

## **Master of Veterinary Anatomic Pathology (MVAP)- Curriculum Overview**

We propose a new professionally-oriented master's degree and residency program in Veterinary Anatomic Pathology. This professional master's degree will rely on existing graduate level courses used in the combined anatomic pathology residency and PhD program. Because the duration of this program of study is shorter than the combined residency/PhD program, we propose adding one new course, Introduction to Histopathology, to accelerate clinical competency.

### ***Master's program description:***

For the current residency training curriculum, students are required to complete 30-36 hours of clinical service each week in VET\_PATH 542 (Advanced Diagnostic Pathology). This course provides experiential pathology training through the Washington Animal Disease Diagnostic Laboratory's necropsy (synonym: autopsy) and surgical biopsy services, and under the mentorship of faculty pathologists. The experiential learning and "in the moment" mentoring provided in this course are complemented by weekly gross and microscopic pathology rounds. For the professionally oriented master's degree program, we propose changing VET\_PATH 542 to a graded course and increasing the number of credit hours to 3 hours/semester (course curricular changes have been submitted through the faculty senate). To help accelerate clinical competency in a condensed 3-year training format, we propose creating a new 1 credit hour introductory histopathology course ("Introduction to Histopathology," previously submitted through the faculty senate). All master's students will also take VET\_PATH 592 (Anatomic Pathology Seminar), which is an existing graduate course taught by faculty pathologists. This course focuses on special topics and is designed to broaden a resident's knowledge of uncommon diseases, microscopic pathology, gross and microscopic lesion interpretation, and disease pathogenesis.

Most career veterinary anatomic pathologists in academia and industry engage in data analysis and scholarly activity/research. To help prepare students for this aspect of their career, the proposed program will include one 400-500 level statistics course (e.g., STAT 511; Statistical Methods for Graduate Researchers). The Master of Veterinary Anatomic Pathology would culminate with 701 Master's special project that would be completed in the final two semesters of the program. These projects will be approved by the student's graduate committee and could include pathology case reports, case series, pathology-focused collaborative research projects, and retrospective studies of diagnostic case material. Students will be required to submit a project-related manuscript for publication in a peer-reviewed scientific journal.

### ***Proposed program of study:***

- 30 hours minimum of total credits
- 26 hours minimum of graded course work
  - 1 hour of Introduction to Histopathology (VET\_PATH 582)
  - 18 hours of VET\_PATH 542 (3 hours in spring and fall semester per year)
  - 12 hours of VET\_PATH 592 (2 hours in spring and fall semester per year)
  - 1-4 hours of statistics
- 2-4 hours VET\_PATH 702 (Master's special project); a minimum of 2 hours must be taken in the semester of project completion

### **Required Courses:**

**Introduction to Histopathology (VP-582):** All students in the Master of Veterinary Anatomic Pathology program will be required to complete 1 credit hour of Introduction to Histopathology, typically taken in the fall semester of year one. This course will cover basic histopathological changes and terminology of common diseases in domestic and non-domestic animals. The emphasis will be on pattern recognition, diagnoses, and written descriptions. In addition, students will learn basic tissue processing techniques and gain competency in digital slide assessment. This course will be team-taught by ACVP board-certified faculty pathologists; students will be evaluated based on weekly assignments (e.g., written descriptions of histologic sections and related diagnoses), class participation, and a cumulative final exam (i.e., “ACVP-board style” exam based on 4-5 unknown slides representing the spectrum of disease processes and animal species covered throughout the course). *Proposed course syllabus included as a separate attachment to this proposal.*

**Advanced Diagnostic Pathology (VET\_PATH 542):** This is the core diagnostic pathology course for veterinary anatomic pathology residents taught through participation in diagnostic service at the Washington Animal Disease Diagnostic Laboratory (WADDL) under the supervision and instruction of the faculty pathologists who are diplomates of the American College of Veterinary Pathologists. During the course, faculty pathologists will provide daily “in the moment” mentoring to residents on real and varied cases that have been submitted to the diagnostic laboratory, developing skills in gross and microscopic pathology for a wide array of species. Training will include techniques in necropsy, interpretation of microscopic lesions in standard hematoxylin and eosin-stained slides, histochemistry, immunohistochemistry, and digital pathology. Residents will also develop the ability to correlate lesions with clinical history and laboratory findings, including clinical pathology, bacteriology, immunology, parasitology, serology, toxicology, virology, and molecular diagnostics. Residents will develop the ability to integrate the information through an understanding of disease pathogenesis and pathophysiology, as well as interpret what the information means for animal/herd treatment and husbandry, and produce accurate, concise, and useful diagnostic reports for clinicians and animal owners. Residents/master’s students will spend approximately 30-36 hours/week in diagnostic service throughout each year and will complete 6 hours of Advanced Diagnostic Pathology credits each year (3 hours/semester) up to a maximum of 18 credits. While it is exceptional to ask so many credit hours of the same course for a master’s degree program, we believe it is appropriate because this type of “real life” on-the-job clinical training will continuously provide new and varied learning opportunities. Furthermore, the number of actual hours students will dedicate to becoming a competent pathologist through this course far exceeds the proposed credit hours and expectations of other graduate level courses. These expectations are on par with recognized anatomic pathology residencies. The guidelines and expectations, including amount of time spent directly on diagnostic pathology duties, for veterinary pathology residencies are set by the American College of Veterinary Pathologists (ACVP). *Proposed modifications to existing course syllabus included as a separate attachment to this proposal.*

**Anatomic Pathology Seminar (VET\_PATH 592):** This is a 2-credit hour graded course that is designed to complement VET\_PATH 542 by exposing students to uncommon presentations of common diseases and to diseases that are not seen in our region (e.g., foreign animal

diseases). It also provides more in-depth discussions of disease pathogenesis and ensures that knowledge gaps left by experiential learning are filled before students take the ACVP board certification exam.

The course typically meets every Thursday and Friday of the fall and spring semester and is coordinated by a faculty pathologist. Thursdays are dedicated to the histologic manifestations of disease and are organized in a 'systems' approach, in which most major body systems will be covered over approximately 6 semesters. Each semester covers 2 or 3 organ systems or special topics. To help broaden the student experience, outside anatomic pathologists with subspecialties may be invited at the discretion of the course coordinator to instruct individual seminars. Students are assessed based on the quality of their histologic descriptions and oral presentations, and their ability to interpret histologic lesions and reach a final diagnosis. Fridays are dedicated to discussing the gross manifestations of disease and are driven by the diagnostic case load seen by students during resident diagnostic duties in the Washington Animal Disease Diagnostic Laboratory (WADDL). Students will collect gross samples or photographs, present their findings, and facilitate discussion of relevant diagnostic features and/or pathophysiologic processes. One week per month the class time will be dedicated to a gross lesion quiz to be given by one of the course coordinators, on a rotating schedule. Lastly, the spring semester will include an ACVP-style mock histologic and gross examination.

**Statistical Methods for Graduate Researchers (STAT 511):** This course focuses on the fundamentals of experimental design and statistics for graduate students across scientific disciplines. Graduate students at WSU conduct research in a diverse array of settings from small-scale lab studies to observational studies across broad regions. This course will instruct students in the principles of designing experiments and analyzing data from designed experiments, and address questions of interest at each of these scales. The course will instruct students on how to develop statistical hypotheses as an approach to answering research questions in the student's discipline. Students will then develop experimental or observational designs so that appropriate data can be collected and a modeling protocol developed so that the research question can be answered. This course is meant to provide a broad overview of a variety of statistical designs and techniques, so as to enable students to be able to analyze data using the methodologies developed in the course. This course is provided by the WSU Department of Mathematics and Statistics and it is typically offered Fall and Spring semesters.

**Master's Special Project (VET\_PATH 701):** Students will be required to complete a minimum of 4 credit hours of VET\_PATH 701, two of which must be taken in the semester of project completion. Projects will be selected under the guidance of a faculty pathologist advisor and integrate the clinical/diagnostic knowledge and skills acquired throughout the program. Projects may include pathology case reports, case series, pathology-focused collaborative research projects, and retrospective studies of diagnostic case material. Publication of an associated manuscript in a peer-reviewed scientific journal is highly encouraged, but it is not a requirement for graduation. Projects will be evaluated by the student's major advisor and graduate committee, with a ballot meeting held in the semester of project completion. *Proposed course syllabus included as a separate attachment to this proposal.*

***Elective courses:***

Additional credit hours for each semester can be obtained through a variety of course offerings that are relevant to the student's career goals in Anatomic Pathology but must be approved by the student's major faculty advisor. These courses include but are not limited to the following.

**Advanced Clinical Pathology (VMS 580):** This is a 1 credit hour course for graduate veterinarians to meet in a small group for discussion of laboratory and cytologic abnormalities as recognized in recent cases from the Veterinary Teaching Hospital.

**Topics in Biomedical Experimentation (VET\_PATH 564):** This course examines the philosophy of experimental design, ethics, practical application, responsible conduct and analysis of various experimental approaches in biomedical research. The Topics in Biomedical Experimentation course and its modules are typically offered during the Spring semester. Each section is taught within a 5-week block of time called a module. Each module is worth 1 credit.

**Mechanisms of Disease (VET\_PATH 545):** This is a 4-credit hour course for immunology and infectious disease graduate students that teaches biomedical and immunologic mechanisms involved in disease processes from a comparative standpoint.