Kansas State University's Program Review Year 2018 Institutional Overview

The mission of Kansas State University (K-State) is to foster excellence in teaching, research and service that develop a highly skilled and educated citizenry necessary to advancing the well-being of Kansas, the nation and the international community. The university embraces diversity, encourages engagement and is committed to the discovery of knowledge, the education of undergraduate and graduate students, and improvement in the quality of life and standard of living of those we serve.

Review of selected degree programs each year helps assure that the university continues to offer rigorous and relevant curricula to meet the needs of students, faculty, the state of Kansas, and the Kansas Board of Regents (KBOR). Such reviews also ensure that the institution is heeding to its mission and strategic goals. For the 2017 cycle, K-State reviewed a total of 19 degree programs in the following disciplinary areas:

- College of Agriculture –Bakery Science & Management, Milling Science & Management, Feed Science & Management, Food Science, Grain Science, Agronomy, Entomology, Genetics.
- College of Veterinary Medicine Pathobiology, Biomedical Science, Physiology.
- **K-State Olathe** Applied Science and Technology.

What follows provides significant highlights of each program and proposed recommendations for the degree programs that did not meet the minimum criteria.

DESCRIPTION OF THE REVIEW PROCESS

The process began with each program examining its assessment of student learning. The Office of Assessment reviewed all reports with the Graduate School Assessment and Review committee additionally reviewing graduate programs' reports on the assessment of student learning. Reviewers provided feedback and recommendations for improvement. Each program examined the statistical data and drafted a summary report resulting from their program's self-review including information on: (1) mission, centrality, uniqueness; (2) quality of faculty; (3) quality of degree programs; (4) external demands; (5) service provided to the discipline, the university and beyond; (6) cost effectiveness; and (7) major achievements or accomplishments and challenges. In consultation with the College Dean's Office and/or the respective College Committee on Planning (CCOP), each department finalized the Program Review Report for its academic programs (by CIP code) as required by KBOR. The college dean then forwarded the reports to the Office of Assessment for review and comment. If necessary, the Office of Assessment returned the reports with suggested revisions to the college dean, which were returned with revisions for final approval. Summaries for all programs are attached. Where possible, the reports for degree programs within a given department were combined into a singular narrative, which may have resulted in slightly longer than the required two pages.

SUMMARY OF THE PROGAMS REVIEWED

Of the 19 degree programs reviewed, seven are doctorates, seven are masters, five are bachelor's degree programs. On the whole, all of the degree programs are in strong and viable academic disciplines. Each department and its academic programs provide opportunities for the advancement of education, research, and service for the state of Kansas, the nation, and the world.

College of Agriculture:

No other institution in the state, region or nation offers Baccalaureate degrees in **Milling, Feed and Baking Science**. The Grain Science and Industry department is unique in that it is the only program of its kind offering majors in Milling Science and Management, Feed Science and Management and Bakery Science and Management. Students regularly return from summer internships with offers for full-time employment upon graduation (87.6% employed; 10.6 further education). It is not uncommon for students to have multiple offers. In fact, if the occasional self- imposed decisions are excluded, student placement is effectively 100%. This program is highly visible and critical to the grain industries which are critical to the Kansas and regional economies. This is perhaps best evidenced by department's industry-funded scholarships (>\$200,000 per year), Professorships (>\$200,000 per year), feed mill (\$16M), flour mill (\$10.5M) and International Grains Program (IGP) facility. Since 2011, the faculty of the **Grain Science** graduate program have raised a yearly average of \$4,800,000 in research dollars, and published a yearly average of 52 peer reviewed research articles. Due to the uniqueness and quality of the training it provides, demand for the department's MS & PhD graduates is high, exceeding supply for well over a decade. Industrially, any processor of cereals, producer of cereal foods, feeds or ingredients would be a likely employer of our graduates.

The B.S. degree in **Food Science and Industry** aligns tightly with this centralized mission, as the only one of its kind in the Kansas Board of Regents system. Recent reports from the Kansas Department of Agriculture indicate that ~43% of the Kansas economy is based on agriculture; thus, the Food Science and Industry program is critical to Kansas. Many students use the Food Science and Industry degree to complete pre-professional requirements for veterinary, medical, pharmacy, nursing, and dental schools while also preparing for challenging careers in the food industry. Using the six-year cohort (2010 to 2016) and the mechanism K-State uses for graduation rates, the 6-year graduation rate for the 2010 cohort of Food Science students was 81.8% compared with 69.5% for the College of Agriculture and 66.4% for the University.

The **Agronomy** Department has a responsibility to train students and provide leadership in agronomy to developing countries and is the only department in Kansas institutions of higher education that offers B.S., M.S., and Ph.D. Agronomy degrees. At the regional and national level, K-State's Agronomy program is widely recognized as one of few that continues to emphasize applied education and research of direct benefit to the state's farmers and ranchers. Average new grant support has been \$6.7 M each year and Agronomy has been the top department for grant funding in the College twice in the past five years (2nd or 3rd the remaining years) and the top department for all of K-State once. The placement rate of our graduating undergraduate students is essentially a 100% since 2010 (262 graduates). Job placement includes: 57% industry related positions, 11% pursuing graduate studies, and 32% return to production agriculture. Students completing the M.S. degree in Agronomy for past five years indicate a 95% placement rate, with 75% employed in professional positions, 20% pursuing further education, and 5% seeking employment. Data obtained from CES for past five years indicate 100% placement of doctoral students, many employed as faculty or post-doctoral researchers at universities in Kansas, the U.S., and overseas. Of the approximately 64 M.S. and Ph.D. candidates per year on GRA appointments, about 82% receive their salary support from extramural grants other external sources of support (scholarships, fellowships, etc.).

The **Entomology** department addresses a wide range of areas, including human and animal health, environmental awareness and conservation, sustainable protection of food and fiber crops, and fundamental understanding of biological systems. It is the only department of Entomology in Kansas and is one of 28 standalone departments of Entomology of the 42 across the nation. They averaged \$2.1 million in extramural research funds (\$190K per research FTE per year) and 72 refereed research publications (6.5 per research FTE per year) annually. The graduated MS students for whom we have accurate records (from 2008-16) have had a 91% placement rate in positions or continuing in graduate school with the graduating PhD students from 2008-16 having ha a 100% placement rate. Six undergraduate courses support majors in other departments and diverse colleges. The program hosts more than 25 undergraduate students in labs each semester for engagement in research. The \$2.1 million annually in faculty extramural research funding supports the graduate research programs and professional development of the students, as well as improving facilities and infrastructure at a time when university funding is unable to do so.

Within the Regents System, the K-State **Genetics** Program is unique in training geneticists in agricultural sciences. Therefore, this program offers critical educational opportunities for Kansas, the state that ranks 2nd in total U.S. cropland and 1st in production of wheat and sorghum. The Genetics Program contributes strength in population and evolutionary genetics, quantitative genetics, molecular and developmental genetics, and bioinformatics. Interdisciplinary interactions often bridge basic and applied genetics and merge diverse fields such as agriculture and computer sciences. Faculty members are internationally-recognized researchers and teachers who receive over \$8.5 million in annual external research funding. The 100% employment record for Genetics graduates from this review period illustrates external demand.

College of Veterinary Medicine:

The **Pathobiology** Graduate Program is an interdepartmental and interdisciplinary program with a mission to provide a broad-based graduate education to students seeking a PhD degree in the field of Veterinary Medicine, specifically in Microbiology, Pathology, Immunology, Toxicology, Epidemiology, Cancer Biology, and Production Animal Medicine and Management. The uniqueness of the Graduate Program is that it is the only program in the State of Kansas that offers a Ph. D degree in Veterinary Pathobiology, a field of Veterinary and

Comparative Medicine that includes disciplines to study infectious and non-infectious diseases of animals and humans, food safety and security, and production animal medicine and management. Since the academic year of 2012, there has been a steady increase in the number of students admitted to the program (28 in 2011-2012 to 41 in 2016-2017). Of all the sub-specialties in the program, Virology has the highest number of students, reflective of the emergence of a number of viral diseases in animals and some of them are potentially zoonotic. Since 2009, a total of 52 students have graduated with a doctoral degree and collectively they have published 231 peerreviewed publications, which averages to 4.4 publications per doctoral dissertation. All of the graduates, except one, have secured almost immediate employment. A large majority of the graduates have positions that involve teaching and or research in the area of animal health and welfare. The pathobiology graduate program is extremely cost effective because the graduate research assistantships and student's research expenses are entirely supported by research funds generated by the faculty.

The mission of the **Veterinary Biomedical Sciences** (VBS) Graduate Program is to prepare students for a career in research and service in academia, animal health industry, public health, governmental agencies, and specialty veterinary practices or to pursue a doctoral degree in biomedical sciences. In fiscal years 2012 to 2016, the faculty in the Department of Diagnostic Medicine and Pathobiology have been awarded extramural grants that averaged \$9.2 million per year. Extramural awards to faculty in the Department of Anatomy and Physiology have exceeded \$3.3 million annually. During this reporting period, 25% of our graduates have gone on to pursue a PhD, 28% are working in academia in a variety of positions from laboratory technician/research associates to instructors or Assistant Professor, 15% are working in animal health industry related careers, and 32% work in a private/specialty veterinary practice or clinics. The strong employer demand is because of the uniqueness of the graduate program, which provide valuable service to other departments in the university, public health and other governmental agencies, animal health industry, particularly swine and beef cattle industries. A number of courses offered by graduate faculty in the program are taken by graduate students in other colleges/departments, such as Anatomy and Physiology, Animal Sciences, Biochemistry, Biology, Food Science, and Grain Science.

The mission of the Department of Anatomy and **Physiology** encompasses instruction, research and continuing education, endeavors that form the critical foundations of medicine. Between 2008 and 2016, extramural awards to faculty in the Department of Anatomy and Physiology alone exceeded \$3.3 million, reflecting a return of ~ 61% of amounts proposed and ~39% success rate on proposals submitted (19/49). They also offer interdisciplinary training of students from undergraduate to post-doctoral levels. The costs of graduate student credit hours, as well as research projects, are funded 100% by faculty research grants. Roughly 69% (9/13) of the program's Ph.D. graduates secured professional employment by the time of graduation. Of these, 6 placed readily as postdoctoral fellows at major national and international universities. Faculty collaborate with peers in departments throughout the university, including Chemical Engineering; Kinesiology; Food, Nutrition, Dietetics and Health; Apparel, Textiles, and Interior Design.

K-State Olathe:

Applied Science and Technology: Professional Science Master's - reviewed in a future year.

RECOMMENDATIONS

Of the 19 programs reviewed, 17 have been recommended for continuance. This review identified one master's programs and one doctoral program with low enrollments and/or few degrees conferred. Rationale for enhancing the **Genetics** program results from the annual average over five-years of majors and degrees conferred in the M.S. degree in (3.2 and .2 respectively) fell below the Kansas Board of Regent's annual average minimum of 20 students enrolled and 5 degrees conferred. It is important to note that the master's degree is largely a feeder program for the Ph.D. and some applicants move directly into the Ph.D. without the master's degree. The five-year average enrollment in the Ph.D. (19) far exceeds the Kansas Board of Regent's threshold of 5, but the five-year average of degrees conferred (1.6) is still below the Kansas Board of Regent's benchmark of 2.

Although the annual average over five-years of majors and degrees conferred in the M.S. degree for **Entomology** (10.4 and 3.8 respectively) fell below the Kansas Board of Regent's annual average minimum of 20 students enrolled and 5 degrees conferred, the five-year average for the Ph.D. enrollment and degrees conferred (21.8 and 3.4 respectively) significantly exceeds the Kansas Board of Regent's annual average minimum of 5 students enrolled and 2 degrees conferred. Since the M.S. is deemed vital to the continuing success of the Ph.D. program, it is recommended that this program be continued.