

# **PROGRAM REVIEW REPORT**

**PATHOBIOLOGY GRADUATE PROGRAM (PH. D)**  
*COLLEGE OF VETERINARY MEDICINE*  
*KANSAS STATE UNIVERSITY*  
*MANHATTAN, KS 66506*

## **I. Introduction**

### **A. College, Department and Date**

College of Veterinary Medicine, Department of Diagnostic Medicine/Pathobiology, April 18, 2008

### **B. Person responsible for preparing the report**

T. G. Nagaraja, Professor and Director of the Pathobiology Graduate Program and Dr. M. M. Chengappa, Professor and Head of the Department of Diagnostic Medicine/Pathobiology

### **C. Brief Description of the Department/Program**

The Department of Diagnostic Medicine/Pathobiology (DM/P) is one of the three academic departments in the College of Veterinary Medicine. The DM/P is a multi-disciplinary department with faculty expertise in Bacteriology, Epidemiology and Public Health, Food Safety, Security and Policy, Immunology, Molecular Biology, Parasitology, Pathology (Anatomic and Clinical), Production Animal Medicine and Management, Toxicology, and Virology. Currently, the department has 36 faculty members and 78 classified and unclassified staff. Of the 36 faculty members, 15 are Professors, including three University Distinguished Professors, 7 are Associate Professors, and 14 are Assistant Professors. In addition, the department has two Assistant Professors with part time appointment. Also, 16 faculty members have Kansas Agriculture Experiment station appointments with appointments ranging from 20 to 80% commitment to food animal disease research. The Department also has 17 adjunct and ancillary Assistant/Associate/Professors with research, teaching and/or service responsibilities.

The department is committed to excellence in teaching (professional and graduate), research and services in areas related to animal and public health. The department contributes to the advancement of knowledge and the veterinary profession through its experimental and clinical investigations of diseases of animals. In addition, the Veterinary Diagnostic Laboratory (VDL), located in the Department, provides high quality, diagnostic and consultative services to veterinarians, livestock producers, animal owners, public health officials, researchers, and commercial enterprises in and around the state of Kansas. The VDL serves the animal health and biosecurity requirements of Kansas and the surrounding region. The VDL is a full service, American Association of Veterinary Laboratory Diagnosticians (AAVLD)-accredited veterinary diagnostic laboratory that has diagnostic responsibilities in both CDC's Laboratory Response Network (LRN) and the USDA/DHS's National Animal Health Laboratory Network (NAHLN). As a NAHLN laboratory, the VDL is involved in the development and implementation of standard diagnostic techniques for identification of select agents, including rapid, high-throughput technologies using modern equipment. In addition, there are experienced laboratory and clinical personnel trained in the detection of emergent, foreign and bioterrorism agents. The NAHLN membership provides the VDL at K-State with a strategic advantage by effectively guaranteeing the expertise of the diagnosticians, the quality and accuracy of the diagnostic services and the excellence of the associated innovation programs.

Currently, the Pathobiology Graduate Program has 51 faculty members representing 5 Departments (Anatomy and Physiology, Animal Sciences, Biochemistry, Biology, Clinical Sciences, and Entomology) and 3 Colleges (Agriculture, Arts and Sciences, and Veterinary

Medicine). The majority (30) of the faculty belongs to the Department of Diagnostic Medicine and Pathobiology. The Department of Clinical Sciences has 8 faculty members in the program and the reason for such a high representation is because the Clinical Sciences Department does not have a Ph. D. program and many of the graduate students mentored by the Clinical Sciences faculty are enrolled in the Pathobiology Graduate Program. Additionally, the Pathobiology Program has adjunct faculty from outside Kansas State University, 3 from other universities, and one each from a Private Company, the State Government and the Federal Government. These faculty members generally serve as members of the supervisory committees of graduate students.

Currently, the Pathobiology Graduate Program has 22 PhD students. The following table provides details about number of students admitted and graduated.

<b>Year</b>	<b>No. of students in the program</b>	<b>No. of students admitted</b>	<b>Number of students graduated</b>	<b>Number of students discontinued</b>
2003	13	4	3	2
2004	18	6	1	1
2005	18	2	2	1
2006	21	8	1	2
2007	26	10	5	0
2008	22	2	1	

The Department also has a strong, nationally recognized residency training program. These programs are in Anatomic Pathology, Clinical Pathology and Toxicology. Residency training is a 3-year program of intense study for post-DVM students who desire advanced and expanded training in Pathology or Toxicology, with a goal of board certification by the American College of Veterinary Pathologists (ACVP) or American College of Veterinary Toxicologists (ACVT). The Toxicology Residency program in the Department allows the participant to be thoroughly trained in clinical and diagnostic toxicology with a sound foundation for understanding the biochemical bases of chemically-induced diseases. Specialties such as Biochemical Toxicology, Analytical Toxicology, and Risk Assessment are also options for interested students. The successful completion of board certification enhances opportunities and marketability of veterinarians for careers in academia, industry, private laboratories, or government. Such training benefits the practices of primary practitioners, researchers in industries, and academic clinicians. As an example, toxicology residents are thoroughly trained in clinical and diagnostic toxicology with a sound foundation for understanding the biochemical bases of chemically-induced disease. The program is conducted predominantly by the board certified pathology or toxicology faculty of the department. Additionally, other faculty and technical personnel in the department provide service, research, and teaching expertise to the program.

#### **D. Brief history of the Department/Program**

The Department of Diagnostic Medicine/Pathobiology is the combination of three departments (Pathology, Laboratory Medicine, and the Veterinary Diagnostic Investigation) that merged at two different times. The faculty and staff in Pathology and Laboratory Medicine were primarily involved in teaching and research with some service responsibilities. Personnel in the Diagnostic Laboratory were predominately service-oriented, with some teaching in the veterinary

curriculum, and little to no research and graduate teaching. Veterinary Pathology and Laboratory Medicine merged in 1993 to form the Department of Pathobiology. In 1996, the Department of Pathobiology merged with the Department of Veterinary Diagnostic Medicine to form the current department. In the initial 3 department structure, diagnostic pathology services, including clinical pathology, were duplicated in the Pathology department and the Diagnostic Laboratory. The Pathology department processed cases presented to the teaching hospital while the Diagnostic Laboratory provided service to practitioners in around the State of Kansas. The formation of Pathobiology/Diagnostic Medicine consolidated all three responsibilities (teaching, research, and service) in one administrative unit. In 2006, the Veterinary Diagnostic Laboratory (VDL) became an operating division of K-State Diagnostic and Analytical Services (KDAS), a not for profit company wholly owned by Kansas State University.

#### **E. A listing of all degrees offered by the department by CIP code**

##### **26.0910 Ph. D. Pathobiology**

Graduate students enrolled in the program can specialize in any of the following disciplines: Bacteriology, Epidemiology and Public Health, Food Safety, Security and Policy, Immunology, Molecular Biology, Parasitology, Pathology (Anatomic and Clinical), Production Animal (bovine and swine) Medicine and Management, Toxicology, and Virology.

##### **51.2503 Certification in Feedlot Management**

The certification program is a joint venture of regional cattle producers, private industries, and academic and research units at Kansas State University, and it is designed to train students to manage a modern confinement feeding facility. The primary function of the certificate program is to prepare graduates for a career in feedlot production management while encouraging interdisciplinary educational experiences. The courses selected for the program are intended to expand a student's educational and career background with an understanding of the interdisciplinary nature of feedlot management by demonstrating the interrelationship of business administration, veterinary medicine, and livestock nutrition in the feeding industry. It is anticipated that the scientific and medical training of veterinarians, coupled with specialized knowledge of feedlot production management, will place certificate holders in a unique position to work with producers to develop cost-efficient programs that provide high quality, safe food products.

## **II. Department/Program Purpose**

### **A. Department/Program Mission Statement.**

#### **i. Department Mission Statement**

The departmental mission is to provide instruction, research, service, and continuing education in pathogenesis, prevention and control of infectious, non-infectious, immunological and

toxicological diseases of animals and humans. The department values diverse perspectives and backgrounds, and recognizes their vital contributions. The mission of the Veterinary Diagnostic Laboratory is to provide high quality, efficient diagnostic services to veterinarians who serve our livestock producers, animal owners, and public health officials. Also, the diagnostic lab provides services to instructors and researchers in the University and commercial enterprises in and around the state of Kansas as part of its mission.

**Teaching Mission.** The teaching mission is to provide excellent instruction using the best and most current information in a variety of media and teaching methodologies.

**Research Mission.** The research mission is to develop highly visible and competitive research programs that discover new information that benefits both food and companion animal industries.

**Service Mission.** The service mission is to provide "state-of-the-art" diagnostic services to livestock, poultry, and companion animal owners and their veterinary practitioners by providing prompt and accurate diagnoses.

## **ii. Program Mission Statement**

The mission of the Pathobiology Graduate Program is to provide a broad based graduate education to students seeking a Doctor of Philosophy in the areas of bacterial and viral pathogenesis, clinical and diagnostic pathology, epidemiology, food safety, security, and policy, immunology and immuno-modulation, parasitology, toxicology (clinical and environmental), and production animal medicine and management. The program graduate faculty members have established the programmatic requirements for admission, supervision, and completion of a Ph.D. within the overall policies of the graduate school and provide both the course instruction and the research training essential to accomplish the mission.

In 2006, the Pathobiology Graduate Group adopted four student learning outcomes (SLO) for Ph.D students. The outcomes students are expected to achieve are:

1. Abilities to formulate and design a hypothesis-driven research project (s), independently carry out the research methodology, critically analyze the data, and disseminate the research findings in the form of presentations at scientific meetings and peer-reviewed publications.
2. Professional and technical expertise in their chosen areas of study or disciplines.
3. Abilities to apply knowledge through critical thinking, to interpret or analyze and integrate information, to respond and adapt to changing situations, to make decisions, to solve problems, and to evaluate actions.
4. Effective oral and written communication skills.

Therefore, the major mission of the program is to have students who have graduated with a Ph.D. degree in Pathobiology demonstrate meeting or exceeding the learning outcomes.

**B. Brief statement of the centrality of the Department and its academic degrees to the College, University, and State.**

The Pathobiology Graduate Program at Kansas State University is an interdepartmental and interdisciplinary program that offers Ph.D., and combined D. V. M./Ph. D. degrees and is supported primarily by faculty in the Department of Diagnostic Medicine/Pathobiology (DMP). The program also has faculty from other departments, including Anatomy and Physiology, Animal Sciences, Clinical Sciences, Biochemistry, Biology, and Entomology. The program was first constituted as the Pathology Graduate Group in 1970. The program became more interdisciplinary as faculty from other disciplines joined the program resulting in the change of the program's name to Pathobiology. In the College of Veterinary Medicine, there are only two Ph.D programs, the Pathobiology program and one offered in Anatomy and Physiology. The Pathobiology program includes Ph. D students working under the guidance of faculty in the Clinical Sciences department whose research interests fit best with the Pathobiology program. Currently, the program has 9 graduate students in the area of Production Animal Medicine and Management. The Pathobiology Graduate Program is the largest in the College of Veterinary Medicine, consisting of 51 graduate faculty members and 22 active Ph. D. students. The program has an Executive Committee to oversee all program activities. The committee consists of four faculty members, one of whom serves as the Chair of the Committee and Director of the Graduate Program. An important aspect of this graduate program is that the basic training is received in a vibrant multi-disciplinary environment, exposing students to a variety of disciplines and research areas.

**C. Brief statement of the uniqueness of the Department's academic degrees to the College, University, Regents System, State, Region, and Nation.**

The Pathobiology Graduate Program in the College of Veterinary Medicine at Kansas State University is a unique program in the State of Kansas. It is the only program that offers a Ph. D degree in disciplines of Veterinary (or Comparative) Bacteriology, Epidemiology, Food Safety, Security, and Policy, Immunology, Molecular Biology, Parasitology, Pathology (Anatomic and Clinical), Toxicology, Virology, and Production Animal Medicine. Additionally, the Pathobiology Graduate Program encourages and offers opportunities to DVM students to concurrently work on a dual degree program (DVM/Ph. D) to gain research experience in their field of interest. The main purpose of this dual degree program is to provide selected professional veterinary students with a better understanding of research and prepare them for careers in academia or health and allied industries.

**D. Brief account of the Department's/Program's goals for academic degrees for the next 7 years.**

The Pathobiology Graduate Program has identified the following key goals and priorities for the next 7 years in support of maintaining and enhancing the quality, visibility and national and international recognition of the Program. The priorities identified are essentially to achieve the goal of meeting and exceeding the student learning outcomes.

### **Overall Priorities of the Department/Program:**

1. Strategically recruit and create incentives to retain high quality faculty, staff, postdoctoral research associates, and graduate students that are committed to fulfilling the research, teaching, and service missions and goals of the department/program.
2. Improve the research, teaching, and service laboratory facilities, equipment and infrastructure, (e.g. phased replacement of key equipments, purchase of critical equipments and enhancement and improvement in efficiency of existing laboratory space through remodeling).
3. Expand departmental mentoring program for young professors, post-doctoral associates and graduate students to assure retention and success.
4. Maintain a professional and a family-friendly environment that fosters mutual respect and collegiality among and between faculty, staff, post-doctoral associates and graduate students of the department/program.
5. Foster cultural, ethnic, and gender diversity in faculty, staff, post-doctoral associates and graduate students in the department/program.
6. Strengthen opportunities to enhance communication (writing and oral) skills of faculty, staff, postdoctoral research associates, and graduate students

### **Specific Graduate Research Priorities:**

1. Increase extramural research support, especially from federal (competitive) agencies, such as NIH, USDA, NSF, EPA, HS, etc.
2. Explore and create internal funding mechanisms/strategies that will help to promote research visibility and credibility.
3. Enhance the existing multi-user core facilities that support graduate training and research (e.g., Flow Cytometry, Microarray Technology facility, DNA sequencing facility, Proteomics, high-throughput PCR and RT-PCR units).
4. Foster research collaboration with other colleges, universities, and research institutes at local, national and international levels to enhance multidisciplinary efforts and quality of our research programs.
5. Reevaluate our targeted research themes (infectious disease/biotechnology/food safety, environmental science, and public health) at regular intervals for continued relevance to the program mission and the needs of the public.
6. Strengthen graduate education through development of new graduate courses that support the major areas of research emphasis in the department.

### **Specific Graduate Teaching Priorities:**

1. Contribute to the education of graduate students to prepare them for public practice, population-based medicine and diagnostics, zoonotic diseases/public health, and under-represented populations of society.
2. Periodically review and implement necessary modifications for all courses in the graduate curriculum to maintain their relevance to the mission and goals of the program.

3. Periodically review and implement necessary changes to residency programs (Anatomic Pathology, Clinical Pathology, Microbiology, and Toxicology) to improve the educational experiences and opportunities and prepare trainees for board certification and successful specialty careers.
4. Create new graduate level courses based on the growing needs of the program.
5. Develop and promote courses for on line, web-based teaching and training.

### **III. Program Description**

#### **A. Major instructional, scholarship, and service responsibilities of the department and interdisciplinary programs.**

The Pathobiology Graduate Program is a multidisciplinary program. The program is sufficiently diverse to provide the critical mass and cross-disciplinary interactions necessary to offer high quality graduate training, yet focused enough to avoid duplication, dilution of resources and conflicts with other graduate programs. The scope and flexibility of the graduate program is a notable strength. The diversity of academic programs and broad expertise of the faculty provide opportunities for cross-disciplinary interactions. In the previous review of the program, the following two focus areas were identified:

1. Infectious diseases of animals and humans with emphasis on pathogenic mechanisms.
2. Environmental sciences/public health.

Because of the departure or retirement of faculty and recruitment of new faculty coupled with the need to revamp the program to meet the demands of the profession and the interests of the graduate students, the focus areas have been expanded. Currently, the Pathobiology Graduate Program emphasizes the following five areas to reflect more accurately the expertise of faculty, interests of the graduate students, and needs of the profession:

1. Infectious Diseases (bacterial, parasitic, and viral) and Immunology
2. Diagnostic Medicine
3. Epidemiology/Food safety, Security and Policy
4. Toxicology (Clinical, molecular, and Environmental)
5. Production Animal Medicine and Management

**a. Instructional Responsibility.** The instructional responsibility of the faculty in the Pathobiology Graduate Program is to provide broad-based knowledge and basic principles in various disciplines of Pathobiology. The curriculum is designed to enhance student understanding of basic mechanisms so that these can be applied to the investigation of specific problems. A critical understanding of problem solving and application of the scientific method is a major emphasis. Students enter the program with predominately one of the following two academic backgrounds: bachelor's and/or master's with non-DVM or DVM (current or post) degrees. Because of the diversity of backgrounds of graduate students, the curriculum is highly customized, and tailored to meet the needs and goals of the individual student. There is a strong emphasis on one-on-one interactions and small group

discussions in formal courses. Independent study, critical thinking, and problem-solving are expected and form an integral part of the curriculum. The Program of Study is determined jointly by the student and the supervisory committee. The program has no required courses. The Program of Study generally includes some courses outside the Pathobiology Program, which are generally in areas of Biochemistry, Molecular Biology, and Statistics. The non-DVM students have the opportunity to take professional courses offered to students in the DVM program.

The courses offered by the Pathobiology Graduate Program are listed below:

<b>Professional courses</b>	DMP 705.	Principles of Veterinary Immunology
	DMP 708.	Principles and Methods of Epidemiology
	DMP 712.	Veterinary Bacteriology and Mycology
	DMP 715.	General Pathology
	DMP 718.	Veterinary Parasitology
	DMP 720.	Systemic Pathology
	DMP 722.	Veterinary Virology
	DMP 753.	Zoonoses and Preventive Medicine
	DMP 759.	Laboratory Animal Science
	DMP 775.	Clinical Pathology
	DMP 777.	Laboratory Diagnosis
	DMP 785.	Diagnostic Medicine
	DMP 790.	Introduction to Research in Laboratory Medicine
	DMP 801.	Toxicology
	DMP 806.	Environmental Toxicology
	DMP 821.	Advanced Clinical Pathology Laboratory
	DMP 849.	Pathologic Technique and Diagnosis
	DMP 852.	Histopathology
	DMP 856.	Advanced Veterinary Parasitology
	DMP 859.	Surgical Pathology
DMP 861.	Advanced Diagnostic Pathology	
DMP 863.	Advanced Principles of Pathology	
DMP 865.	Diagnostic Veterinary Virology	
DMP 867.	Advanced Topics in Comparative Pathology	
DMP 877.	Advanced Laboratory Diagnosis	
<b>Graduate Courses:</b>	DMP 820	Rumen Metabolism
	DMP 860.	Pathogenic Mechanisms
	DMP 870.	Seminar in Pathobiology (MS)
	DMP 871.	Molecular Diagnostics of Infectious Diseases
	DMP 878.	Applications of Flow Cytometry
	DMP 880.	Problems in Pathobiology (MS)
	DMP 895.	Topics in Pathobiology
	DMP 899.	Research in Pathobiology (MS)
	DMP 925.	Rumen Microbiology
	DMP 935.	Necropsy Diagnosis

DMP 947.	Advanced Systemic Pathology I
DMP 950.	Advanced Systemic Pathology II
DMP 965.	Cellular and Molecular Pathology
DMP 970.	Seminar in Pathobiology (Ph. D)
DMP 980.	Problems in Pathobiology (Ph. D)
DMP 995.	Topics in Pathobiology (Ph. D)
DMP 999.	Research in Pathobiology (Ph. D)

The professional courses are required courses for DVM students. However, these courses are available for non-DVM students in the program. These courses are grouped into those that are offered on an ongoing basis during fall, spring, and summer semesters. Some of the graduate courses are offered once in two years and others are offered every year. The course offerings of the Program are refined and changed in response to shift in program emphasis, changing needs of society and potential employers of our students. In the past 5 years, the program has introduced the following new courses:

DMP 815.	Multidisciplinary Thoughts and Presentations
DMP 816.	Trade and Agricultural Health
DMP 850.	Immunology of Domestic Animals
DMP 910.	Pathogenic Mechanisms Viruses
DMP 954.	Design and Interpretation of Epidemiologic Research

Additionally, faculty in the department or program offer courses to meet the needs of students in Master's in Public Health and Certification in Feedlot Medicine and Management. DMP 830. Analysis in Food Animal Production offered is a required course for students enrolled in the certification program. A number of courses offered in the department are available for students in the MPH program. Three courses (DMP 708. Principles and Methods of Epidemiology, DMP 854. Disease Epidemiology and DMP 806. Environmental Toxicology) are required core courses for all students in the MPH program.

- b. Scholarship Responsibility.** The faculty members in the department/program are involved in a broad range of both applied and basic research programs in the study of all aspects of infectious, parasitic, and noninfectious diseases of animals and humans. They provide highly focused research skills employing molecular biology, biochemistry, statistics, and related disciplines so that investigations of animal or human diseases are conducted at the basic and applied levels. The combined experience of technical skills and a strong foundation in basic principles and mechanisms of host-agent interactions in disease gives our graduates the attributes that are currently sought by industry, government and academia. Research programs of individual faculty/investigators are grouped under broad "umbrella programs" to facilitate strategic planning, recruitment of new faculty and internal funding decisions, and more importantly, foster intra- and inter-departmental collaborative efforts. The Program supports a strong research atmosphere in which faculty provide appropriate student research experiences, maintain strong research teams and develop interactive student/faculty forums (weekly seminars and journal clubs) discussing areas of importance. The following are some of the major and active areas of research:

- 1. *Infectious Diseases.*** Faculty members in the department are involved in the investigation of bacterial and viral diseases of animals and humans. The research represents and reflects current investigative trends, methodologies and emerging technologies. Students have the option of tailoring training to focus on basic aspects of viral or bacterial pathogenesis, host parasite interactions, immunobiology and pathology of animal and human infections. Because of the economic prominence of food animal production to the State of Kansas, a strong research focus exists in infectious diseases of cattle and swine, not only to understand the pathogenic mechanisms, but also develop or refine diagnostic tests and vaccines for prevention and control. Collaborative interactions between basic scientists, pathologists, diagnosticians, and clinicians create powerful investigative teams to examine the etiologic agents causing disease, the mechanisms of infection, the ramifications of disease and toxicological agents in animal systems. Strong emphasis is placed on development and utilization of modern approaches which involve cutting edge molecular techniques, such as recombinant DNA technology, real-time polymerase chain reaction, microarray, proteomics, etc. Exposure to and acquisition of these skills allow students to pursue careers in independent laboratory investigation in molecular pathogenesis, disease resistance, molecular diagnostics, vaccine development.
- 2. *Biology and Control of Fleas and Ticks.*** Parasitologists in the program have focused on ecology, epidemiology and control strategies of fleas and ticks infesting dogs and cats, interactions and potential transmission of parasites between urban wildlife (raccoons, skunks or opossums), humans and their domestic pets.
- 3. *Preharvest Food Safety.*** A core group of researchers are using a multidisciplinary approach to investigate issues relating to preharvest food safety in beef cattle and swine. The primary focus is on two major food-borne pathogens, *Escherichia coli* O157:H7 and *Salmonella*. Another research emphasis is on antimicrobial resistance of food borne and fecal bacteria. This research has been a crucial component in the development and recognition of Kansas State University as a leader in Food Safety and Security. These research areas have directly contributed to training graduate students and food safety education and outreach opportunities.
- 4. *Food Security, Border Security and Policy.*** This area of research in the program was initiated by hiring a faculty member with expertise in areas related to trade policy, economic history and the history of science, international political economy, and multidisciplinary research and writing. The program-called *Frontier*-is an interdisciplinary program for the historical studies of border security, food security, and trade policy (see <http://frontier.k-state.edu>). Research activities relate to the World Trade Organization (WTO), the *WTO Agreement on the Application of Sanitary and Phytosanitary Measures*, veterinary history, the history of public health, North American border issues, and the history of trade disputes regarding food safety and animal disease. Cross-border cooperation, food safety and security, and trade policy are issues often studied in rigid disciplinary channels; the unique *Frontier* program treats these issues as interrelated, by involving K-State and New Mexico State University scholars from different academic disciplines.

**5. Clinical, Molecular and Environmental Toxicology.** The toxicology research program offers unique opportunity to graduate students interested graduate program as well as board certification in the American College of Veterinary Toxicology. The research expertise available includes in areas of biochemical actions of toxicants, identification of the effects of environmental chemicals on public health, development in clinical and diagnostic veterinary and human toxicology, toxicology of inhaled toxicants (radionuclide particulates, ozone and diesel exhaust particles) in chronic lung disease, absorption of chemicals into the body following skin exposure to develop quantitative models in toxicology, use of geographic information systems and remotely sensed data derived from satellites to build models of the conditions under which plant poisonings in livestock, cell to cell communications in cancer cells.

**c. Service Responsibility.** Faculty associated with the Kansas State Veterinary Diagnostic Laboratory (KSVDL) deliver accurate and timely diagnostic and consultative services to the veterinary and animal health community in Kansas and the nation. The KSVDL is a full-service, American Association of Veterinary Laboratory Diagnosticians (AAVLD)-accredited laboratory, offering a complete range of diagnostic services for all species. The KSVDL also provides support for the teaching and research responsibilities of the Department of Diagnostic Medicine/Pathobiology and other departments in the college and the university.

## **B. Brief description of the facilities and equipment for the Department.**

**Physical Facilities.** Research laboratories, office space and support areas for the program are housed in two (Coles Hall and Mosier Hall) of the three buildings of the Veterinary Medicine Complex. All research faculty in the program have well equipped laboratories for research in their areas of interest. Based on needs, many of the laboratories are approved by the Institutional Biosafety Committee for use of Biosafety Level-1 and Biosafety Level-2 agents and Institutional Radiation Safety Committee for use of radioisotopes.

**Laboratory Facilities.** The department has laboratories with state-of-the art equipments to provide excellent opportunities for graduate research. Faculty members in the program have well equipped laboratories for research in their areas of interest. Major equipment include cell counters, environmental chambers, cryostats, densitometers, fluorometers, chromatography equipment, high-vacuum evaporators, neurophysiological recording devices, recording spectrophotometers, spectrometers (atomic absorption, respiratory mass, scintillation), biohazard safety hoods, stereotaxic instruments, ultracentrifuges, ultramicrotomes, ultrasonic membrane destructors, and high-performance liquid chromatography units, Flow-through diffusion cell systems (PermeGear) including 28 cells, inverted microscopes for tissue culture, light, phase contrast, and fluorescent microscopes, tabletop centrifuges, a microplate spectrophotometer, cell harvester, electrophoresis apparatuses for protein, and nucleotide analysis, and immunoblotting equipment. Other available equipment in the department include the Fibrometer for coagulation studies, an ultra-low freezer, ultracentrifuges, liquid scintillation counters, densitometer, real time thermocycler for PCR or RT-PCR, high speed refrigerated centrifuges, analytical balances, water baths, shakers, walk-in dark room, incubator, and cold room, refrigerators, and freezers (-

20C, -70C, -150C). Faculty and graduate students have access to two multi-user laboratories that contain modern research equipment and instrumentation including low and high speed centrifuges, scintillation counters, scanning spectrophotometer, blood gas analyzer, DNA sequencer and synthesizer, PCR equipment, HPLC and gas chromatography. In addition, researchers have access to an electron microscope housed in the department with a dedicated technician.

There is also a core flow cytometry facility in the College. Becton Dickinson FACSCalibur and FACSVantage (high speed cell sorter) equipped with G4 Macintosh computers and networked to printers. This equipment serves as a multi-user flow cytometry facility for the research community of Kansas State University.

**BioSafety Level-3 Laboratory.** The BL3 labs in Mosier Hall consist of three rooms: P204 (13x12 ft), P204A (24x23ft), and P204B (13x9ft). There is a shower in P204 and P204B consists of a storage area for supplies and a chest freezer. P204A is the largest room in which laboratory procedures are performed. This room consist of a variety of equipments, including biological safety cabinets, freezers (-20 & -80), ultracentrifuge, compound microscope, microcentrifuge and incubator.

**Animal Resources Facilities.** The facilities include indoor housing facilities for laboratory animals and outdoor facilities to house large animals (Cattle, horses, swine, sheep and goats). Personnel in the Animal Resource facility, headed by the University Veterinarian, are responsible for care of all animals used in teaching and research in the College. The unit is accredited by the American Association of Laboratory Animal Care (AALAC) and managed by a director and a group of support personnel.

**Laboratory Animal Research Facilities.** The Coles Hall animal facility contains 16 animal rooms encompassing 14,475 sq ft of animal holding space. Support areas include two staff locker rooms with showers, a 200sq ft laboratory, feed and bedding storage areas, a cage wash area with a walk-through cage washer and pass-through autoclave, and two 400 sq ft treatment/procedure rooms. Mosier Hall contains a 6,651 sq ft animal facility with 14 animal holding rooms, three procedure rooms, and feed storage and cage wash areas. Animal penning throughout the facility is portable and can accommodate a large variety of animal species. Both facilities have back-up emergency generators in the event of a power failure. All rooms in both facilities have epoxy-coated walls and floors. Each room is equipped with individual light timers. A temperature control system provides temperature control and static room pressure control allowing each individual room to have a different set point for pressure and temperature. These are single pass systems utilizing 100% fresh air. A third facility is a large agricultural building containing over 40,000 sq ft of animal housing space. This building is constructed of sealed concrete floors with FRP panels on the walls. Floor drains are connected to the city sanitary sewer system. Four air handling units provide heating and cooling. These units are manually set to utilize 70-100% outside air that is drawn in through a course air filter. Air is exhausted through vents on the roof of the building.

These facilities can also be utilized for Biosafety Level-2 projects with some changes to the management system. All animal rooms have floor drains with traps, hand washing sinks, and are composed of materials that can be easily sanitized. Rooms can be set to operate under negative

pressure relative to the surrounding hallways and other rooms. Air flow is 100% outside air and non-recirculating through 97% particulate filters. Solid waste generated by animals and bedding is collected and placed in biohazard bags. Each facility has access to an autoclave that is used to decontaminate solid waste before disposal.

**Large Animal Research Facilities.** It is a complex of outdoor pens, paddocks and small pastures, located on top of a hill (Research Hill Area) adjacent to the college, for housing all types of livestock. Fencing is either steel pipe or metal field fence. Every animal housing area has a loafing shed for shelter and an automatic waterer. The area has a main office with locker rooms, shower and laundry facilities for staff. The majority of the ARF equipment for working with large animals is stored in this area.

**Main Barn.** This is a typical agricultural building with solid concrete floors, metal walls, and a metal roof. The building does have supplemental heating and air conditioning. There are 31 stalls within this building along with an office and storage room.

**Swine Building.** This is a metal agricultural type building with two animal holding rooms and a support room. The floor is a partial concrete slab with concrete slats covering the central portion of each room. Liquid and solid waste is collected in a pit under the slats and is discharged into the city sanitary sewer system. A variety of pens for either cattle or swine are set up in this facility depending upon the project and size of animal.

**Modular Dog Building.** This building contains two animal holding rooms and a treatment/support room. This is a modular facility from Art's Way Scientific (formerly Techspace) designed to house research dogs in elevated runs. Socialization panels and sliding doors allow dogs to move freely between adjacent runs. The building was installed in 2007.

**West Dog Building.** This is an older metal building designed to house dogs in runs with solid concrete floors. Runs are connected to outdoor exercise areas so that each dog has space to go outside for exercise and enrichment. Outside run areas are solid concrete floors covered in epoxy paint. This building contains a treatment room, feed room and equipment storage room.

**Greyhound Building.** This is an older metal building designed to house dogs in runs with solid concrete floors. Runs are connected to large outdoor exercise areas so that each dog has space to go outside for exercise and enrichment. Outside run areas are composed of sand and dirt.

**Frick Farm.** This is a farm setting that is pasture only. Each pasture has a loafing shed for shelter. Numerous trees are also present for shade and shelter. Water is supplied by automatic waterers in each pasture.

**BiosafetyLevel-3 Facility.** The facility located in the Biosecurity Research Institute contains over 2,700 sq ft of large animal holding rooms with shower-in and shower-out capabilities and penning/gating for housing 32 animals weighing up to 800 pounds under BL-3Ag conditions. All penning within the facility is modular, and can be configured for numerous species, including cattle. Two large animal necropsy rooms that can operate under BL3-Ag conditions are present

within the facility. All waste from the facility, including prions, is rendered inert utilizing equipment designed by Waste Reduction, Inc. This system includes a custom fabricated tissue digester with a capacity of 5,500 lbs per cycle and 34,000 gal effluent decontamination.

**C. Provide information on any special information resources and services (e.g., library collections).**

**Library Facilities**

The Veterinary Medical Library is a branch of the KSU Libraries and is located on the fourth floor of Trotter Hall in the College of Veterinary Medicine. The library possesses medical and veterinary Medical books and journals to serve research and teaching needs of all faculty, staff, and graduate students in the College and the University. State-of-the-art computerized searching workstations and on-line networks provide users with rapid access to the most current scientific literature. The library offers digital searches via its CatNET system, which provides access to e-journals and databases such as PubMed. Interlibrary loan and instructional services are also provided for materials not available in the library. The proximity of the library to faculty, staff, and graduate students is an added convenience. The library staff of information specialists provides customized information services for all clientele including veterinary and health care practitioners, allied groups, and the general public.

**Digital Information Service Center (DISC)**

This is a service provided for faculty, staff and students in the College of Veterinary Medicine at no charge. The goal is to provide education and training to enable people to excel in giving presentations, organizing data, saving time, and ensuring that they can access and use information skills and services to maximize quality and consistency. Technical assistance is available for commonly used soft wares, such as Publisher, PowerPoint, Adobe Photoshop CS, Camtasia, MS Word, Refworks, MS Movie Maker, EndNote, GroupWise, Snag It, etc. Also, technological equipments (lap top, LCD projector, digital camera, video camera, etc.) are available for check out by the faculty, staff, and graduate students. Help is provided for getting images and movies from the camera to the computer. The DISC Coordinator also identifies and investigates electronic access to full text journals for the Veterinary Medical Library.

**D. Briefly indicate the Department's/Program's contributions to general education.**

The faculty in the department/program participates in teaching a variety of professional courses, both clinical and preclinical courses, to DVM students. Many of these courses are team-taught so that individual faculty contributions to teaching match their areas of expertise. Additionally, faculty members participate in continuing education of veterinarians on an annual basis. This is generally in the form of lectures or seminars for one to few hours. K-State College of Veterinary Medicine Continuing Education (VMCE) facilitates life-long learning anytime, anywhere, through innovation, technology and partnerships. Programs are offered for practitioners, technicians, faculty, students, specialty and professional groups. Participation in these programs can provide licensing renewal. Content material of presentations and wet labs include the most current information for all species. In the year 2007, VMCE organized 15 traditional conferences, 4 new distance sessions, and 9 distance sessions available for 24/7. There were 140

contact hours available for continuing education credit out of a possible 214 concurrent contact hours. A total of 1885 participants from 22 countries and 39 states participated in 2007 in the VMCE programs. As the program expands, the goal is to continue current programs, add more distance modules and add credit courses. The website <http://www.vet.ksu.edu/CE/index.htm> contains all VMCE information.

**E. Briefly indicate the Department's role in providing instructional services to students outside the Department.**

The faculty in the Program/Department teach courses that are used by graduate students in other programs, particularly in the MPH program and the Certification in Feedlot Production Management. The following professional courses are available as an option for students in the MPH program who are on the Infectious Diseases track:

DMP 708.	Principles and Methods of Epidemiology
DMP 712.	Veterinary Bacteriology and Mycology
DMP 718	Veterinary Parasitology
DMP 722.	Veterinary Virology
DMP 753.	Zoonoses and Preventive Medicine
DMP 759.	Laboratory Animal Science
DMP 770	Fundamental Concepts in Emerging Pathogenic Diseases
DMP 801	Toxicology
DMP 809	Problems in Toxicology
DMP 830	Quantitative Analysis
DMP 850	Immunology of Domestic Animals
DMP 860	Pathogenic Mechanisms
DMP 871	Molecular Diagnostics of Infectious Diseases

The following courses are taught by DMP faculty and are required core courses for the MPH student.

DMP 806.	Environmental Toxicology
DMP 708.	Principles of Epidemiology
DMP 854.	Disease Epidemiology

In addition, the following courses offered by graduate faculty in the department are taken by graduate students in other programs, mainly Anatomy and Physiology, Animal Sciences, Food Science, Grain Science and Biology:

ASI/DMP 820.	Rumen Metabolism
DMP 815.	Multidisciplinary Thoughts and Presentations
DMP 816.	Trade and Agricultural Health
DMP 850.	Immunology of Domestic Animals
DMP 860.	Pathogenic Mechanisms
DMP 871.	Molecular Diagnostics of Infectious Diseases
DMP 878.	Applications of Flow Cytometry
ASI/DMP 925.	Rumen Microbiology

Rumen Metabolism is a core course for graduate students in the Ruminant Nutrition Group. Multidisciplinary Thoughts and Presentations course is being used by graduate students to enhance their communication skills, both writing and oral presentations. Trade and Agricultural Health is jointly taught and offered online by a DMP faculty and a faculty from New Mexico State University for graduate students at both schools. Immunology of Domestic animals course is generally taken by graduate students who do not have DVM degree. Applications of flow Cytometry is also a useful course for students from other departments, particularly Clinical Sciences and Biology. Rumen Microbiology is a highly specialized course and generally taken by Ph. D. students in the Ruminant Nutrition program or those with research interests in anaerobic microbes.

#### **IV. Self Evaluation of Faculty and General Programs**

The department and the program are multidisciplinary with academic missions of professional and graduate education, research and service, therefore, have faculty with widely varying responsibilities and time allocations. Teaching, research and directed service are major academic responsibilities of the department/program faculty, but additionally carry out non-directed services within the department, college, university community, as well as the profession and the society. These activities involve special expectations and are assessed by stated performance criteria for each position. Thus, specified criteria for the awarding of tenure and promotion and annual evaluation of performance are not rigidly applied but the responsibilities outlined at the time of appointment and subsequent modifications of responsibilities based on changing needs and expectations are taken into considerations.

Scholarship includes critical questioning and disciplined study within and beyond an area of specialized knowledge for the faculty member, and the investigation, development, disclosure, and dissemination of new information in that area. Scholarship is not limited to research efforts, but is attainable in all areas of responsibility. It includes discovery and the development of new knowledge or methods in teaching and service, and the synthesis, distribution of previous knowledge by unique, effective means and awakening an area of scholarship for new exploration. The quality and productivity of the faculty member's scholarship can be judged by numerous indicators, including the faculty member's role in well-focused, significant investigations as project initiator and leader, and the timely publication of reports in high quality, peer reviewed scientific journals.

#### **Evaluation of Instructional Activities**

The scholarship of teaching is fundamentally important to the attainment of academic excellence. Tenure and promotion may be granted under specific circumstances primarily on the basis of teaching in the case the individual's responsibility is only teaching, the faculty member has demonstrated an unusual level of excellence, the teaching fulfills a particular important need of the Department or College, and most importantly the faculty member is active in educational research.

In general, teaching includes instruction of veterinary medical students, graduate and postgraduate students and/or involvement with other educational programs appropriate to the

mission of the Department (e. g., continuing veterinary medical education). Teaching commitments may include lecturing in courses for veterinary or graduate students, supervising laboratory sections, conducting veterinary medical student rounds, supervising students, residents, and/or graduate students, supervising postdoctoral fellows, and/or other instructional experiences. Documentation of teaching participation must include a description of the teaching activities, lecture and/or student contact, and the faculty member's relative importance to the teaching program (course director, developer, contributions as percent of course teaching hours).

Quality teaching is judged by other faculty members within and outside the Department, student questionnaires and evaluations, and the Department Head. Student ratings have an important place in assessment of teaching effectiveness, but taken alone, should never be the only source of input to the evaluation process. Specific other methods of evaluation and objective criteria (both qualitative and quantitative) should be clearly given. The settings in which these teaching activities occur are not confined to the classroom, but include the diagnostic laboratory or other settings for faculty who provide special services. Some faculty may provide special services such as expertise in the development of educational programs essential to the Department and College.

A faculty member's excellence in teaching is determined by criteria such as:

1. The types of teaching activities in which the faculty member participates, including classroom lecture, supervision of veterinary medical students and residents, evidence of formal didactic activities such as lectures at conferences, Departmental and College seminars, and other teaching lectures throughout the College and University.
2. Evaluations from students, residents, and peers using norm-referenced instruments (i.e. TEVAL) that assess teaching effectiveness rather than popularity and that adjust for such known sources of bias as student motivation and class size.
3. Description of administrative activities with regard to teaching, including the development and organization of new and innovative teaching or evaluation methods, or directorship of a veterinary medical student, graduate student or residency program.
4. Serving as Major Professor of graduate students or as Chair of Doctoral dissertation committees.
5. Materials produced for individual courses such as reading lists, syllabi and other instructional materials, and tests and other materials and methods used to assess student achievement.
6. Appropriateness of course content, and depth, breadth and currency of subject matter.
7. Effective course administration, e.g., being available for student consultation and punctuality in performing teaching-related paperwork, such as grading examinations, reporting grades and filing syllabi.
8. Successful direction of high quality individual student work, e.g. independent studies, theses or dissertations, and special student projects, and effective and diligent advisement of students pursuing their academic programs.
9. Versatility in contributing to the Department's/program's teaching mission, e.g. effective performance at all levels of instruction appropriate to the department,

- including membership on the Graduate Faculty, certification to direct doctoral dissertations, and special contributions to effective teaching of diverse and international student populations.
10. Compiled student comments (such as those obtained from program assessments or exit interviews) that address a teacher's abilities to arouse student interest and to stimulate achievement by students; letters of evaluation from former students.
  11. Accomplishments of the faculty member's present and former students; i.e. information showing the students' success in the discipline and in pursuing it to a point of intellectual significance.
  12. Students coming from other schools or countries especially to study with the faculty member.
  13. Professional publications on teaching or materials prepared for teaching such as textbooks, published lectures and audio-visual or computerized instructional materials.
  14. Adoptions of a faculty member's textbooks or other instructional materials by reputable institutions.
  15. Presentation of papers on teaching before learned societies, testimony before governmental groups concerning educational programs, and honors or special recognition for teaching accomplishments.
  16. Selection for special teaching activities outside of the University; e.g. Fulbright awards, special lectureships, panel presentations, seminar participation, international study and development projects, and membership on special bodies concerned with teaching.
  17. Receipt of competitive grants or contracts to fund innovative teaching activities or investigations into effective teaching, and membership on panels to judge proposals for teaching grants or contracts.

### **Evaluation of Research Activities**

High quality research and publications are fundamental to attaining the goals of academic excellence and national and international prominence in a major research university. The quality of contribution to the body of knowledge is a criterion in evaluation. Indices of quality include impact on science as measured by citations and impact on other's research, significant extramural funding for research, a consistent record of publication, membership on editorial boards, and reputation in science. Original research is considered as evidence only after acceptance for publication. Both collaborative and individual contributions in research and publication are meaningful.

Multiple indicators of research scholarship over an extended period of time are important components in evaluating faculty contributions. Faculty must demonstrate a consistent record of funded grants and/or donations, research productivity, well-designed basic research projects or clinical trials, presentation of papers at scientific conferences, and the publication of results in high quality, peer-reviewed journals. The research and reports must reflect original independent studies, which contribute new knowledge. It is important to document that the faculty member had an essential role in the formation and testing of new ideas and hypotheses.

The quality of the research is more important than the quantity. Quality and impact of research are judged by the quality of journals in which the works are published, peer-reviewed

external research support, evaluation by nationally recognized scholars outside the University with expertise in the faculty member's field, and presentation of peer-reviewed papers or special lectures. Independence as a researcher is documented by the faculty member publishing as senior author, providing the major creative or intellectual force in planning and developing of projects, and being the principal investigator or co-investigator on research grants.

Faculty with major research responsibilities should have a consistent record of research grant proposals, which receive excellent ratings by national funding agencies. Faculty should have success in obtaining extramural research support from national agencies, but evaluation must also consider that success in having proposals funded continuously may be subject to variables beyond the merit of the investigator. Occasionally, willingness to redirect one's research thrust may be necessary to sustain productivity. Faculty with major responsibilities in teaching or directed service should have a record of proposal submission and support from local, regional or commodity/commercial bodies. These faculty may be co-investigators or consultants with other principal investigators on grants funded by national agencies. Nonetheless, evidence of a consistent funding record is an important factor in positive consideration for tenure and/or promotion. Evidence of peer recognition for research activities may also include serving on study sections, on editorial boards, or as reviewer for high quality journals.

Criteria for evaluating a faculty member's scholarship in basic and clinical research include:

1. Significant extramural funding for research; competitive grants and contracts that were subject to rigorous peer review and approval.
2. Participation as investigator or co-investigator on major grants with other principal investigators or corporate sponsors.
3. Local or regional grant support for independent investigative studies. Contracts for clinical trials according to protocols provided by corporate sponsors are not equivalent to grants awarded for investigator-initiated research.
4. Developing patents or copyrights for processes or instruments useful in solving important problems.
5. Peer evaluation of involvement in the administrative aspects of research, such as direction of research programs.
6. Ability to inspire others to independent scholarly research activities through work with graduate students, residents, veterinary students, and colleagues on collaborative projects or as mentor in other settings.
7. Grant/contract reviewer for research organizations and institutions, e.g. NIH, NSF.
8. Publications in peer-reviewed journals; reviews, monographs, bulletins, articles, and books and other scholarly works published in journals and by scholarly presses and publishing houses.
9. Scholarly reviews of the faculty member's publications, and citation of research in scholarly publications, or the quoting of scientific publications.
10. Presentation of research papers before peers at scholarly meetings and learned societies.

11. Recognition from peers in the field, e.g. fellowships, research awards, publication awards; prizes and awards for excellence of research done.
12. Awards of special fellowships for research or selection to study at special institutes.
13. Invitations to testify before governmental groups on research or other creative activities; membership on important scholarly expeditions or explorations.
14. Accomplishments of the faculty member's present and former graduate students.
15. Supporting letters of research evaluation from colleagues outside of the Department and College.

### **Evaluation of Directed Service**

Directed service is work that furthers the mission of and is directly related to the goals and objectives of the Program, the Department, and the College that requires academic credentials or special skills. It must be part of the faculty member's assigned responsibilities. There may be no clear separation between teaching, research and directed service because the scholarship indicants for one may overlap the scholarship indicants for the other. It is important to note that Department faculty service many constituencies, including academia, the veterinary profession, the public, livestock industries, and businesses in the state and region.

Faculty with a major responsibility commitment to directed service are evaluated based on demonstrated scholarship in these duties. Diagnostic faculty is recognized experts with knowledge of the pathophysiology of disorders related to their specialty, and they should have special expertise about particular diseases or groups of diseases. The faculty may discover, organize, interpret, and disseminate knowledge related to disease entities, health care economics, professional ethics, medical-legal issues and educational methodology. Their approach to problems should lead them to investigate and integrate several areas of research to clinical problems. They should share their knowledge and expertise by excellent teaching and communication. The new knowledge and concepts from these efforts should be published in respected peer-reviewed diagnostic research and educational journals.

Scholarly contributions can take many forms, and some faculty may contribute in unique ways. If appropriate or necessary, faculty with major responsibilities to directed service are expected to achieve and maintain relevant licensure and specialty certification status in their professional specialty.

The variety of directed service roles can be scholarly and important to excellence in the Department's and College's academic programs. The delivery of state-of-the-art quality and efficient directed service in veterinary medical and diagnostic investigations are major functions of the Department.

A faculty member's scholarship in directed service is documented by criteria such as:

1. Efficient and appropriate management of cases and case submissions, timely maintenance of case records, prompt and meaningful communications with clients and veterinarians, providing valid diagnostic services, and updated information transfer and implementation.

2. Effective consultation with veterinarians and animal owners on animal health problems.
3. Effective assistance to regulatory officials with laboratory support for animal health regulatory programs and identification of diseases of public health significance.
4. Participation in area, state and national meetings of veterinarians and livestock producers.
5. Excellent evaluations by clients of the quality of service provided and by practicing professionals who receive faculty member's service.
6. Efficient organization and effective administration of directed service units, such as laboratories or services in the veterinary diagnostic laboratories.
7. Excellent ratings by students of the faculty member's delivery of directed service and by peers or supervisors who observe and are qualified to rate the delivery of professional services.
8. Documentation of improvements in the quality and efficiency of the faculty member's directed service programs.
9. Local, regional and national recognition of diagnostic expertise, including invitations to speak at seminars, conferences, and symposia.
10. Participation on Department, College, University, and national committees related to veterinary care and service.
11. Developing a diagnostic procedure or method to confirm an important veterinary medical condition.

### **Evaluation of Non-Directed Services**

Non-directed service includes significant contributions to committees at the Departmental, College, University, Community, State, Regional, National and International levels. Serving in administrative positions in the Department is an important contribution. Offices held in national organizations indicate recognition for contributions to the discipline. Quality of service may be judged by soliciting evaluations from the chairs of committees, peers, and the Department Head.

*Institutional-based service* is work essential to the operation of the University, such as service on Departmental, College or University committees, acting as advisor to student organizations, and serving on the Faculty Senate, Graduate Council, or Faculty Council.

*Profession-based service* is work directly related to the function of the unit and that provides leadership and service to the faculty's profession or discipline.

*Public-based service* involves the application of a faculty member's professional time and expertise for the benefit of non-academic audiences. This does not include all activities a faculty member might perform for the public good, but only those that are job related; i.e. serving as an expert witness, developing programs, providing training, or providing consultation.

Non-directed service is an indication of good academic citizenship. However, a spirit of cooperation of working in words and deeds for the unselfish benefit of colleagues and institution is an important and necessary part of the expected academic attitude.

Several indicants of a faculty member's excellence in the various non-directed service categories are the following:

***Service to the Institution.*** Evaluation is generally done based on the feedback from by administrators, committee heads, and co-workers in the groups.

1. Chairing of, membership on, or contributions to standing or ad hoc committees of the Department, College or University.
2. Chairing of, membership on, or contributions to bodies of faculty governance, such as Faculty Senate and its committees, Graduate Council, and College Committees such as Planning.
3. Performance of unbudgeted administrative responsibilities at the Department or College level.
4. Special assignments, such as representing the Department or University at national or international meetings.
5. Honors or special recognition for contributions to the Department, College or University or to faculty governance.

***Service to the Profession.*** Evaluation is generally based on input from other members and leaders of the organizations to which the service is rendered.

1. Holding office and leadership in local, national or international professional associations and learned societies.
2. Service on state, national, and international committees in professional organizations.
3. General presentations or addresses at conventions and other professional meetings.
4. Organizing or chairing sessions at professional meetings or organizing the meeting itself.
5. Reviewing or editing professional journals, e.g. writing book reviews for publication, or service as editor, associate editor, book review editor or member of an editorial board.
6. Membership on panels judging grant/contract proposals.
7. Service as a consultant on problems appropriate to the discipline.
8. Honors or special recognition for contributions to an organization, discipline or profession.

***Service to the Public.*** Non-directed public service is the application of a faculty member's professional time and expertise for the benefit of non-academic audiences. It does not include all activities a faculty member might perform for the public good, but only those that are job related. Evaluations of performance are based on feedback from members and leaders of the groups served.

1. Written dissemination of professional knowledge or information to non-academic audiences through general interest publications.

2. Oral presentations and dissemination of professional knowledge or information to civic, religious or private groups.
3. Providing expert testimony to courts or legislative bodies.
4. Consulting for state, national and international public and private groups engaged in educational and scholarly endeavors.
5. Consulting for individuals or corporations engaged in business or industry.
6. Providing technical consultation to professional or non-academic groups.
7. Engaging in the delivery of technology through involvement in development projects, especially through international assignments.
8. Awards of merit from local or national organizations.

The self evaluation process is carried out annually and are done to i) assess the performance of each faculty member in comparison with their pre-established goals and objectives, ii) review and establish new goals and objectives for each faculty member in relation to Program/Departmental missions, iii) evaluate and adjust the percent effort each faculty member applies to various areas of responsibilities, and iv) review and establish new Departmental directions and areas deserving special emphasis. The self evaluation process is designed to reflect the unique aspects of the Pathobiology Program and the Department of Diagnostic Medicine/Pathobiology in terms of its missions while recognizing the diversity of faculty interests, abilities, assignments, and academic/scientific disciplines. In this process the self evaluation is designed to promote and recognize excellence in all areas of academic responsibilities without favoritism or preference given to any activity or discipline. The process is designed to balance the quality and quantity of a faculty member's contribution and to match the changing needs of the Program/Department with the evolving talents of the faculty and needs of the state/nation.

Because of the diversity of faculty assignments, disciplines, and responsibilities within the program/Department (one of the broadest in the University), the self evaluation process is based on the understanding that evaluations should be based on multiple sources of input from different perspectives. In this regard it is important to recognize that evaluation of faculty performance in a professional environment is complex and multifactoral so that even highly specific evaluation criteria may not accurately reflect a faculty member's contribution. Within this environment adequate evaluation requires a degree of professional judgment by qualified peers. Peers are particularly well qualified to assess the relative importance of an activity and the degree of individual versus shared contributions while balancing the quality and quantity of the faculty member's accomplishments. The Department of Diagnostic Medicine/Pathobiology is one of the few departments in the university that values and practices peer evaluation in the assessment of scholarly activities.

The Program/Department's self evaluation process is based on the precept that multiple professional judgments provided by academic peers, the Diagnostic Laboratory Director, and the Department Head reduce the likelihood of unfounded subjective assessments. Competent persons will ordinarily arrive at similar, although not identical, judgments regarding the merit of professional activities, and the pooled judgment of several competent professionals tends to be more reliable than the judgment of any one person. Use of multiple raters enhances the reliability with which things such as scientific/professional publications, instructional materials,

student rating of teaching effectiveness, and various service activities are evaluated. Although it is recognized that the use of multiple raters (in this case peers) increases both the cost and complexity of the evaluation, the use of peer groups provides a reasonable and desirable tradeoff.

In the Department of Diagnostic Medicine/Pathobiology, faculty evaluations are based on the combined rating of the Department Head (50%) and the rating of faculty peers (50%). In the case of those faculty with a >50% directed service appointment, the annual faculty evaluations are based on the combined rating of the Department Head (25%), Diagnostic Laboratory Director (25%), and the rating of faculty peers (50%). Faculty membership in a peer group is determined by assignment percentage for the evaluation period. Performance assessments in areas that a peer does not feel qualified to evaluate are not required to provide a peer rating. In addition faculty that are members of another peer group but who feel qualified to provide a rating of faculty in one or more area(s) of responsibility are encouraged to provide their input.

Faculty members in the department are grouped into three peer groups: Group 1: Instruction: Research and/or Service, Group 2: Research: Instruction and/or Service, and Group 3: Service: Instruction and/or Research. Because the number of members in the research peer group is large, the group is randomly divided into two approximately equal cohorts. The overall performance of each faculty member is ranked based on the following “Overall Performance Categories”.

1. Fails to meet established minimum performance expectations
2. Meets minimum expectations but improvement is necessary if possible
3. Meets individually established expectations
4. Meets individually established expectations at a high level
5. Exceeds individually established expectations

The table presented below provides data of the faculty evaluations

Evaluation	Year				
	2003	2004	2005	2006	2007
Exceeded expectation	11	13	13	9	14
Met expectations at high	11	7	8	16	13
Met expectations	2	6	4	2	3
Met expectations at low	1	0	0	1	1
Failed to meet expectations	0	0		0	1
<b>Total</b>	<b>25</b>	<b>26</b>	<b>25</b>	<b>28</b>	<b>32</b>

Additionally, faculty members in the department have received various honors, awards and recognitions at national and international levels. Following are some of the examples:

### 2003

**Dr. M. M. Chengappa:** Selected to serve on the Editorial Boards of Veterinary Microbiology and Veterinary Research Communication; Selected to serve on the Advisory Board of Pet India; Elected to serve on the ACVM Board of Governors; Selected as University Distinguished Professor.

**Dr. Steve Dritz:** 2003 National Pork Board Swine Research Innovation Award – Increasing weaning age improves performance and profitability in three site production systems.

**Dr. Roman Ganta:** Elected to serve as the Secretary/Treasurer, American Society for Rickettsiology; Served as a reviewer for the study section of NIAID, NIH; Served as a reviewer for the Oklahoma Center for the Advancement of Science and Technology, Oklahoma City in April.

**Dr. Fred Oehme:** 2003 Society of Toxicology Education Award

**Dr. Carol Wyatt:** Served as president of American Association of Veterinary Immunologists

#### 2004

**Dr. M. M. Chengappa:** Selected to serve on the Editorial Boards of Veterinary Microbiology and Veterinary Research Communication; Selected to serve on the Advisory Board of Pet India; Elected to serve on the ACVM Board of Governors; Elected Vice President of the American College of Veterinary Microbiologists.

**Dr. Shaffiq Chowdhury:** Pfizer Award for Research Excellence; Big 12 Fellowship to conduct research at UNL.

**Dr. Roman Ganta:** Recipient of the Pfizer Animal Health Award for Excellence in Research by Faculty Member 2005, College of Veterinary Medicine, Kansas State University, Manhattan, KS; Elected as the Secretary/Treasurer for the American Society for Rickettsiology; Invited to serve as an Ad-Hoc NIH review panel member (BM1 study section); Review panel member and Chairperson for Infectious Diseases/Immunology grants panel for the Oklahoma Center for the Advancement of Science and Technology (OCAST); Director for the Molecular Biology Core facility of the NIH-funded KSU-CVM COBRE project on Epithelial Function.

**Dr. Manual Moro:** AAI (American Institute of Immunologists) Minority Scientist Award, April 16-21, Washington DC.

**Dr. Bob Rowland:** Elected member of the Sigma Chapter of the Society of Phi Zeta.

**Dr. Steve Stockham:** Elected as an Honorary Diplomate of the European College of Veterinary Clinical Pathology.

#### 2005:

**Dr. M. M. Chengappa:** Selected to serve on the Editorial Boards of Veterinary Microbiology and Veterinary Research Communication, selected to serve on the Advisory Board of Pet India, elected to serve on the ACVM Board of Governors and also elected Vice President of the American College of Veterinary Microbiologists.

**Dr. William Fortney:** President elect of the Western Veterinary Conference in Las Vegas, NV. Also, small animal program coordinator for the Western Veterinary Conference.

**Dr. Roman Ganta:** Recipient of the Pfizer Animal Health Award for Excellence in Research by a College of Veterinary Medicine Faculty Member 2005. Dr. Ganta was elected as the Secretary/Treasurer for the ASR in September 2004.

**Dr. Derek Mosier:** Received the Norden Distinguished Teaching Award.

**Dr. T.G. Nagaraja:** Honorary Diplomate in the American College of Veterinary Microbiology.

**Dr. Fred Oehme:** Received the American Board of Veterinary Toxicology 2005 Service Award, the Thermo Electron 2005 Distinguished Service Award from the American Academy of Veterinary and Comparative Toxicology and was recertified by The American Board of Toxicology.

**Dr. Steve Stockham:** Received the Bayer Animal Health Teaching Excellence 2005 Award.

## 2006

**Dr. M. M. Chengappa:** Selected to serve on the Editorial Boards of Veterinary Microbiology and Veterinary Research Communication, selected to serve on the Advisory Board of Pet India, elected to serve on the ACVM Board of Governors and also elected Vice President of the American College of Veterinary Microbiologists.

**Dr. Mike Dryden:** 2006 Bayer Animal Health, Teaching Excellence Award in recognition of outstanding instruction of second year veterinary students. 2006 Frick Professor of Veterinary Medicine.-an endowed professorship recognizing and honoring a faculty member who has developed an exemplary national and international reputation in veterinary medicine.

## 2007

**Dr. M. M. Chengappa:** Selected to serve on the Editorial Boards of Veterinary Microbiology and Veterinary Research Communication, selected to serve on the Advisory Board of Pet India. 2007 Karuna Award Recipient in recognition of Outstanding Contribution to the Field of Science and Technology.

**Dr. Steve Dritz:** 2007 Hanson Lecture- Allen D. Leman Swine Conference, St. Paul, MN. Sciences.

**Dr. Mike Dryden:** 2007 Entomological Society of America North Central Branch Recognition Award in Urban, Entomology.

**Dr. Tanya Grondin:** Finished resident training in Clinical Pathology; sat for boards in September 2007 (passed 3 of 4 sections); Charles Louis Davis Foundation Student Scholarship Award

**Dr. Fred W. Oehme:** Recertified as Diplomat and Fellow of The Academy of Toxicological Sciences

**Dr. Mary Wight-Carter:** Passed all 4 parts of the ACVP board examination and became Diplomate ACVP. Received a \$2,200.00 scholarship/award from the Jackson Laboratory/NCRR to attend "Pathology of Mouse Models of Human Disease" meeting.

**Dr. Melinda Wilkerson:** Elected as President-elect for the American Society of Clinical Pathologists

**Dr. Carol Wyatt:** elected member - The Society of Phi Zeta (honorary).

## **V. Self Evaluation of Academic Degrees**

### **A. Quality of the Pathobiology Ph. D. Degree**

The Pathobiology Graduate Program is a multi-disciplinary program and is sufficiently diverse to provide the critical mass and inter-disciplinary interactions necessary to offer high quality graduate training, yet focused enough to avoid a dilution of resources and conflicts with unrelated disciplines. The program cooperatively provides advanced graduate, post-doctoral training, and research in areas that are not offered at any other university in Kansas. Research and graduate training in the disciplines related to animal disease are critical to the economic success of many animal agricultural enterprises. Animal agriculture is of considerable economic importance to the State. The disciplines encompassed by the group either directly or on a comparative basis also have significance in human health. The scope and flexibility of graduate programs offered by the program is a notable strength. The diversity of academic programs and broad expertise of the faculty provide the opportunity for cross-disciplinary interactions. As such, supervisory committees are able to custom design graduate training programs which address the interests of individual students and successfully compete for extramural research funding which support graduate training programs. Collectively, the faculty in the pathobiology program has a history of successful extramural funding, from both federal and industrial sources, and productive research that results in scientific publications of high quality. Many faculty are recognized nationally or internationally for their expertise. The program is supported by excellent physical facilities, support services, and selected equipment.

### **B. Quality of the Students in the Pathobiology Program**

The multi-disciplinary nature of the program, opportunities for inter-disciplinary interactions and existence of critical mass of faculty in certain disciplines (Infectious diseases, Food Safety, Toxicology, and Production Animal Medicine and Management) have been major factors in attracting high-quality domestic and international graduate students. The quality of students that the program attracts and admits is also because recruitment is done by individual faculty, often based their need to match the students background and aptitude with their research programs. Although the program requires GRE scores, there are no minimum score requirement. The following table provides statistics on GRE and GPA statistics.

**PhD Students in the Program in 2003-2007**

	<b>STUDENT</b>	<b>MAJOR PROFESSOR</b>	<b>ENTERED PROGRAM</b>	<b>Graduation Date</b>	<b>GRE</b>	<b>GPA</b>
1.	Thompson, Brian	Stewart	6/02	2007	A680 Q710 V480	3.85
2.	Kim, Dal Young	Rowland	9/02	2007	N/A	3.29
3.	Bieker, Jill	Oberst/Phebus	1/03	2006	N/A	3.92
4.	Tadepalli, Sambasivrao	Nagaraja/Stewart	1/03	2007	A480 Q560 V460	3.84
5.	Williams, Cecilia	Oberst/Phebus	6/03	Discontinued	N/A	N/A
6.	Wang, Hsu-Fong	Wyatt	8/03	Discontinued	N/A	3.19
7.	Chauhan, Vinita	Rowland	1/04	2005	A740 Q630 V440	3.243
8.	Hatle, Khetki	Chowdhury	1/04	Transferred out	A690 Q650 V610	N/A
9.	Sirigireddy, Kamesh	Ganta	1/04	2007	N/A	3.66
10.	Fox, Trent	Nagaraja	6/04	2007	A660 Q630 V390	4.0
11.	Peddireddi, Lalitha	Ganta	6/04		A700 Q660 V440	3.67
12.	Ragsdale, John	Mosier	6/04		N/A	3.82
13.	Colvin-Marion, Landa	Nguyen	8/05	Discontinued	N/A	3.94
14.	Stevens, Elliot	Thomson	8/05		N/A	3.50
15.	Al-Wabel, Mohammed	Moro	1/06	Discontinued	N/A	3.36
16.	Dedonder, Sara	Kastner	1/06		A4.5 Q600 V420	3.91
17.	Jacela, Jay	Dritz	1/06		N/A	3.63
18.	Christopher, Julia	Thomson	6/06	Discontinued	N/A	3.37
19.	Lubber, Brian	Apley	6/06		N/A	3.82
20.	Nickell, Jason	Larson	6/06		N/A	N/A
21.	Reinbold, Brandon	Coetzee/Apley	8/06		N/A	3.39
22.	Gakhar, Gunjan	Nguyen	12/06		A3.5 Q710 V550	4.0

	STUDENT	MAJOR PROFESSOR	ENTERED PROGRAM	Graduation Date	GRE	GPA
23.	Al-Bataineh, Mohammad	Gehring/Apley	1/07		N/A	4.0
24.	Artzer, Marjorie	Payne/Dryden	1/07		N/A	4.0
25.	Babcock, Abraham	White/Renter	1/07		N/A	3.63
26.	Patton, John	Chang	1/07		N/A	3.727
27.	Seibert, Kendra	Ganta	1/07		N/A	3.39
28.	Jacob, Megan	Nagaraja	6/07		N/A	4.0
29.	Tawde, Snehal	van der Merwe	6/07		N/A	N/A
30.	Potter, Megan	Dritz	6/07		N/A	N/A
31.	Pillai, Deepti	Zurek	8/07		*	N/A
32.	Kumar, Amit	Narayanan	8/07		*	N/A
33.	Dhokal, Kiran	Pickrell	1/08		N/A	N/A
34.	Wileman, Benjamin	Thomson	1/08		N/A	N/A

GRE : A= Analytical ; Q=Quantitative ; V=Verbal  
N/A not available in DMP files

Another measure of the quality of the students in the Pathobiology program is evidence of scholarships and awards at various levels. The recognition that is truly reflective of their research contributions are the awards received at National and International Conferences. The following are some of the examples of graduate students recognitions :

**Kamesh R. Sirigireddy:**

2002: Morris Animal Foundation Fellow.

2003: Third prize for best Basic Science Research presentation at the Annual Phi Zeta day

2004: Third prize for best Clinical Science Research presentation at the Annual Phi Zeta day

2004: First prize at the K-State 9th Annual Graduate Research Forum at the Kansas State University

2005: Awarded the K-State Graduate Student Travel Grant for the years 2004 and 2005.

2006: A. S. R. Ganta Graduate Student Award, College of Veterinary Medicine, Kansas State University

2006: Albert L. Burroughs Memorial Award, College of Veterinary Medicine, Kansas State University

2006: American Society of Rickettsiology Student Travel award

2006: Awarded free membership to the AAAS/Science/Program for Excellence in Science.

2006: Graduate Student travel Award to attend Scientific Meetings.

**Lalitha Peddireddi:**

2005: Third prize for best research presentation at K-State 10th Annual Graduate Research Forum at the KSU

2005: The ACVM molecular award for best oral presentation at the Conference of Research workers on Animal Diseases annual meeting, Chicago, IL.

2006: Third prize for best research presentation at K-State 11th Annual Graduate Research Forum at the KSU

2006: Elected to the membership in the sigma chapter of the Society of Phi Zeta.

2007: American Society for Rickettsiology travel grant to attend 21<sup>st</sup> Meetings of the American Society for Rickettsiology.

2008: CVM Graduate Student Travel award to attend 108th General Meeting and/or the American Society for Microbiology/Kadner Institute Summer Workshop from College of Veterinary Medicine, Kansas State University, Manhattan, KS

**Kalyan Nannuru:**

2004: ASM travel award for American Society for Microbiology meeting

**Sara Schul:**

2005: Second prize for best research presentation at K-State 10th Annual Graduate Research Forum.

**Fox, J. T**

2005 Best Oral Presentation in Food Safety, 86th Annual Conference of Research Workers on Animal Diseases, Chicago, IL.

2005: Kansas State University Graduate Student Council Travel Grant.

**Sambasivarao Tadepalli**

Kansas State University Graduate Student Council Travel Grant in Spring 2005, Spring 2006 and Summer 2006.

Kansas State University College of Veterinary Medicine Graduate Student Travel Grant in Spring 2006 and Fall 2006.

**Rodger Main**

2003: Winner of Midwest Animal Science Meeting invitational competitive PhD research paper

2003: National Pork Board Swine Research Innovation Award

**Niranjan Babu Butchi**

2005: Best paper in virology at Conference of Research Workers on Animal Diseases annual meeting, Chicago, IL.

**Jason Nickell**

2008: First prize for best clinical research presentation at Annual Phi Zeta Day

2008: Doug Armstrong Memorial Scholarship from the Academy of Veterinary Consultants awarded for excellence in clinical research

## **C. Student Demand for the Pathobiology Ph. D. Program**

The student demand for the Pathobiology Program has always been high and the number of serious applicants has always been higher than the need of the faculty. In the past 7 years, the program has consistently maintained 25 to 30 graduate students in the Program. The program does not have Graduate Teaching Assistantships nor college or departmental funds to provide

financial support to graduate student. Because research assistantships are entirely supported by individual faculty, recruitment is done by individual faculty and the yearly fluctuations in number of graduate students are reflective of the award of research grants.

### **D. Employment Demand for Pathobiology Ph. D. Graduates**

The Ph. D. graduates from the program find employment immediately after, and often times before, graduation. The majority of graduates accept post-doctoral positions, particularly if their intention is to have an academic career, or opt for jobs in Animal Health industries. The following table provides employment and salary data of recent graduates of the program:

**Ph. D. Students (2003-2007)**

	<b>Student</b>	<b>Major Professor</b>	<b>Graduation date</b>	<b>Position</b>	<b>Salary</b>
1.	Al-Mubarak, Abdullah	Chowdhury	2004	Returned to Saudi Arabia	Not available
2.	Lee, Joong-Chul	Stewart	2004	Staff Scientist – pharmaceutical co. in South Korea; will be starting a masters in public health program in the U.S. in the fall	Not available
3.	Van Baale, Matt	Galland/ Nagaraja	2004	Manger/Owner, Dairy, Iowa	\$120,000
4.	Gao, Jinxin	Stewart	2005	Post-Doc	\$40,000-45,000
5.	Tseng, Delores	Stewart	2005	Post-Doc	\$40,000-45,000
6.	Main, Rodger	Dritz	2005	Director of Health and Research - Smithfield West	\$145,000
7.	Chauhan, Vinita	Rowland	2005	Post-Doc	\$40,000
8.	Kim. Jeong Ki	Kapil	2006	Post-Doc	\$40,000
9.	Bieker, Jill	Oberst/ Phebus	2006	Plum Island Animal Disease Lab, USDA	\$80,000
10	Tadepalli, Sambasivrao	Nagaraja/ Stewart	2007	Research Microbiologist, Novartis Animal Health, Larchwood, Iowa	\$65,000
11	Kim, Dal Young	Rowland	2007	Post-Doc	\$35,000
12	Sirigireddy, Kamesh	Ganta	2007	Research Microbiologist, Newport Laboratories, Worthington, MN	\$65,000

	<b>Student</b>	<b>Major Professor</b>	<b>Graduation date</b>	<b>Position</b>	<b>Salary</b>
13	Thompson, Brian	Stewart	2007	Postdoctoral Associate, Univ. of Missouri, Columbia, MO.	\$35,000
14	Fox, Trent	Nagaraja	2007	Sophomore DVM Student	Not applicable

## **VI. Assessment of Student Learning (ASL)**

### **A. Student Learning Outcomes**

In 2006, the Pathobiology Graduate Group adopted four student learning outcomes (SLO) for Ph. D students. The outcomes students are expected to achieve are:

1. Abilities to formulate and design a hypothesis-driven research project (s), independently carry out the research methodology, critically analyze the data, and disseminate the research findings in the form of presentations at scientific meetings and peer-reviewed publications.
2. Professional and technical expertise in their chosen areas of study or disciplines.
3. Abilities to apply knowledge through critical thinking, to interpret or analyze and integrate information, to respond and adapt to changing situations, to make decisions, to solve problems, and to evaluate actions.
4. Effective oral and written communication skills.

### **B. Method of Assessment**

The faculty developed a list of criteria to evaluate each SLO. Each criterion is rated on a scale of 4 to 1, with 4 being exemplary, 3 being exceeds expectation, 2 being meets expectations, and 1 being failed to meet expectations. The document is presented below. Because of the diversity of disciplines, not all criteria would be applicable to each and every student. Therefore, we have the option of checking not applicable in such cases. The evaluation, generally done in December, covers the period of the academic year, from July 1 to June 30. Each student in the Pathobiology Program will be evaluated using the assessment document by their respective major supervisor. The documents are distributed in and collected by the Chair of the program for preparing an overall summary of the evaluation.

**GRADUATE STUDENT PERFORMANCE ASSESSMENT**

Evaluation Period: July 1, \_\_\_\_\_ to June 30, \_\_\_\_\_ Program year: 1      2      3      4

Degree:            MS                            PhD

Student \_\_\_\_\_ Evaluator: \_\_\_\_\_

**Program SLO 1:            Abilities to design, carry out the research, analyze data, and disseminate the research findings**

Assessment criteria	Exemplary (4)	Exceeded expectations (3)	Met expectations (2)	Failed to meet expectations (1)	NA
Ability to develop research ideas and formulate hypothesis					
Ability to design experiments and apply scientific method to organize and test ideas/hypotheses					
Familiar with guidelines and institutional policies relevant to laboratory safety, animal experimentation, and human subjects.					
Ability to operate and maintain basic laboratory instrumentation					
Sound laboratory practice and ability to develop and maintain records, logs, and protocols					
Ability to handle experimental animals					
Ability to analyze and interpret data					
Ability to recognize unexpected results and to use troubleshooting skills					
Abstracts/Publications					

NA = Not applicable

**Program SLO 2:            Professional and technical expertise in chosen discipline**

Assessment criteria	Exemplary (4)	Exceeded expectations (3)	Met expectations (2)	Failed to meet expectations (1)	NA
Handling of course work					

Desire to take challenging courses					
Familiarity with research literature relevant to research focus					
Ability to manage time effectively					
Ability to identify and seek needed resources					
Skills with computers, including basic software applications					
Proficiency in information storage and retrieval					
Member of Professional organizations and Societies					
Awareness of contemporary issues in Pathobiology					
Awareness of various career opportunities					

**Program SLO 3: Critical thinking and interpretation of information presented**

<b>Assessment criteria</b>	<b>Exemplary (4)</b>	<b>Exceeded expectations (3)</b>	<b>Met expectations (2)</b>	<b>Failed to meet expectations (1)</b>	<b>NA</b>
Ability to conceptualize problems					
Ability to brainstorm in a group					
Ability to integrate information from disparate sources					
Ability to solve problems by staying current with new technology					
Presentation/participation in journal clubs					
Presentation/participation in departmental seminars					
Ability to locate and assimilate new information rapidly					

**Program SLO 4: Effective use of oral and written communication skills**

<b>Assessment criteria</b>	<b>Exceeded</b>	<b>Met</b>	<b>Failed to meet</b>	<b>NA</b>
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	<b>Exemplary (4)</b>	<b>expectations (3)</b>	<b>expectations (2)</b>	<b>expectations (1)</b>	
Ability to organize ideas and convey complex knowledge in an audience-appropriate fashion					
Ability to use graphics to communicate ideas effectively					
Ability to speak before small and large groups					
Ability to field questions					
Writing skills: Ability to organize ideas and write logically					
Ability to write at multiple levels (abstract to full-length manuscripts)					
Ability to edit and proof read manuscripts					
Ability to revise one's work in response to constructive criticism					
Familiar with processes related to publication in scientific journals					

**Additional Comments:**

**Is the student making satisfactory progress?**

**Yes**

**No**

\_\_\_\_\_  
**Signature**

\_\_\_\_\_  
**Date**

In addition, each student after completion of the final defense of the doctoral examination will be evaluated by the Supervisory committee using the document presented below. The Chair of the Program is responsible for distribution and collection of the evaluation document.

**FINAL EXAMINATION ASSESSMENT**

Date: \_\_\_\_\_

Graduate Student: \_\_\_\_\_

Degree (circle one):

**PhD**

**MS**

Examination:

**Final Oral Examination**

Examination Outcome (circle one):      Pass                      Fail                      Other \_\_\_\_\_

*Based on the performance on this examination, rate this student's capabilities in the following Student Learning Outcomes:*

<b>Student Learning Outcomes</b>	<b>Exemplary (4)</b>	<b>Exceeds Expectation (3)</b>	<b>Meets Expectation (2)</b>	<b>Fails to meet Expectations (1)</b>
<i>Abilities to design, carry out the research, analyze the data, and disseminate the research findings</i>				
<i>Ability to demonstrate professional and technical expertise in the chosen discipline.</i>				
<i>Demonstration of critical thinking and ability to interpret information presented.</i>				
<i>Demonstrate effective use of oral and written communication skills.</i>				

**Additional Comments:**

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### **C. Results of Assessment**

The evaluations of the SLOs of graduate students were initiated in 2006. The data gathered for the past two academic years (2005-2006 and 2006-2007) have been analyzed and are presented below. The scores were averaged and further discussions are needed to determine the ways of data analyses to make them more meaningful. The first table provides a summary of the scores in the last two academic years.

#### **Summary of the assessments**

**SLO-1: Abilities to formulate and design a hypothesis-driven research project, Independently carryout the research methodology, critically analyze the data, and disseminate the research findings in the form of presentations at scientific meetings and peer-reviewed publications**

	<b>Mean 2005-2006 (no. of</b>	<b>Mean 2006-2007 (no. of</b>

<b>Assessment criteria</b>	<b>students=13)</b>	<b>students=16)</b>
Ability to develop research ideas and formulate hypothesis	2.6	2.6
Ability to design experiments and apply scientific method to organize and test ideas/hypotheses	3.0	2.8
Familiar with guidelines and institutional policies relevant to laboratory safety, animal experimentation, and human subjects	2.6	2.7
Ability to operate and maintain basic laboratory instrumentation	2.8	2.7
Sound laboratory practice and ability to develop and maintain records, logs, and protocols	2.7	3.0
Ability to handle experimental animals	1.5	2.0
Ability to analyze and interpret data	2.5	3.0
Ability to recognize unexpected results and to use troubleshooting skills	2.5	3.0
Abstracts/Publications	2.3	2.6

**SLO-2: SLO-2: Professional and technical expertise in their chosen areas of study or discipline**

<b>Assessment criteria</b>	<b>Mean 2005-2006 (no. of students=13)</b>	<b>Mean 2006-2007 (no. of students=16)</b>
Handling of course work	2.1	2.9
Desire to take challenging courses	2.3	2.8
Familiarity with research literature relevant to research focus	2.6	2.9
Ability to manage time effectively	2.6	2.9
Ability to identify and seek needed resources	3.2	2.9
Skills with computers, including basic software applications	2.6	3.1
Proficiency in information storage and retrieval	2.6	3.0
Member of Professional organizations and Societies	1.7	2.2
Awareness of contemporary issues in Path biology	2.2	2.8
Awareness of various career opportunities	2.6	2.9

**SLO-3: Abilities to apply knowledge through critical thinking, to interpret or analyze and integrate information, to respond and adapt to changing situations, to make decisions, to solve problems and to evaluate actions.**

<b>Assessment criteria</b>	<b>Mean 2005-2006 (no. of students=13)</b>	<b>Mean 2006-2007 (no. of students=16)</b>
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Ability to conceptualize problems	2.8	2.9
Ability to brainstorm in a group	2.6	2.8
Ability to integrate information from disparate sources	2.9	2.9
Ability to solve problems by staying current with new technology	3.0	2.9
Presentation/participation in journal clubs	2.7	2.9
Presentation/participation in departmental seminars	2.5	2.7
Ability to locate and assimilate new information rapidly	2.8	2.9

**SLO-4: Effective oral and written communication skills**

<b>Assessment criteria</b>	<b>Mean 2005-2006 (no. of students=13)</b>	<b>Mean 2006-2007 (no. of students=16)</b>
Ability to organize ideas and convey complex knowledge in an audience-appropriate fashion	2.6	3.0
Ability to use graphics to communicate ideas effectively	2.5	3.0
Ability to speak before small and large groups	2.8	2.8
Ability to field questions	2.7	2.8
Writing skills: Ability to organize ideas and write logically	2.5	2.7
Ability to write at multiple levels (abstract to full-length manuscripts)	2.4	2.3
Ability to edit and proof read manuscripts	2.1	2.2
Ability to revise one's work in response to constructive criticism	2.6	2.4
Familiar with processes related to publication in scientific journals	2.5	2.7

The evaluations of the SLOs of graduate students also provide data to track their progress from year to year. Majority of the students graduate in 3 years, although some take 4 years. The following table provides summary of scores averaged by year for the past two academic years (2005-2006 and 2006-2007) on each SLO. The scores generally indicate improvement in each SLO.

**PHD STUDENTS  
ACADEMIC YEAR 2006-2007**

**SLO-1: Abilities to formulate and design a hypothesis-driven research project, independently carryout the research methodology, critically analyze the data, and disseminate the research findings in the form of presentations at scientific meetings and peer-reviewed publications**

<b>Assessment criteria</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>
Ability to develop research ideas and formulate hypothesis	2.3	3.0	3.0	3.0

Ability to design experiments and apply scientific method to organize and test ideas/hypotheses	2.4	2.5	3.5	3.5
Familiar with guidelines and institutional policies relevant to laboratory safety, animal experimentation, and human subjects	2.6	2.5	3.5	2.8
Ability to operate and maintain basic laboratory instrumentation	2.8	2.5	3.0	2.8
Sound laboratory practice and ability to develop and maintain records, logs, and protocols	3.3	2.0	3.5	3.0
Ability to handle experimental animals	2.5	0.0	3.5	3.0
Ability to analyze and interpret data	2.8	2.5	3.5	3.2
Ability to recognize unexpected results and to use troubleshooting skills	2.9	2.0	3.5	3.2
Abstracts/Publications	2.4	3.0	3.0	2.8

**SLO-2: Professional and technical expertise in their chosen areas of study or discipline**

Assessment criteria	Year 1	Year 2	Year 3	Year 4
Handling of course work	3.0	2.5	3.5	2.5
Desire to take challenging courses	2.9	2.5	3.0	2.8
Familiarity with research literature relevant to research focus	2.8	2.5	3.5	3.0
Ability to Manage Time Effectively	2.9	2.5	3.5	3.0
Ability to identify and seek needed resources	2.6	2.5	3.5	3.5
Skills with computers, including basic software applications	3.0	3.5	3.5	3.0
Proficiency in information storage and retrieval	2.9	3.0	3.5	3.0
Member of Professional organizations and Societies	2.5	2.5	3.0	3.3
Awareness of contemporary issues in Pathobiology	2.5	3.0	3.0	3.3
Awareness of various career opportunities	2.8	2.5	3.0	3.3

**SLO-3: Abilities to apply knowledge through critical thinking, to interpret or analyze and integrate information, to respond and adapt to changing situations, to make decisions, to solve problems and to evaluate actions.**

Assessment criteria	Year 1	Year 2	Year 3	Year 4
Ability to conceptualize problems	2.6	3.0	3.5	3.3
Ability to brainstorm in a group	2.4	3.0	3.0	3.5
Ability to integrate information from disparate sources	2.5	2.5	3.5	3.5
Ability to solve problems by staying current with new technology	2.6	2.5	3.5	3.5
Presentation/participation in journal clubs	2.6	3.0	3.0	3.3
Presentation/participation in departmental seminars	2.5	3.0	3.0	3.0
Ability to locate and assimilate new information rapidly	2.5	3.0	3.5	3.5

**SLO-4: Effective oral and written communication skills**

Assessment criteria	Year 1	Year 2	Year 3	Year 4
Ability to organize ideas and convey complex knowledge in an audience-appropriate fashion	2.8	3.0	3.5	3.3
Ability to use graphics to communicate ideas effectively	2.8	3.0	4.0	3.0
Ability to speak before small and large groups	2.4	3.0	4.0	3.0
Ability to field questions	2.5	2.5	4.0	3.0
Writing skills: Ability to organize ideas and write logically	2.5	2.5	3.0	3.0
Ability to write at multiple levels (abstract to full-length manuscripts)	1.8	2.5	3.0	3.0
Ability to edit and proof read manuscripts	1.6	2.0	3.0	3.0
Ability to revise one's work in response to constructive criticism	2.6	1.0	3.5	2.3
Familiar with processes related to publication in scientific journals	2.4	3.5	3.5	3.0

**PH. D. STUDENTS  
ASSESSMENT AFTER COMPLETION OF THE FINAL EXAM  
ACADEMIC YEAR 2006-2007**

Student Learning Outcomes	Mean Score No. of Students =5
Abilities to design, carry out the research, analyze the data, and disseminate the research finding	2.7
Ability to demonstrate professional and technical expertise in the chosen discipline.	3.0
Demonstration of critical thinking and ability to interpret information presented.	2.6
Demonstrate effective use of oral and written communication skills.	3.0

**D. Review of the Assessment Results**

Because we initiated the assessment in 2006, we had one graduate faculty meeting in 2007 to analyze the data collected for the academic year of 2005 to 2006. Information on the average score of graduate students in both the MS and the PhD programs were discussed. There were only some minor changes in the evaluation form. The scoring system was changed from 0 to 4, with 0 being failed to meet expectations, to 1 to 4.

**E. Implementation of Actions and/or Revisions**

The evaluation form was changed to reflect the new scoring system of 1 to 4, with 1 being failed to meet expectations and 4 being exemplary. Although the diversity of disciplines offered by the program was viewed as an asset, the fact that some of these areas are supported by only one or two faculty is a notable weakness. In effect, the program has the necessary breadth to be successful but in some areas lack sufficient depth. The loss of key faculty would place some aspects of the program at considerable risk and could compromise the completion of graduate programs by current students. In large part because the program represents a wide number of disciplines and has members from several departments, interactions and relationships between the Pathobiology Graduate Program and department heads/deans are variable and inconsistent. Inadequate funding for the purchase of advanced biomedical research equipment and the maintenance of existing equipment is a significant limitation in the training of graduate students as well in the ability of faculty to compete for extramural funding. Because a significant portion of the faculty in the program conducts research in the area of infectious diseases, the absence of adequate physical facilities to conduct infectious disease experiments in animals is a serious weakness. Stipends for graduate students in the program are insufficient to attract and motivate high quality graduate students.

#### **F. Effects of Actions and/or Revisions on Student Learning**

The next meeting to review the actions and revisions are scheduled in the month of May.