Doctor of Philosophy in Clinical and Translational Science

The University of Kansas Medical Center is committed to improving lives and communities in Kansas and beyond through innovation in education, research, and health care. To fulfill this mission, KUMC has established a PhD program in Clinical and Translational Science (CTS). CTS is an emerging field of research that focuses on translating scientific discoveries into new treatments and cures for disease. This PhD program prepares graduates to lead and conduct research that improves the overall quality of healthcare and the health of patients. Program students and faculty investigate the clinical and translational aspects of diseases such as Alzheimer's and related dementias, brain aging, polycystic kidney disease, and cancer, among others.

KUMC is one of the leading medical schools in the U.S. and is home to several National Institutes of Health-funded research programs, including the University of Kansas Comprehensive Cancer Center, Frontiers Clinical and Translational Science Institute, KU Alzheimer's Disease Research Center, KU Polycystic Kidney Disease Research and Translation Core Center, Kansas Institutional Development Award Networks of Biomedical Research Excellence, and Kansas Institute for Precision Medicine Centers of Biomedical Research Excellence. KUMC has a strong research infrastructure, including state-of-the-art research facilities and a large pool of highly skilled researchers, providing students with the mentoring and resources they need to conduct cutting-edge clinical and translational research. The institutional environment is also highly collaborative, giving students the opportunity to work with researchers from a variety of disciplines and develop the skills they need to conduct interdisciplinary research.

Graduates will be prepared for principal investigator roles in academic, clinical, and biomedical industry research settings, leading and conducting research that improves the overall quality of healthcare and the health of patients. Specifically, they will be able to:

1. Identify important, testable scientific questions.
2. Design studies that operationalize a testable hypothesis.
3. Apply ethical principles and considerations for patient safety.
4. Understand and navigate the development, approval, and regulation processes for investigational products.
5. Plan, implement, and manage research studies and sites to ensure compliance with regulatory standards and study protocols.
6. Use data management tools and informatics to ensure the accuracy, security, and usability of research data.
7. Critically analyze and disseminate study results.
8. Lead interdisciplinary teams in biomedical research.
9. Collaborate within interdisciplinary teams to advance shared research objectives.

The application process for the Ph.D. in Clinical and Translational Science is online. Detailed instructions on how to apply are posted on the Department of Biostatistics & Data Science (https://www.kumc.edu/school-of-medicine/academics/departments/biostatistics-and-data-science/academics.html) website. Students may be admitted to begin the fall, spring, or summer semesters. Applications for the spring semester must be received by September 1st, the summer semester must be received by February 1st, and the fall semester must be received by April 1st for consideration.

Admission Requirements:

- A bachelor's degree from a regionally accredited institution documented by submission of an official transcript indicating the degree has been conferred before entering the program.
- A terminal degree (M.D., DDS, D.O., Pharm.D., Ph.D., DNP), or other professional degree; or enrolled in a clinical professional doctoral degree program. Completion of the degree is documented by submission of an official transcript indicating the degree has been conferred before entering the program. Official transcripts from institutions attended post-baccalaureate are also required.
- Students with degrees from outside the U.S. may be subject to transcript evaluation indicating the degree is equivalent to a U.S. degree and meets the minimum cumulative GPA requirements.
- A cumulative grade-point average (GPA) of at least a 3.0 on a 4.0 scale for the bachelor's degree.
- Applicants who are not native speakers of English, whether domestic or international, must demonstrate they meet the Minimum English Proficiency Requirement (https://www.kumc.edu/academic-and-student-affairs/departments/office-of-international-programs/inbound-programs/information-for-students/academic-english-requirements.html). The Educational Commission for Foreign Medical Graduates (ECFMG) certificate is accepted in lieu of a TOEFL/IELTS score for applicants with a Medical Degree applying to this program.
- A background check (https://www.kumc.edu/academic-and-student-affairs/student-resources/criminal-background-checks-for-students.html) is required during the admission process; it may affect the student's eligibility to enter the program.
- A letter grade of a B or better in Calculus I (or equivalent).
- Submission of official scores on the Graduate Record Examination (GRE) or other professional test scores (such as the Graduate Management Admission Test, Medical College Admission Test, Law School Aptitude Test) that are not more than five years old. Official copies of scores should be sent from the Educational Testing Service (ETS) to the University of Kansas Medical Center - ETS institutional code 6895. Applicants who have earned a doctoral degree in the United States are exempt from this requirement.
- Two letters of recommendation from employers, instructors, or other persons who can assess the applicant's academic and professional potential and experience. Letters are submitted per instructions provided for the online application process.
- A letter of recommendation and commitment from the proposed research mentor. Mentor letters are submitted per instructions provided in the online application.
- A personal statement describing research interests and how the program aligns with career goals.
- A current curriculum vitae. Demonstration of one or more years of responsible work experience in the health field or a degree in a recognized health profession or other evidence of training or experience that indicates adequate preparation for the Ph.D. in Clinical and Translational Science curriculum is preferred.
- A personal interview is required of all applicants who meet the minimum admissions standards.

Applicants who are employed by KUMC, the University of Kansas Hospital, or any affiliates should also submit:

- A letter of recommendation and commitment from the applicant's department head and/or division director. Department head/division director letters are submitted per instructions provided in the online application.

Applicants will be assessed based on these requirements.

After an applicant has been admitted, a program may defer an applicant's admission for one year, after which time the applicant must submit a new application.

Admission requirements are subject to change. In most cases, the catalog of the year the student entered the program should be used. *Other years' catalogs».*

The curriculum of the Ph.D. Program in Clinical and Translational Science is built upon four pillars: clinical and translational research methods, statistics and analytics, professional skills, and mentored research. The program is designed to allow students to engage simultaneously in didactic coursework and practical research experiences. The Ph.D. also offers specialty programs for residents and MSTP trainees (MD/PhD).

The typical program consists of 61 credit hours, including required and elective courses in the student's area, mentored research, annual evaluations, graduate examinations, and the successful completion of a doctoral dissertation. Dissertation research culminates in a final dissertation examination consisting of an oral presentation by the candidate and an examination by the faculty. The program is designed for full-time study, with students participating in mentored research and developing their research projects from their first semester.

Relevant prior graduate work and training are considered in setting up individual programs of study leading to the Ph.D. The typical course plan consisting of 61 credit hours is designed for students who have not previously completed a master's degree in clinical research, public health, or a directly relevant area. The course plan for a student who has previously completed a master's degree in clinical research, public health, or a directly relevant area is customized to account for master's-level courses already taken; therefore, the total credit hours required will vary.

DEGREE REQUIREMENTS:

- Degree requirements are typically completed within 4 years of admission to the program.
- A cumulative grade-point average (GPA) of at least 3.0 for all KU graduate coursework.
- Successful completion of the Written Preliminary Examination. By the end of Year 1, students are expected to have a research plan, including specific aims for research, and undergo a Written Preliminary Examination. This preliminary evaluation of student progress is conducted to ensure that they are meeting program milestones. The Program Directors will evaluate in conjunction with the student and his or her primary mentor(s). The evaluation will involve a review of the student's academic and research progress and will determine whether the student should continue with the program.
- Successful completion of the Comprehensive Examination. By the end of Year 2, students are expected to establish a dissertation committee, undergo a Comprehensive Examination, and submit a Comprehensive Examination report. The student is expected to demonstrate sufficient knowledge through the Comprehensive Exam to begin their dissertation project. The written portion of the Comprehensive Exam will follow the format of an NIH R-style proposal. It will include, at a minimum, an abstract, specific research aims, a draft research strategy, and reference materials. The oral portion of the Comprehensive Exam will mimic the format of an NIH study section review. Successful completion of the Comprehensive Examination is a requirement for the program and precedes the defense of the dissertation proposal (the Oral Comprehensive Examination (https://catalog.ku.edu/graduate-studies/kumc/#ComprehensiveOralExaminatin)). The Comprehensive Exam and the PhD dissertation proposal must be completed before a student can be granted Doctoral Candidacy status.
- Successful completion of the University's Research Skills and Responsible Scholarship requirement. This requirement must be met before scheduling the Oral Comprehensive Examination.
  - Successful completion of BIOS 899 Mentored Research (or equivalent) and documented participation in relevant journal clubs and seminar series meets the Research Skills requirement.
  - Successful completion of PRVM 853 Responsible Conduct of Research and completion of Human Subjects Protection, Good Clinical Practice, and Responsible Conduct of Research training modules through institutional training meets the Responsible Scholarship requirement. Students must keep their certification current throughout their tenure in the Ph.D. program.
- Successful completion of the Residence Requirement (https://catalog.ku.edu/graduate-studies/kumc/#programstext) before scheduling the Oral Comprehensive Examination. The requirement is met by full-time enrollment status for a minimum of two semesters.
- Successful completion of the Oral Comprehensive Examination (https://catalog.ku.edu/graduate-studies/kumc/#ComprehensiveOralExaminatin) (dissertation proposal). This examination is typically given when a doctoral aspirant has satisfactorily completed a major portion of the coursework and all other prerequisites as outlined above. The exam has a written component, an oral presentation, and an oral defense. Students are recognized as formal candidates for the Ph.D. only after they have passed this examination.
- Successful completion of Post-Comprehensive Enrollment (https://catalog.ku.edu/graduate-studies/kumc/#PostComprehensiveEnrollment) requirement.
- Enrollment in a minimum of one credit hour of dissertation BIOS 999 (https://catalog.ku.edu/search/?P=BIOS%20999) Doctoral Dissertation the semester the student will defend the dissertation and graduate.
- Successful completion of the Final Oral Examination (https://catalog.ku.edu/graduate-studies/kumc/#FinalOralExamination) (dissertation defense.) The candidate must present a dissertation showing the planning, conduct, and results of original research and scholarly activity. The purpose of the dissertation is to encourage and ensure the development of broad intellectual capabilities and to demonstrate an intensive focus on a problem or research area. This work is carried out under the guidance of a dissertation advisor. When the dissertation committee has

accepted the completed dissertation in final draft form, and all other degree requirements have been satisfied, the chair of the committee requests (at least 3 weeks before the date of the examination) Graduate Studies approval to proceed with the final oral examination.

- Successful Dissertation Submission and Publication (https://catalog.ku.edu/graduate-studies/kumc/#DissertationSubmissionandPublication) (according to Office of Graduate Studies policy.)
- Successful completion of the following courses (or equivalent):
  - **Research Methods Courses (10 credit hours)**

Code	Title	Hours
PRVM 853	Responsible Conduct of Research	1
PRVM 872	Grant Writing	3
BIOS 810	Clinical Trials	3
BIOS 811	Scientific Rigor and Reproducibility	3
Total Hours		**10**

  - **Analytics Methods Courses (9 credit hours)**

Code	Title	Hours
BIOS 714	Fundamentals of Biostatistics I	3
BIOS 715	Introduction to Data Management using RedCap and SAS	3
BIOS 717	Fundamentals of Biostatistics II	3
Total Hours		**9**

  - **Professional Skills Courses (3 credit hours)**

Code	Title	Hours
NRSG 880	Organizational Foundations for Leading Change	3
or HP&M 840	Organizational Foundations for Leading Change	

  - **Dissertation (minimum 18 credit hours).** In preparation for the Comprehensive Oral Examination, students may take Doctoral Research. Enrollment in this course will provide credit for mentored guidance through preparing and submitting the written dissertation proposal and preparation for the oral proposal defense. Students must take at least 18 credits of Doctoral Research and BIOS 999 Doctoral Dissertation, with at least nine credits from BIOS 999 Doctoral Dissertation, to be eligible for graduation. Only students who have passed the Comprehensive Oral Examination and submitted a dissertation proposal are eligible to enroll in BIOS 999 Doctoral Dissertation.

Code	Title	Hours
Doctoral Research		
BIOS 999	Doctoral Dissertation	1-9

  - **Advanced Elective Courses (minimum 15 credit hours).** Students must take at least 15 advanced elective credits, including at least six credits of advanced analytics and six credits of advanced research methods. The student's PhD advisor must approve advanced electives before enrollment.
  - **Other Requirements.**
    - Students are required to obtain explicit training in critical reading of the research literature in their area of interest through participation in a monthly journal club offered by their home department or department related to their research area.
    - Students are required to participate in at least one event in each of the five Growth Pathways each calendar year through the KUMC ASCEND Program.
    - Students are encouraged to attend the KUMC Research Institute *Research and Discovery Grand Rounds*, co-sponsored by Frontiers.
    - Students are also encouraged to take PRVM 869 Systematic Reviews.
    - Students are encouraged to give at least one public research presentation each year, preferably at a national conference.

Degree requirements and course descriptions are subject to change. Any courses taken as an equivalent must be approved by the Graduate Director and the Office of Graduate Studies. In most cases, the catalog of the year the student entered the program should be used. Other years' catalogs *(*https://catalog.ku.edu/archives/*).*

Typical Plan of Study

Year 1

Fall	Hours	Spring	Hours	Summer	Hours
BIOS 714	3	BIOS 810	3	BIOS 811	3
PRVM 872	3	BIOS 717	3	Elective	1-3
		PRVM 853	1		
		Preliminary Examination			
	6		**7**		**4-6**

Year 2

Fall	Hours	Spring	Hours	Summer	Hours
BIOS 715	3	BIOS 899	3-6	BIOS 999	3-6
HP&M 840	3	Elective	3-6	Elective	1-3
Elective	1-3	Written Comprehensive Examination			
		Oral Comprehensive Exam (dissertation proposal defense) may be scheduled as early as this semester if approved by committee to proceed.			
	7-9		**6-12**		**4-9**

Year 3

Fall	Hours	Spring	Hours
BIOS 999	6-9	BIOS 999	6-9
Elective	1-3	Elective	1-3

	Final Oral Exam (dissertation defense) may be scheduled this semester if approved by committee to defend and graduate.	
	7-12	**7-12**

Total Hours 48-73

Because the Ph.D. in Clinical and Translational Science degree signifies that the holder is prepared for entry into the practice of clinical and translational research, it follows that graduates must have the knowledge and skills necessary to function in a broad range of academic and research situations. The **Technical Standards** include those physical, cognitive, and behavioral standards that are required for the satisfactory completion of all aspects of the curriculum and the development of professional attributes required by all students at graduation. Therefore, the following abilities and expectations must be met by all students **with or without accommodations** admitted to the and Ph.D. program:

1. **Observation.** A student must be able to observe and evaluate class demonstrations and field experiences relevant to the field. He or she must be able to read and comprehend text, numbers, tables and graphs, both in print and displayed electronically. Observation necessitates the functional use of the senses of vision and hearing.

2. **Communication.** A student must be able to communicate effectively and efficiently in English in oral, written, and electronic form with other students, faculty, staff, researchers, and the public. Effective communication includes: the ability to understand assigned readings, lectures, and technical and professional materials; the ability to analyze information; the ability to present results of such analyses verbally and in writing; the ability to independently prepare papers and presentations; and the ability to follow verbal and written instructions. Use of computers and other technology is imperative to this communication.

3. **Motor.** A student must have sufficient motor function to attend classes, prepare assignments, use electronic media, deliver lectures and make public presentations. Class requirements may also include field work in a variety of collaborative environments.

4. **Intellectual, conceptual, integrative and quantitative abilities.** A student must possess the ability to understand and read and understand documents written in English, to understand and work with measurements and calculations, and to engage in reasoning, analysis, synthesis and critical thinking. A student must be able to exercise sufficient judgment to recognize and correct performance deviations, and be able to draw on all the above mentioned abilities to be an effective problem solver, researcher, and communicator.

5. **Behavioral and social attributes.** A student must have the emotional health required for the full use of his or her intellectual ability. A student must be able to exercise sound judgment, and to act ethically and with integrity. He or she must develop mature, sensitive, and effective professional relationships with others. A student must be self-motivated, reliable and responsible to complete assigned tasks in a timely manner with no supervision. Students must be able to give attention to detail and have the flexibility to function in a research setting, including adapting to changes in time, place and structure of academic and research settings. The student must have the ability to work with diverse groups.

NOTE: Reasonable accommodations will be considered and may be made to qualified students who disclose a disability, so long as such accommodation does not significantly alter the essential requirements of the curriculum and the training program, or significantly affect the safety of patient care. Students who disclose that they have a disability are considered for the program if they are otherwise qualified. Qualified students with a disability who wish to request accommodations should provide the appropriate documentation of disability and submit a request for accommodation to the University's Office for Academic Accommodation Services.