SP
- 617 – Medical Biology Seminar (1).** Invited speakers. Topics posted in advance. Satisfactory/No Credit grading only. May be repeated. Maximum 12 credit hours. Maximum 3 credit hours may be applied toward degree requirements. FA, SP
- 618 – Advanced Topics in Medical Science (1-3).** New developments in biological research applicable to clinical medicine. May be repeated. Maximum 12 credit hours. Primarily for doctoral candidates in Comparative and Experimental Medicine. Consent of instructor. E
- 620 – Current Topics in Comparative and Experimental Medicine (1–3).** Specialized, in-depth experience in various disciplines, such as current and future research methodology, and recent advances in instrumentation in analytical techniques for comparative medicine. May be repeated. Maximum 12 credit hours. E
- 650 – Surgical Pathology (1-2).** Examination of biopsy specimens and interpretation of observations. Preparation of specimens for sectioning. May be repeated. Maximum 3 credit hours. Consent of Instructor. E
- 652 – Disorders of the Endocrine System (2).** Cross-listed: (Animal Science 652). Pathological and physiological aspects of diseases; endocrine glands of various animal species. Recommended Background: 3 credit hours of physiology. SP–Even

College of Veterinary Medicine

Biomedical and Diagnostic Sciences

Cox, Sherry – MS, PhD

scox6@utk.edu

Research Emphasis: Pharmacology

Donnell, Robert – DVM, PhD, DACVP

rdonnell@utk.edu

Research Emphasis: Pathogenesis of amyloid formation, deposition and clearance via use of transgenic models, development of antibodies and clinical evaluation of novel approaches

Fecteau, Kellie – MS, PhD

kfecteau@utk.edu

Research Emphasis: Clinical endocrinology

Flatland, Bente – DVM, MS, DACVIM, DACVP

bflatlan@utk.edu

Research Emphasis: Clinical pathology quality management, method validation/comparison, point-of-care testing, coagulation, hematology, chemistry of stains and staining, diagnostic cytology

Fry, Michael – DVM, MS, DACVP

[mfry@utk.edu](mailto:m fry@utk.edu)

Research Emphasis: Canine hepcidin, reticulocyte indices as markers of iron deficiency

Gerhold, Richard – DVM, MS, PhD

rgerhold@utk.edu

Research Emphasis: Wildlife and public health-associated parasite epidemiology; protozoa and tick-borne diseases

Giori, Luca – DVM, PhD

lgiori@utk.edu

Research Emphasis: All aspects of laboratory medicine, with a specific interest in diagnostic of adrenal endocrinopathies

Kania, Stephen – MS, PhD

skania@utk.edu

Research Emphasis: Immunology and diagnosis of infectious diseases, microbial molecular diversity, and mechanisms of bacterial virulence

Kennedy, Melissa – DVM, PhD, DACVIM

mkenned2@utk.edu

Research Emphasis: Coronavirus, infections in felidae, viral diseases of non-domestic species

Martin-Jimenez, Tomas – DVM, PhD DECVPT, DACVPC

tmartinj@utk.edu

Research Emphasis: Pharmacology

McEntee, Michael – DVM, DACVP

mmcentee@utk.edu

Research Emphasis: Gross, histologic, and ultrastructure and ultrastructural pathology

Miller, Debra – DVM, MS, PhD

dmille42@utk.edu

Research Emphasis: Amphibian diseases; Leatherback sea turtle and marine and Arctic mammal pathology

Newkirk, Kim – DVM, PhD, DACVP

knewkirk@utk.edu

Research Emphasis: Mouse models of human disease; mouse phenotyping

Odoi, Agricola – BVM, MSc, PhD, FAHA, FACE

aodoi@utk.edu

Research Emphasis: Applications of GIS & spatial epidemiology in health research & practice; zoonotic infections of public health significance; determinants of population health

Okafor, Chika – DVM, MS, PhD

okaforch@utk.edu

Research Emphasis: Qualitative veterinary epidemiology and public health; food safety in foods of animal origin

Reed, Robert – DVM, PhD

rbreed@utk.edu

Research Emphasis: Nutritional regulation of LHRH and LH secretion and effects on the reproductive axis; Macroscopic and applied anatomy of domestic and exotic species

Rouse, Barry – DVM, MSc, PhD

btr@utk.edu

Research Emphasis: Comparative cellular and molecular immunology; viral infection diseases

Schaefer, Deanna – DVM, MS, DACVP

dschaefer@utk.edu

Research Emphasis: Hematopathology; comparative hematology; iron metabolism

Souza, Marcy – DVM, MPH, DABVP, DACVPM

msouza@utk.edu

Research Emphasis: Infectious diseases; zoonoses of wildlife and exotic pets

Thompson, Sharon – DVM, MPH

srthompson@utk.edu

Research Emphasis: Food safety and defense

Wang, Hwa-Chain Robert – BVM, MS, PhD

hcrwang@utk.edu

Research Emphasis: Anti-cancer molecular oncology

Large Animal Clinical Sciences

Adair, Henry S. – DVM, MS, DACVS, DACVSMR, CERP
sadair@utk.edu

Research Emphasis: Equine laminitis; laser Doppler flowmetry; microvascular blood flow and laser surgery

Anderson, David – DVM, MS, DACVS
dander48@utk.edu

Research Emphasis: Bovine pain and welfare; ruminant surgery; animal models for human research

Beever, Jon – MS, PhD
jbeever@utk.edu

Research Emphasis: Livestock genomics.

Caldwell, Marc – DVM, PhD, DACVIM
mcaldwell@utk.edu

Research Emphasis: Infectious diseases of food animals with particular focus on bacterial pathogenesis and host-pathogen interactions

Collar, Elizabeth – DVM, PhD, DACVS
ecollar@utk.edu

Research Emphasis: Musculoskeletal injuries in race and performance horses

Dhar, Madhu – MS, PhD
mdhar@utk.edu

Research Emphasis: Animal models of human disease with special relevance to obesity and diabetes

Lear, Andrea – DVM, MS, PhD, DACVIM
alear@utk.edu

Research Emphasis: Reproductive and placental immunology, infectious disease, neonatology

Mulon, Pierre-Yves – DVM, DES, DACVS
pmulon@utk.edu

Research Emphasis: Biomechanics, bone healing, regenerative medicine, bone implant interface, osseointegration

Prado, Tulio – DVM, MS, DACT
tprado@utk.edu

Research Emphasis: Large animal reproductive efficiency with emphasis on food animal production medicine. General animal reproduction including companion animals, lamoids, and equine.

Seddighi, M. Reza – DVM, MS, PhD, DACVAA, CVMA
mrsed@utk.edu

Research Emphasis: Pharmacokinetics and dynamics of analgesics and anesthetics

Whitlock, Brian – DVM, MS, PhD, DACT
bwhitloc@utk.edu

Research Emphasis: Reproductive physiology and endocrinology; interaction of metabolic and reproductive systems

Small Animal Clinical Sciences

Jones, Michael – DVM, DABVP (Avian)
mpjones@utk.edu

Research Emphasis: Avian medicine

Millis, Darryl – DVM, MS, DACVS, CCRP, DACVSMR
dmillis@utk.edu

Research Emphasis: Effects of growth factors on bone healing; canine gait analysis

Morandi, Federica – DVM, MS, DECVDI, DACVR
fmorandi@utk.edu

Research Emphasis: CT; nuclear Medicine; PET

Murphy, Maryanne – DVM, PhD, DACVN
mmurph30@utk.edu

Research Emphasis: Obesity prevention and management

Rollins, Angela – DVM, PhD, DACVN
arollins@utk.edu

Research Emphasis: Veterinary nutrition

Tobias, Karen – DVM, MS, DACVS
ktobias@utk.edu

Research Emphasis: Portosystemic shunts

Whittemore, Jacqui – DVM, PhD, DACVIM
jwhittemore@utk.edu

Research Emphasis: Vaccine-associated immune disorders; pancreatic and liver disorders; non-invasive interventional techniques

Entomology & Plant Pathology, Food Science, Public Health, Nutrition

Barroso, Cristina – DrPH

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Research Emphasis: Child and adolescent health disparities, childhood obesity, healthy eating, active living, and body image

Brown, Kathleen C. – PhD, MPH

kcbrown@utk.edu

Research Emphasis: Health issues and how they affect the overall quality of life and health of the community

Chen, Jiangang (Jay) – MM, PhD

jchen38@utk.edu

Research Emphasis: Impacts of environmental toxicants on development and reproductive function

D'Souza, Doris – PhD

ddsouza@utk.edu

Research Emphasis: Rapid detection & tracking systems for foodborne pathogens in the food environment to prevent outbreaks and recalls

Kintziger, Kristina W. – PhD, MPH

kkintzig@utk.edu

Research Emphasis: Understanding the vulnerabilities and current & future disease burden associated with climate-sensitive hazards; understanding the relationship between

Raynor, Hollie – PhD, MS

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Research Emphasis: Lifestyle interventions for obesity treatment in children and adults; examining environmental dietary factors which influence food consumption

Trout Fryxell, Rebecca – MS, PhD

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Research Emphasis: Surveying vector populations and assessing pathogen prevalence; ascertaining specific biologies and life histories of vectors by population, species, and/or community; investigating population specific vector ecology and genetics; and developing and evaluating novel methods for vector management and disease suppression

UT Graduate School of Medicine

Gerard, David – PhD

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Research Emphasis: Bone activity in response to implanted materials and bone response to growth factors

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Research Emphasis: Vascular/transplant surgery

Grandas, Oscar – MD

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Research Emphasis: Pancreas transplantation

Karlstad, Michael D. – PhD

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Research Emphasis: Regulation of pulmonary inflammation and protein metabolism by protein and lipid mediators in critical illness and trauma

Kennel, Stephen – PhD

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Research Emphasis: Human immunology & cancer

Marks, Murray K – PhD

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Research Emphasis: Mineralized tissue biology and histology; dental enamel histopathology; skeletal trauma histology; fetal dental development, human identification/forensic anthropology

Mountain, Deidra - PhD

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Research Emphasis: Vascular/transplant surgery

Terry, Paul – PhD, MPH

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Research Emphasis: Epidemiology

Wall, Jonathan S. – PhD

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Research Emphasis: Amyloid and other abnormal protein assemblies

APPENDICES

Forms

- CEM Forms
 - vetmed.tennessee.edu/research/Pages/gp_current_students.aspx
- Graduate School Forms
 - gradschool.utk.edu/forms-central/

Funding

- Costs and Funding Opportunities
 - tiny.utk.edu/grad-funding
- Financial Aid and Scholarships
 - onestop.utk.edu/financial-aid
- Travel Awards for Research Presentation – Graduate Student Senate
 - gss.utk.edu/travel-awards

International Students

- Center for Global Engagement
 - cge.utk.edu
- International House
 - ihouse.utk.edu

Professional Development & Training

- Best Practices in Teaching
 - tiny.utk.edu/bpit
- Center for Career Development & Academic Exploration
 - career.utk.edu
- Center for Integration of Research and Teaching (UT CIRTL)
 - teaching.utk.edu/utcirtl
- Experience Learning
 - experiencelearning.utk.edu
- Libraries Information for Graduate Students
 - libguides.utk.edu/graduate
- Office of Graduate Training and Mentorship (OGTM)
 - gradschool.utk.edu/training-and-mentorship
- Teaching & Learning Innovation
 - teaching.utk.edu

Student Resources

- Academic Appeals
 - tiny.utk.edu/rights-obligations
- Admissions, Graduate
 - gradschool.utk.edu/admissions
- Comparative and Experimental Medicine
 - vetmed.tennessee.edu/research/Pages/Graduate_Program.aspx
- Counseling Center
 - counselingcenter.utk.edu
- Equity and Diversity, Office of
 - oed.utk.edu
- Graduate Catalog
 - catalog.utk.edu/index.php?catoid=30
- Graduate School
 - gradschool.utk.edu
- Graduate Student Senate
 - gss.utk.edu
- Graduation Deadlines
 - tiny.utk.edu/grad-deadlines
- Housing
 - housing.utk.edu
- Multicultural Student Life
 - multicultural.utk.edu
- OIT - Office of Information Technology
 - oit.utk.edu
- Office of Title IX (sexual assault, relationship violence & stalking)
 - titleix.utk.edu/
- Research Integrity
 - research.utk.edu/compliance
- Safety – LiveSafe Campus Safety App
 - prepare.utk.edu/app/
- Student Conduct and Community Standards
 - studentconduct.utk.edu
- Thesis/Dissertation Consultant
 - gradschool.utk.edu/thesesdissertations