

## Transforming Nursing Education Through Problem-Based Learning

About the PhD Program Prospective students who would like to enter the graduate program in pharmaceutical sciences select from one of five specific training tracks with an emphasis in the following disciplines: pharmaceuticals and drug delivery, pharmacology and toxicology, pharmaceutical/medicinal chemistry, clinical pharmacokinetics, and biomedical sciences. We tailor our curriculum, resources, and mentoring styles to the individual needs of a diverse next generation of pharmaceutical scientists who will positively shape the world through scientific research in the pharmaceutical sciences. Students with or without master's degrees will be considered for admission into PhD program. Texas A&M University is ranked among the top U.S. public universities and is the top university in the south and southwest states for research funding according to the National Science Foundation. With some of the most accomplished faculty across the nation, the graduate faculty also exemplifies the highest standards in teaching, research, and scholarship. By joining the Texas A&M Irma Lerma Rangel School of Pharmacy you will be engaged in exciting research while becoming a part of the Aggie family, a unique and life-long experience full of traditions and a network of leaders across the world. With 25 PhD faculty members with expertise in pharmacology, pharmacokinetics, pharmaceuticals, medicinal chemistry, molecular biology, immunology, biochemistry, microbiology, physiology, as well as the social and behavioral sciences and more than 20 postdoctoral fellows and staff scientists, the Department of Pharmaceutical Sciences has active research projects with funding from the NIH, FDA, DOD, NIPTE, American Heart Association, several state and national foundations, and the pharmaceutical industry. The research spans the areas of cancer, diabetes, pain, HIV, cardiovascular diseases, opioid/cannabinoids addiction, drug delivery systems and formulations, manufacturing sciences, epigenetics, nanotechnology, 3-D printing and many more emerging technologies. Our diverse student body comes from across the nation and the world to become independent and creative scientists and develop professional skill sets through top research projects, professional development, and other trainings that prepare them to become leaders in a wide range of pharmaceutical sciences. Being part of our PhD program allows our graduate students to select one of our two campuses: the traditional Aggie experience on the College Station campus and the Kingsville campus that is located in the coastal bend area of South Texas. The campuses may be geographically different, but both provide students with excellent resources, cultures and environments in which to pursue graduate studies in the pharmaceutical sciences. The goal of graduate study at the School of Pharmacy is to develop the intellectual breadth and specialized training necessary for a career in transforming the health care capacity to its full extent. Mission Statement The mission of the PhD program in Pharmaceutical Sciences (PHSC) is to provide a comprehensive knowledge base that leads to drug discovery, design, and development of pharmaceutical dosage forms through basic and applied research in pharmaceutical sciences. This comprehensive knowledge will afford graduates the ability to detect and correct product manufacturing issues of post-marketing adverse drug events and to perform translational research leading to the discovery and development of pharmaceutical dosage forms. Consistent with the Food and Drug Administration's (FDA) message of pharmaceutical current good manufacturing practices (cGMP) of the 21st century, Process Analytical Technologies (PAT), Quality by Design (QbD), and the Critical Path Initiative,

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the PHSC aims to provide strong foundational, educational, and research training in drug discovery and pharmaceutical product development; delivery of drugs to their sites of action; modernization of pharmaceutical manufacturing; regulatory affairs; and to support the existing preclinical and translational research programs within Texas A&M to obtain practical dosage forms that benefit patients and the citizens of Texas. The PHSC program will prepare students for executive positions in academia, research, education, government, industry, and related fields. These new leaders of pharmaceutical sciences will identify, research, and problem-solve issues related to pharmaceutical sciences. The proposed PhD program will provide education and research training for a comprehensive knowledge base required for translational research from bench to bed side, and to identify product quality issues that cause post-marketing adverse drug events and recalls that lead to dose and medication changes by physicians. It will prepare the students to fill the voids of pharmaceutical scientists and executives in academia, research, education, government, industry, and related fields. Vision Statement Texas A&M's strategic plan supports doctoral programs. The strategic plan can be found on the Office of the Provost website. Texas A&M's strategic planning document Vision 2020 and road map to achieve this vision with 12 imperatives can be found on the Vision 2020 website. The top two imperatives include elevation of faculty with teaching, research and scholarship, and the strengthening of graduate programs. The School of Pharmacy is already receiving solid support to hire established faculty with attractive start-up packages, equipment purchases, space for laboratories, and a new good manufacturing practice laboratory. The establishment of the proposed PhD in PHSC supports the imperative of strengthening graduate programs. The School of Pharmacy's Research and Scholarship strategic goals reflect the Health Science Center's strategic plan and lists development of graduate programs as a key objective/strategic direction to achieve the institution's aspirations of national ranking similar to other strong programs within Texas A&M. Additionally, during the most recent faculty retreat, RSOP faculty overwhelmingly voted for development of PhD program in PHSC as the top priority

for the College of Pharmacy. The students will be informed of the marketable skills through several didactic courses on applied sciences and reinforcing of this knowledge through industrial collaboration, and industrial internships and ultimately through awareness on absorption of workforce in pharmaceutical industries, public universities, and government agencies such as FDA and others. The students are also expected to attend professional meetings with the mentors, and they will have a lot of opportunities to interact with potential recruiters. Additional Graduate Program Information

TAMU Office of Graduate and Professional Studies (OGAPS) The Office of Graduate and Professional Studies (OGAPS) at Texas A&M University is a global leader in graduate education, committed to the pursuit of knowledge and the power of intellect. Through exceptional service and commitment to the highest standards, OGAPS advocates for graduate education at Texas A&M and throughout Texas. The Office of Graduate and Professional Studies is committed to a diverse campus climate, enhancement of the graduate experience and the development of all students as global citizens. For more information, visit the Texas A&M OGAPS site. Admissions Application Admission Guidelines Applications can be submitted through the following links under fall and spring semester consideration. Fall Application Deadlines Domestic and International applicants " January 30, 2023 The application for fall 2023 admission (August) can be found here.

Please use the search terms "Pharmaceutical" or "Pharmaceutical Sciences" to find and apply for this program. Areas of Specialization Pharmaceutics and drug delivery

Pharmacology and toxicology

Pharmaceutical chemistry

Biomedical sciences

Clinical pharmacokinetics Documents Needed and Scoring Criteria Letter of recommendation (minimum of 2)

Overall GPA

GRE (at least 152 in one of the sections and 300 in total desired)

TOEFL/IELTS Use institution code 6003 for GRE and TOEFL

Background in Pharmacy/Engineering/other areas that are mission specific

MS degree holders preferred but not required

Research experience

Potential for employment

Essay (250 words max) How to Apply (Domestic Students) You are a domestic freshman if you: are a citizen or permanent resident of the United States or have applied for permanent residency For more information, visit the Texas A&M Office of Admissions site. How to Apply (International Students) You are an international freshman if you: are not a citizen or permanent resident of the United States or

are not graduating from a Texas high school after three years in residence in Texas (please review Senate Bill 1528)

are a student without college credit or

earned college credit prior to high school graduation (dual credit/early college high school) For more information, visit the Texas A&M Office of Admissions site. Tuition and Fees Educational expenses for the months of enrollment will vary according to the course of study. For details on the basic budget for a particular graduate or professional program, please visit the Texas A&M Office of Financial Aid site. Scholarships & Financial Aid considers tuition and fees, books and supplies, transportation, room and board, incidental and living expenses in the cost of attendance for programs. All tuition and fee amounts provided herein represent the most accurate figures available at the time of publication and are subject to change without notice. University Rules in place at the time of publishing are reflected here. All are subject to change. The most current information available will be maintained on the Student Business Services website.

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Degree Requirements The School of Pharmacy PhD program follows the Texas A&M University guidelines for PhD program requirements and the SCH requirements for students with or without master's degrees. Further, unlike other programs with separated disciplines of pharmaceuticals, pharmaceutical chemistry, pharmacology, or pharmacy administration, the proposed program will have only one administrative unit. Regardless of the discipline interest of students, they will take the required core courses followed by a qualifying examination conducted by the PHSC PhD Program Committee with help from the course instructors and advisory committees. Following the completion of six-week lab rotations, students will select mentors and an advisory committee. This advisory committee will select prescribed electives to advance the student experience and training depending upon the discipline interest; the advisory committee will work with the PHSC Graduate Program Committee to develop content for the qualifying examination and take part in the progress evaluation of research throughout a student's stay in the program. The advisory committee, with assistance from the PHSC PhD Program Committee, ensures the general requirements of the Texas A&M graduate catalog are met. At the end of the second year, or any time prior, students will present their research proposal to the advisory committee and larger departmental audience in consultation with the major advisor. They will also take questions to demonstrate the mastery of the subject in which they are conducting dissertation research. Furthermore, students are required to participate in the School of Pharmacy's seminar series and make a presentation on their respective dissertation topic at least once every year. At the end of every year, students will present their progress report to their advisory committee or present departmental seminars on research progress, and complete their dissertations at least one month before the final defense. The dissertation must be defended in an open presentation followed by in-depth questions and examination on the research content by the advisory committee. Dissertations must be submitted to the Office of Graduate and Professional Studies (OGAPS) as per their requirements. Semester Credit Hour Requirements by Category  
Category SCH Entering with a Bachelor's SCH Entering with a Master's Required Courses 26 18 Prescribed Electives

14 8 Electives 12 6 Dissertation 38 28 Other (Specify, e.g., internships, clinical work, residencies) Lab rotations, seminars (2) Lab rotations, seminars (2) TOTAL 90 60 1 Texas Education Code 61.059 (1) limits funding for doctoral students to 99 SCH. Programs may be allowed to require additional SCH, if there is a compelling academic reason. Courses The program offers courses and opportunities to pursue graduate education in a variety of areas including process or product development of pharmaceutical products by quality by design and process analytical technologies with chemometrics and big data management techniques. Further, the proposed PhD program will be the first of its kind offering graduate training and education based on the FDA's critical path and CGMPs of the 21st century initiatives and the National Institute for Pharmaceutical Technology and Education's (NIPTE) recommendations for modernization of pharmaceutical development. Specialized courses such as pediatric dosage forms, vaccine delivery, chemometrics and big data management, process and product development with PAT and QBD tools are not offered as prescribed electives or electives in many other institutions. These unique courses will help modernize the pharmaceutical industry as needed by the FDA and pharm industry. Texas A&M is uniquely positioned to accomplish this because of the qualifications of the faculty in the School of Pharmacy as well as the state-of-the-art infrastructure at Texas A&M. The faculty of the School of Pharmacy is diverse, which is a strength for the integration of knowledge required for pharmaceutical science research. The core courses represent basic fundamental knowledge required for all majors within pharmaceutical science. After the students complete these courses and laboratory rotations, they will select PhD advisory committees. Depending upon the specialty areas of the major advisor and advisory committee members, appropriate electives will be suggested. Another unique feature of the program is that students will understand the drug development from a regulatory standpoint so that they develop the ability to convert basic discoveries into actual dosage forms for targeted drug delivery, controlled drug delivery, biotech and vaccine product development, transdermal and topical drug delivery, as well as herbal drugs, nanotechnology for biomedical applications, and knowledge of big data management and chemometrics. For transfer credits, a maximum of six credit hours will be allowed after the determination of competency-based equivalency with existing courses by the PHSC PhD Program Committee. For professional experience, a student may be allowed to work in a pharmaceutical industry for a maximum of six credit hours of research with consent of the major advisor and approval of the PHSC PhD Program Committee. The School of Pharmacy has well-tested teaching strategies of active learning, problem-based learning, competency-based learning, and flip-teaching that have been evaluated by American Council on Pharmaceutical Accreditation when the college recently received its accreditation for PharmD degree. The School of Pharmacy will also participate in the Texas A&M pedagogy project to enhance student learning and professional experiences. Required/Core Courses Prefix and Number Required/Core Course Title SCH PHSC 610\* Biotech drugs and vaccine products 4 PHSC 611\* Drug delivery and formulations 4 PHSC 612\* Principles of drug actions 4 PHSC 613\* Laboratory rotations 3 + 3 PHSC 621\* Biostatistics or equivalent 3

PHSC 622\* Professionalism and ethics in research or equivalent 3 PHSC 623\* Seminar 1+1 The courses in the above table are the required courses for 26 SCH for all entering students without Master of Science (MS) degrees and 18 SCH with MS degrees. They build the foundation and bring consistency to a diverse group of incoming students. It is highly likely that some of these required courses have already been completed at the graduate level by students entering with MS degrees. Depending upon their backgrounds, only 18 out of the 26 credits will meet the requirements. If a student enters after a MS degree and is found to have taken more courses or their equivalents in an accredited program, the PHSC PhD Program Committee may waive the required course and substitute that course with an elective based on the student's background and dissertation advisory committee recommendations. Prescribed Elective Courses (course offering is determined by graduate program committee and availability of courses) Prefix and Number Prescribed Elective Course Title SCH PHSC 724\* Principles of pharmacology and toxicology 3 PHSC 725\* Biopharmaceutics and pharmacokinetics 3 PHSC 731\* Process and product development or equivalent 2 PHSC 732\* Controlled and targeted drug delivery 3 PHSC 733\* Drug degradation and product stability or equivalent 3 PHSC 734\* Vaccine delivery 3 PHSC 735\* Industrial pharmacy 3 PHSC 736\* Physical pharmacy 3 PHSC 737\* Transdermal and topical drug delivery 3 PHSC 738\* Cosmetic development 2 PHSC 739\* Pediatric dosage forms 3 PHSC 741\* Analytical/Bioanalytical techniques and validation 3 PHSC 742\* High throughput training in drug discovery and screening 3 PHSC 743\* Polymer chemistry or equivalent 3 PHSC 744\* Chemometrics and big data management or equivalent 3 PHSC 689\* Topics in pharmaceutical science 1, 2, 3 PHSC 752\* Nanotechnology for biomedical applications 3 PHSC 753\* Pk/PD and drug metabolism or equivalent 3 PHSC 754\* Toxicokinetics and predictive toxicology 3 PHSC 755\* In-vitro/in-vivo simulations and modeling 3 PHSC 756\* Advanced pharmacology 3 PHSC 757\* Herbal drugs or equivalent 3 PHSC 758\* Research in pharmaceutical science 1, 2, 3 PHSC 691\* Dissertation research 3 Prescribed electives vary depending upon the background of incoming students. If it is not prescribed, the students may elect to take the above courses or others from Texas A&M that their advisory committee may recommend. Graduate Catalog The Texas A&M University Graduate and Professional Catalog, published annually, provides information about the graduate and professional studies programs of Texas A&M University to students, prospective students, and faculty and staff of the university. Included is information concerning requirements for admission to graduate and professional studies at the university, services available to students, graduate and professional course offerings and listings of the administrative officers and the graduate faculty. For more information, visit the Texas A&M Graduate and Professional Catalog website. Graduate Faculty Committee Narendra Kumar, PhD

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About Our Campuses The School of Pharmacy operates educational and research campuses in Kingsville, Texas, and College Station, Texas. The first, second, and third professional years are offered on both campuses simultaneously, while the fourth professional year will continue to consist of advanced clinical rotations throughout Texas. Using distance learning technology, we offer one curriculum that runs concurrently in real time, accommodating nearly all courses with the exception of practice and skills laboratories that will be physically offered on each campus. College Station The School of Pharmacy facilities in College Station are located on the main campus of Texas A&M University, and our students enjoy the full Aggieland experience. Beyond campus, Bryan-College Station is a community rich in tradition and history. Set deep in the heart of Central Texas, the region offers the modern amenities of a big city with a warm small-town charm, making this one of the friendliest places you'll ever visit. Research focus areas on the College Station campus include: drug biomaterial design and synthesis

nanomedicine and drug delivery

drug formulations design and development

biopharmaceutics

drug 3-D printing

drug quality control and good manufacturing practices

disease biomarker development

stem cell biology

obesity and metabolic complications

neuropathogenesis of HIV and drug abuse Learn more about College Station Kingsville The College of Pharmacy facilities in Kingsville are located on the campus of Texas A&M University Kingsville, the oldest institute of higher education in south Texas. Founded in 1904 and named for Captain Richard King of the legendary King Ranch, Kingsville is home to nearly 30,000 people, and is a vital part of Texas's growing gulf coast region. Research focus areas on the Kingsville campus include: anti-cancer drug design & synthesis

polymer chemistry and drug discovery

nanomedicine

controlled release formulations

drug delivery

pharmacokinetics

Cancer biomarkers,

chronic inflammatory diseases (obesity, mental health, IBD)

thrombosis

platelet biology. Learn more about Kingsville

Campus Safety & University Police College Station The mission of the Texas A&M University Police Department is providing a safe and secure environment through education, the cooperative spirit of all university community members and the enforcement of laws and regulations. For more information, visit the Texas A&M University Police Department website.

Kingsville The Texas A&M-Kingsville University Police Department is dedicated to providing excellent customer service and protection to the campus community. One of our goals is to maintain a safe learning and working environment for everyone on campus. Additionally, the University Police Department is committed to educating the campus community on personal protection and crime awareness. For more information, visit the Texas A&M-Kingsville Police Department website.

College Station The College Station campus is about 4½ hours north of the Kingsville campus. It is also within a 3-hour drive or less to multiple metro areas, including: San Antonio (3 hours southwest)

Austin (2 hours southwest)

Houston (1½ hours south) Kingsville Kingsville is within a 4-hour drive or less to multiple metro areas, including: San Antonio (2½ hours northwest)

Austin (3½ hours north)

Houston (4 hours northeast)

Brownsville-McAllen-Harlingen metro area (2 hours south)

**International Student Services** The Texas A&M University student population is comprised of a diverse group of students that includes more than 6,000 international students from nearly 130 nations. International Student Services (ISS) administers a wide variety of services to the international community of Texas A&M. The mission of ISS is to facilitate international students' admittance to the United States, to assist international students' transition to life in the United States and at Texas A&M, to promote interactions between the U.S. and international populations, and to provide services necessary to meet the special needs of international students. For more information, visit the Texas A&M International Student Services website.

**Human Resource Department** Texas A&M University's Division of Human Resources and Organizational Effectiveness assists the university's employees, departments, and HR Liaison Network members regarding human resources matters. For more information visit the Texas A&M Division of Human Resources and Organizational Effectiveness website.

**Student Health Services** Student Health Services exists to advance student development and academic success by providing personalized and evidence-based healthcare to Aggies. For more information, visit the Texas A&M Student Health Services website.

**Information Technology Services** The Division of Information Technology provides reliable and accessible IT services to elevate and enhance Texas A&M University. We provide IT leadership to the campus community while serving the mission of Texas A&M. With trusted services and innovative solutions, we are changing the technology landscape on campus. For more information, visit the Texas A&M Division of Information Technology website.

**Scholarships** With the generous support of donors, several scholarships are made available each year to students enrolled at the Texas A&M Irma Lerma Rangel School of Pharmacy. The college and the scholarship recipients appreciate the support and generosity of the donors who have contributed to these awards. Current students may view and apply for School of Pharmacy scholarships using the Scholarship Portal (login required). Access the Scholarship Portal With the generous support of donors, several scholarships are made available each year to students enrolled at the Texas A&M Irma Lerma Rangel School of Pharmacy. The college and the scholarship recipients appreciate the support and generosity of the donors who have contributed to these awards. Current students may view and apply for School of Pharmacy scholarships using the Scholarship Portal (login required).

## Reference

[A Conceptual Guide to Statistics Using SPSS](#)

[International Handbook of Emotions in Education \(Educational Psychology Handbook\)](#)