DEPARTMENT OF HIGHER EDUCATION & WORKFORCE DEVELOPMENT

New Program Report

Date Submitted:
02/12/2024

Institution
University of Missouri-Kansas City

Site Information

Implementation Date:
2/12/2024 12:00:00 AM

Added Site(s):

Selected Site(s):

University of Missouri-Kansas City, 5100 Rockhill Road, Kansas City, MO, 64110

CIP Information

CIP Code:
140801

CIP Description:
A program that generally prepares individuals to apply mathematical and scientific principles to the design, development and operational evaluation of structural, load-bearing, material moving, transportation, water resource, and material control systems; and environmental safety measures.

CIP Program Title:
Civil Engineering, General

Institution Program Title:
Civil Engineering

Degree Level/Type

Degree Level:
Doctoral Degree (Research PhD)

Degree Type:
Doctor of Philosophy (Ph.D.)

Options Added:

Collaborative Program:
N

Mode of Delivery

Current Mode of Delivery

Classroom

Student Preparation

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Special Admissions Procedure or Student Qualifications required:
A student who satisfies the general requirements for admission and meets the minimum requirements stated below will be considered for regular admission to the Civil Engineering Ph.D. program. A student who does not meet some of the requirements but shows high potential for advanced-level work may be considered for provisional admission. Admission also depends on factors such as number of seats available, resources available in the area of the student's interest, the quality of previous work, etc. Requirements for admission are the same whether the applicant is requesting Engineering as the primary discipline or the co-discipline.

1. The applicant must have a bachelor's degree or a master's degree in civil or mechanical engineering or related disciplines with a grade-point average of at least 3.0 on a 4.0 scale in the last 60 hours of undergraduate engineering coursework. In addition, a GPA of 3.5 or better in all post-baccalaureate coursework is required. Pre-program requirements may be specified in case the bachelor's degree is in a discipline different than that to which the candidate is applying.

2. The GRE test is preferred but not required. It is beneficial to applicants to take the test and submit scores.

3. TOEFL or IELTS scores are required for international students without prior U.S. degrees. The minimum required score is 80 or 6.5 on TOEFL or IELTS, respectively. TOEFL requirements may be waived for applicants with a baccalaureate from an ABET accredited program.

4. The student must provide at least three recommendation letters from professors at previous institutions or mentors at work. The application can be initially reviewed with just one recommendation letter.

5. The applicant must provide a maximum 300-word statement on their goals and objectives in pursuing the Ph.D. The statement at the least should indicate which of the areas (civil or mechanical) the student is interested in and preferably indicate the sub-discipline the student is interested in as well, such as structures, construction management, biomechanical, HVAC etc.

6. Provisional admission may be granted if the minimum GPA and GRE requirements are not met, but other indicators promise the student's success in the program. To be fully admitted to the Interdisciplinary Ph.D. program, the provisionally admitted student must obtain a grade of B or better in the first nine hours of coursework and submit a satisfactory GRE score within their first year of the program.

Specific Population Characteristics to be served:
n/a

Faculty Characteristics

Special Requirements for Assignment of Teaching for this Degree/Certificate:
All faculty with teaching responsibilities in the PhD, Civil Engineering program will have a terminal degree, PhD or professional doctoral degree (MD, DDS, PharmD).

Estimate Percentage of Credit Hours that will be assigned to full time faculty:
Full time faculty will teach 100% of coursework/credit hours in the program.

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Expectations for professional activities, special student contact, teaching/learning innovation:
Faculty teaching in the program will be expected to engage in professional activities and teaching/learning innovation activities including research, and participation and presentations at professional organizations and societies. Faculty will also be expected to mentor and advise students while enrolled in the program and while engaging in independent research.

Student Enrollment Projections Year One-Five

Year 1	**Full Time:** 7	**Part Time:** 0	
Year 2	**Full Time:** 10	**Part Time:** 0	
Year 3	**Full Time:** 13	**Part Time:** 0	**Number of Graduates:** 3
Year 4	**Full Time:** 17	**Part Time:** 0	
Year 5	**Full Time:** 20	**Part Time:** 0	**Number of Graduates:** 3

Percentage Statement:
n/a

Program Accreditation

Institutional Plans for Accreditation:
The proposed Civil Engineering PhD program falls under the purview of the university's institutional accreditation. The university is accredited by the Higher Learning Commission, one of the regional accrediting bodies recognized by the US Department of Education. It ensures that the institution and all its programs, including the proposed PhD program, meet the established standards of academic quality.

To ensure our PhD programs meet the highest standards, we will adhere to guidelines and curricular recommendations provided by influential professional organizations the American Society of Civil Engineers (ASCE). Although not equivalent to accreditation, these guidelines offer a robust framework for maintaining academic and research excellence. Additionally, we will continually monitor and evaluate the program's performance in areas like faculty research output, student success, and alignment with industry trends and demands. This continuous assessment will enhance our program's reputation and ensure we deliver a high-quality education to our doctoral students. Lastly, while there is no specific timeline for accreditation given the context of doctoral programs, we commit to maintaining the university's existing institutional accreditation status and upholding the standards expected by our accrediting body, the Higher Learning Commission.

Program Structure

Total Credits:
42

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Residency Requirements:
Ph.D. students must satisfy the doctoral residency requirement by satisfactory completion of at least 18 credits in no more than 24 consecutive months. When satisfying the residency requirement, all Ph.D. students are subject to the following restrictions:

• The doctoral residency requirement must be satisfied no later than the end of the semester in which the student completes his or her comprehensive examinations.

• Students must achieve a cumulative graduate grade-point average of at least 3.0 in all courses counted toward satisfying the residency requirement.

General Education Total Credits:
42

Major Requirements Total Credits: 42

Course(s) Added

COURSE NUMBER	CREDITS	COURSE TITLE
CE 5568	3	Construction Planning and Scheduling
CE 5571	3	Advanced Portland Cement Concrete
CE 5531	3	Fundamentals of Geomaterial Characterization
CE 5523	3	Advanced Structural Steel Design
CE 5529	3	Design of Structures for Blast and Fire
CE 5504	3	Project Management of Integrated Design and Construction
CE 5517	3	Advanced Structural Analysis
CE 5547	3	Legal Topics for Engineers
CE 5501	3	Intro to Freight Railroads Engineering
CE 5569	3	Construction Methods and Equipment
CE 5567	3	Introduction to Construction Management
CE 5505	3	Capital Project Delivery Methods
CE 5506	3	Construction Project Risk Management
CE 5549	3	Environmental Compliance, Auditing, & Permitting
CE 5501	3	Intro to Geoenvironmental Engineering

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CE 5516	3	Advanced Engineering Mathematics
CE 5563	3	Construction Law
CE 5526	3	Prestressed Concrete
CE 5556	3	Urban Hydrology
CE 5552	3	Hydraulics of Open Channels
CE 5532	3	Foundation Engineering
CE 5554	3	River Stability and Scour
CE 5575	3	Seismic Design of Structures
CE 5527	3	Advanced Reinforced Concrete Design
CE 5521	3	Matrix Methods of Structural Analysis
CE 5553	3	Hydraulics and Variability of Rivers
CE 5570	3	Corrosion Engineering

Free Elective Credits:
0

Internship or other Capstone Experience:
12 credit hours of dissertation are required.

Assurances

I certify that the program is clearly within the institution's CBHE-approved mission. The proposed new program must be consistent with the institutional mission, as well as the principal planning priorities of the public institution, as set forth in the public institution's approved plan or plan update.

I certify that the program will be offered within the proposing institution's main campus or CBHE-approved off-site location.

I certify that the program will not unnecessarily duplicate an existing program of another Missouri institution in accordance with 6 CSR 10-4.010, subsection (9)(C) Submission of Academic Information, Data and New Programs.

I certify that the program will build upon existing programs and faculty expertise.

I certify that the program can be launched with minimal expense and falls within the institution's current operating budget.

I certify that the institution has conducted research on the feasibility of the proposal and it is likely the program will be successful. Institutions' decision to implement a program shall be based upon demand and/or need for the program in terms of meeting present and future needs of the locale, state, and nation based upon societal needs, and/or student needs.

Contact Information

First and Last Name: Zandra Kent

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New Degree Proposal
FULL PROPOSAL

Basic Program Information

Sponsoring University: University of Missouri – Kansas City

College or School: School of Science and Engineering

Department: Civil Engineering (NBE)

Proposed Program Title: Civil Engineering

Degree Level/Type: Doctoral

Emphasis Areas: None

Program Modality: In-person

If online component: n/a

Program CIP Code[1]: 14.0801

Implementation: August 2024

Expected Date of First Graduation: May 2025

Proposal Author(s): Masud Chowdhury, EMS Division Director

Name, phone, and email of person primarily responsible for the proposal:

Professor Masud Chowdhury, EMS Division Director -- masud@umkc.edu (816-235-2432).
Professor John Kevern, NBE Director – kevernj@umkc.edu (816-235-5977).

Individual(s) Responsible for Success of the Program:

Professor Masud Chowdhury, EMS Division Director.
Professor John Kevern, NBE Division Director.
Kevin Truman, SSE Dean.

[1] A selection of CIP codes can be viewed on the National Center for Education Statistics website: https://nces.ed.gov/ipeds/cipcode/browse.aspx?y=55

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Executive Summary

UMKC currently offers a PhD in Interdisciplinary Studies under CIP code 30.0000 (Multi-/Interdisciplinary Studies, Other; Defined as "any instructional program multi/interdisciplinary studies not listed above," National Center for Education Statistics). As part of a comprehensive strategy to improve academic and research excellence, inclusive of Carnegie R1 classification, UMKC seeks to close the current, catch-all interdisciplinary PhD and create eight (8) discipline-specific and more narrow interdisciplinary PhD programs from the over 20 primary disciplines within it.

This transition will allow for the following: Carnegie credit for degree conferrals across STEM, Social Science, and Humanities disciplines, improved research ranking and reputation as a discovery enterprise, advantage in recruiting high quality students and faculty, and enhanced clarity and validity with students and employers regarding the curricula offered as part of our doctoral degrees.

This proposal focuses on a new **Civil Engineering PhD** that can be delivered with existing courses, faculty, staff, student support services, assistantship funding, and other resources currently allocated to the engineering primary discipline within the Interdisciplinary PhD.

The Civil Engineering PhD program's main goal is to prepare the next generation of scholars for a wide range of research opportunities in academia, industry, and national labs. It will continue to provide students with the background, research skills, and tools to advance the state of the art in Engineering, as the current engineering primary discipline does within the Interdisciplinary PhD program. Additionally, the program underscores the importance of fostering independent critical thinking, problem-solving abilities, and innovative skills within the civil engineering arena.

We currently supervise a wide range of doctoral dissertations in the following areas of Civil Engineering:

1. Structures
2. Materials
3. Construction
4. Water resources

The proposed PhD program in Civil Engineering mirrors the existing doctoral program, maintaining academic rigor through a balanced curriculum. The curriculum includes foundational courses, advanced coursework, research seminars, and a comprehensive doctoral dissertation, all drawn from the existing courses and resources of the interdisciplinary doctoral program.

As with the current doctoral program, a minimum of 30 classroom credits are required, including fundamental and advanced courses along with seminars. Additionally, a doctoral dissertation necessitates a minimum of 12 research credits.

1. Introduction

The PhD in Interdisciplinary Studies (30.0000) was launched in 1989. For many years it has provided UMKC students the opportunity to develop as scientists and scholars in their chosen field by combining two or more disciplines of study. The Interdisciplinary PhD at UMKC originally included 26 distinct disciplines, ranging from STEM to social sciences to the humanities. Despite its strength as a highly flexible doctoral degree, it limits our ability to attract highly competitive PhD students who want a narrower disciplinary focus, as well as prospective students who are seeking STEM certified doctoral education. Most recently, we have learned that the current Interdisciplinary PhD program is not recognized by Carnegie in their university classification system—a significant barrier in our progress toward becoming a Carnegie R1 institution.

To address these challenges, we aim to transition the current Interdisciplinary PhD program into eight (8) distinct PhD programs that will be attractive to students (evidenced by historical enrollment data) and that will be recognized by Carnegie. These include **Computer Science, Economics, Education, Engineering (Electrical and Computing; Civil; and Mechanical), Humanities, plus a multidisciplinary PhD in Natural Sciences**. These doctoral research programs were selected after extensive review and discussion with doctoral faculty across the university because they are the strongest historic enrollments, core faculty of active researchers, and greatest potential for ongoing success at UMKC. Together they promise to have a significant impact on our ranking as a research institution, and the workforce in the Kansas City and greater MO area through the research and post-graduate employment outcomes produced by the graduates.

This proposal focuses on the **PhD in Civil Engineering**.

Impact:

The impact of this broad degree transition, including the **PhD in Civil Engineering**, will be the following: Carnegie credit for degree conferrals across STEM, Social Science, and Humanities disciplines, improved research ranking and reputation as a discovery enterprise, advantage in recruiting high quality students and faculty, and enhanced clarity and validity with students and employers regarding the curricula offered as part of our doctoral degrees.

2. University Mission & Program Analysis

2.A. Alignment with University Mission & Goals

The needs of the Greater Kansas City region are of the utmost importance and drive what UMKC is doing. The university is a change agent and plays a vital role in economic development and workforce development for the region. The new proposed PhD degrees in Engineering will support our mission of economic development of the region and the nation by educating the

specialized graduate-level engineers necessary to build the necessary infrastructure for economic development. Therefore, the proposed Engineering PhD programs align seamlessly with the broader goals of the campus, college, and department as detailed in https://www.umkc.edu/about/strategic-plan.html.

Successful PhD programs are necessary for the department and the college to show a comprehensive program that attracts future students to maintain the increase in enrollment at the BS, MS, and PhD levels. In addition, PhD students are the key components of maintaining and expanding our research excellence at the department and college levels. Finally, Engineering PhD programs in Electrical and Computer Engineering, Civil Engineering, and Mechanical Engineering will expand the number and quality of our STEM graduates, which will help advance the research classification of UMKC in general.

2.B. Duplication & Collaboration within Campus, Across System

The proposed Civil Engineering PhD program already exists in the form of the engineering primary discipline within the Interdisciplinary PhD program and there is no threat of duplication with programs across the UM System. The proposed title and code changes reflect the correct Engineering CIP codes as per the current course requirements: this will attract students who might have been deterred by the esoteric Interdisciplinary PhD title. This change will make our existing doctoral program more attractive.

The Civil Engineering PhD is diverse and wide enough to allow for multiple successful programs across the UM System. Moreover, we have established several niche areas in this area of Engineering with several years of demonstrated success.

3. Business-Related Criteria & Justification

3.A. Market Analysis

3.A.1. Rationale & Workforce Demand for the Program

Civil engineering PhDs can have various titles in the industry. The table below shows the current open positions listed on indeed.com, a job search engine commonly used for engineering job postings, with a requirement or preference of a PhD or PhD level education as an alternative to experience requirements. In addition to the total number of listed positions in the US, specific numbers for MO or KS are also listed.

Employment Search Data on Indeed.com

Job Description	US	MO or KS
Geotechnical engineer	133	2
Highway engineer	133	4

Bridge engineer	270	8

Employment opportunities for civil engineers in Missouri are expected to increase by 19 percent from 2020 to 2030. Worn-out bridges, damaged water mains, and cracked highways all need repair. Therefore, whenever state funding permits, they will hire civil and environmental engineers to meet future transportation and architectural needs. Missouri has the seventh largest transportation system in the country and MoDOT projects are varied needing many civil engineering specialized in different emphasis areas that will be offered as part of the proposed program. Recently, a $10 million federal grant was awarded to the School of Science and Engineering to develop innovative approaches to improve the sustainability and equity of transportation infrastructure. The proposed PhD Civil Engineering program will help attract additional students from the region, the nation, and internationally to perform the cutting-edge research necessary to build an environmentally responsible, 21st century infrastructure.

3.A.2. Student Demand for the Program

Student demand is evidenced by our previous five-year enrollment trends in the catch-all engineering primary discipline within the current UMKC interdisciplinary PhD program. The engineering primary discipline has ranged from 17-21 students/year with an average of 19.6 students/year. The proposed Civil Engineering PhD is estimated to represent approximately ½ of those students. We anticipate the new program will start with 8-10 students and grow to a steady state of approximately 20 students/year as faculty research, and consequently grant-funded research assistantships, grow in the next 3-5 years. Pending approval, we will encourage current interdisciplinary PhD students to switch to the new degree program in Fall 24; those who want to complete their degree within the existing interdisciplinary PhD program will be allowed to do so. Admission to the existing interdisciplinary PhD program will be suspended in Fall 24 and program teach out will begin. This period of transition is reflected in the enrollment projections below.

Table 1a. Student Enrollment Projections (anticipated total number of students enrolled in the program during the first five fall semesters following implementation.)

Year:	**1**	**2**	**3**	**4**	**5**
Full-time	7	10	13	17	20
Part-time	0	0	0	0	0
Total	7	10	13	17	20

Table 1b. Projected Number of Degrees Awarded

Year:	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
# of Degrees Awarded	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**

3.B. Financial Projections

Research-based doctoral education (i.e., PhD) differs in key ways from professional doctoral education (e.g., JD, MD, PharmD, DDS, etc.). These differences can be found in the curricular and academic experiences, size of the student cohorts, and relationship of the program to the University mission. As such, there are significant differences in the financial models between research-based and professional doctoral programs. PhD programs, in contrast to professional doctoral programs, generally accept a smaller cohort of new students each year and often offer full or partial financial support in the form of tuition waivers and graduate assistantships. PhD students, in turn, make significant contributions to faculty research through their work on research studies (e.g., data collection), dissemination of research findings (e.g., manuscript/monograph writing), and grant writing. PhD students also provide critical support to the educational mission of the University through mentorship and instruction of undergraduate students. In most instances, PhD programs are revenue neutral or have a financial cost that is offset by positive impact on University research productivity and support of undergraduate education.

In the sections that follow, we have estimated the costs and revenues associated with the PhD in Civil Engineering. ***Notably, because we are using the same resources, the net revenue and financial impact of the PhD in Civil Engineering is the same as the engineering primary discipline within the existing interdisciplinary PhD program.*** We anticipate adding grant funded assistantships in years 3-5 in order to grow the cohort size to maintain academic viability.

3.B.1. Additional Resources Needed

No new instructional, marketing, or other university overhead resources are needed. In order to grow the program size to 20 total students/year, research-funded assistantships are expected by year 3. These are included in expenditure estimates.

3.B.2. Revenue

Revenues are generated from tuition (net scholarshipping) and remain the same as the existing interdisciplinary PhD program.

3.B.3. Net Revenue

No new one-time expenses are needed because all resources exist within the current interdisciplinary PhD program. Recurring expenses are estimated based on the current interdisciplinary PhD program. Because we are growing the program size beyond the current engineering primary discipline within the interdisciplinary PhD, assistantship funding beginning in year 3 will be supported by externally-funded faculty research grants. The other existing recurring expenses and revenues will shift from the interdisciplinary PhD to the new PhD, with the majority of that shift happening in year 1, as most current students transfer to the new degree program.

Faculty salaries are estimated at .10 FTE (representing 25% of their overall teaching workload) for the current faculty who participate in teaching and mentorship within the interdisciplinary PhD. Notably, most courses are co-taught with advanced undergraduate and/or master's level students, thereby inflating the FTE specific to PhD students; this inflation is offset by the variable amount of time spent mentoring dissertations. Staff estimates represent staff support time within the academic unit. Institutional overhead includes library and all central campus enrollment management and student support staff. "Other" includes assistantship stipends and associated tuition remission.

Table 2. Financial Projections for Proposed Program for Years 1 Through 5.

	Year 1	Year 2	Year 3	Year 4	Year 5
1. Expenses per year					
A. One-time					
New/Renovated Space	0	0	0	0	0
Equipment	0	0	0	0	0
Library	0	0	0	0	0
Consultants	0	0	0	0	0
Other	0	0	0	0	0
Total one-time	0	0	0	0	0
B. Recurring					
Faculty	52749	52749	52749	52749	52749
Staff	5000	5000	5000	5000	5000
Benefits	20789	20789	20789	20789	20789
Equipment	0	0	0	0	0
Library	0	0	0	0	0
Institutional Overhead	2352	3360	4368	5712	6720
Other	81568	122352	183528	244704	305880
Total recurring	162,458	204,250	266,434	328,954	391,138
Total expenses (A+B)	162,458	204,250	266,434	328,954	391,138
2. Revenue per year					
Tuition/Fees	35221	50316	65410	85537	100632
Institutional Resources	0	0	0	0	0
State Aid -- CBHE	0	0	0	0	0
State Aid -- Other	0	0	0	0	0
Total revenue	35221	50316	65410	85537	100632
3. Net revenue (loss) per year	(127,237)	(153,934)	(201,024)	(243,417)	(290,506)

3.B.4. Academic and Financial Viability

There is no net difference in academic and financial viability between the existing engineering primary discipline within the interdisciplinary PhD and the new PhD in Civil Engineering. The enrollment projections described above will ensure we achieve a degree conferral threshold consistent with MDHE expectations, as well as advance our Carnegie ranking. There is a financial cost, consistent with doctoral education in general. In addition to new assistantship funds generated through faculty research grants, funds will be reallocated from the existing PhD program to the new PhD program so that we remain financially net neutral.

3.C. Business Plan: Marketing, Student Success, Transition & Exit Strategies

3.C.1. Marketing Plan

The marketing plan for UMKC's newly coded and titled PhD programs in Engineering will continue to use the following strategies, which we have used successfully for the interdisciplinary PhD:

1- Offer new research areas with many exciting employment opportunities.
2- Advertise the success of previous doctoral students in terms of local, national, and international awards. We will encourage our doctoral students to participate more in these competitions.
3- Use our alums as ambassadors to recruit new students.
4- Focus heavily on online platforms and social media, considering their extensive reach and the tech-oriented nature of our target audience. Platforms such as LinkedIn, Facebook, and academic forums can facilitate reaching prospective students locally, nationally, and internationally.

The target population will continue to be highly qualified graduates of other state schools and domestic students across the nation, including local UMKC undergraduates and the international population of students through our extensive global network in countries like India, Pakistan, Bangladesh, Saudi Arabia, and Egypt. Employees of local industry interested in pursuing a PhD degree as part of their existing duties or in a part-time format will also continue to be a primary target.

3.C.2. Student Success Plan

No additional student support services will be needed to support or retain students in the PhD in Civil Engineering program. Current enrollment, retention and graduation trends for this program are on track with institution and national averages, and the program will continue to provide current levels of faculty and staff resources to support students through graduation.

3.C.3. Transition Plan

The people primarily responsible for the success of the PhD in Civil Engineering program are: Professor Masud Chowdhury, EMS Division Director, Professor John Kevern, NBE Division Director, and Kevin Truman, SSE Dean. Program leadership is supported by program faculty and the School of Graduate Studies staff.

3.C.4. Exit Strategy

If full-time enrollment in the PhD in Civil Engineering drops below 10 students, the School of Science and Engineering will evaluate a temporary hiatus or program closure, depending on the reason for the low enrollment (e.g., temporary funding challenge, market demand, etc.).

4. Institutional Capacity

The proposed PhD in Civil Engineering is designed to utilize existing infrastructure, faculty, and resources, thereby negating the necessity for any additional expenses. The program will repurpose the existing faculty resources, student support services, laboratories, equipment, and technology from the current doctoral program.

5. Program Characteristics

5.A. Program Outcomes

Program Goals

Students in the Ph.D. Program will acquire:

- grounding in the discipline
- the ability to integrate the principles and theories of the disciplines
- the ability to effectively communicate findings and approaches to solving research problems;
- research skills, such as approaches, methods, ethical principles, and tools to pursue a research line of inquiry;
- the ability to form effective teams to solve novel research questions

5.B. Program Design & Content

The course requirements for the Civil Engineering Ph.D. will remain largely consistent with those of the previous engineering discipline within the Interdisciplinary PhD program. No new resources will be required. The coursework requirements include:

- A total of 30 credit hours of total coursework beyond an MS degree in Engineering;
- At least 12 dissertation hours

5.C. Program Structure

5.C.1. Program Structure Form

1. *Total Credits Required for Graduation: 42*

2. **Residence requirements, if any:** Ph.D. students must satisfy the doctoral residency requirement by satisfactory completion of at least 18 credits in no more than 24 consecutive months. When satisfying the residency requirement, all Ph.D. students are subject to the following restrictions:

- The doctoral residency requirement must be satisfied no later than the end of the semester in which the student completes his or her comprehensive examinations.
- Students must achieve a cumulative graduate grade-point average of at least 3.0 in all courses counted toward satisfying the residency requirement.

1. **General education**
    a. Total general education credits**: n/a**

Courses (specific course or distribution area and credit hours):

The PhD in Civil Engineering offers courses designed to provide students with advanced knowledge and skills in Civil Engineering topics. Students can select their required courses from those offered within the unit. Non-Civil Engineering courses can also be selected after discussion and approval by the student's Primary Advisor. After completing coursework, students entering the program with an MS must complete at least 30 credit hours, inclusive of the 12 dissertation hours. The table below shows existing courses that will be offered under this program.

Number	Title	SCH
CE 5505	Capital Project Delivery Methods	3
CE 5506	Construction Project Risk Management	3
CE 5517	Advanced Structural Analysis	3
CE 5523	Advanced Structural Steel Design	3
CE 5531	Fundamentals of Geomaterial Characterization	3
CE 5547	Legal Topics for Engineers	3
CE 5553	Hydraulics and Variability of Rivers	3
CE 5567	Introduction to Construction Management	3
CE 5568	Construction Planning and Scheduling	3
CE 5529	Design of Structures for Blast and Fire	3
CE 5501	Intro to Geoenvironmental Engineering	3
CE 5501	Intro to Freight Railroads Engineering	3
CE 5504	Project Management of Integrated Design and Construction	3

CE 5516	Advanced Engineering Mathematics	3
CE 5521	Matrix Methods of Structural Analysis	3
CE 5527	Advanced Reinforced Concrete Design	3
CE 5549	Environmental Compliance, Auditing, & Permitting	3
CE 5552	Hydraulics of Open Channels	3
CE 5563	Construction Law	3
CE 5569	Construction Methods and Equipment	3
CE 5570	Corrosion Engineering	3
CE 5554	River Stability and Scour	3
CE 5556	Urban Hydrology	3
CE 5575	Seismic Design of Structures	3
CE 5526	Prestressed Concrete	3
CE 5571	Advanced Portland Cement Concrete	3
CE 5532	Foundation Engineering	3

- **Free elective credits**
  b. Total free elective credits: n/a

Requirement for thesis, internship, or other capstone experience:
12 credit hours of dissertation are required.

Any unique features such as interdepartmental cooperation:
n/a

5.D. Program Goals and Assessment

All UMKC programs are required to submit an annual summary of program assessment efforts (assessment plans, findings & discussions, and recommendations). The Civil Engineering Ph.D. program will maintain the established assessment protocol currently in place for all Interdisciplinary Ph.D. disciplines. The following outcomes have been identified:

1. Students will demonstrate a thorough degree of knowledge in the discipline.
2. Students will demonstrate an ability to use proper investigation techniques for the discipline.

3. Students will effectively use oral and written forms of communication to convey their ideas.

Applicable student learning outcomes will be assessed at the following program, academic milestones: 1) Comprehensive Exams; 2) Dissertation/Research Proposal; and 3) Dissertation Defense.

At the milestone of Dissertation Defense, program targets for student performance across all Student Learning Outcomes have been set to meet or exceed average ratings of 3.5 for all (100% of) students assessed. For example, one component of students' ability to use proper investigation techniques will be evaluated by the following rubric and rating scale:

Superior (4)	Good (3)	Acceptable (2)	Unacceptable (1)	Cannot Judge
Cutting edge methodology or novel application of existing method	Incremental advance in application of methodology and careful plan for execution of research	Conventional use of methodology and adequate plan for execution of research	Inappropriate use of method; use of method that cannot adequately address research question	Outside area of expertise

5.E. Student Preparation

The minimum criteria for admission to the UMKC graduate school can be found via the UMKC catalog.

Civil Engineering Admission Requirements

A student who satisfies the general requirements for admission and meets the minimum requirements stated below will be considered for regular admission to the Civil Engineering Ph.D. program. A student who does not meet some of the requirements but shows high potential for advanced-level work may be considered for provisional admission. Admission also depends on factors such as number of seats available, resources available in the area of the student's interest, the quality of previous work, etc. Requirements for admission are the same whether the applicant is requesting Engineering as the primary discipline or the co-discipline.

1. The applicant must have a bachelor's degree or a master's degree in civil or mechanical engineering or related disciplines with a grade-point average of at least 3.0 on a 4.0 scale in the last 60 hours of undergraduate engineering coursework. In addition, a GPA of 3.5 or better in all post-baccalaureate coursework is required. Pre-program requirements may be specified in case the bachelor's degree is in a discipline different than that to which the candidate is applying.

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3. TOEFL or IELTS scores are required for international students without prior U.S. degrees. The minimum required score is 80 or 6.5 on TOEFL or IELTS, respectively. TOEFL requirements may be waived for applicants with a baccalaureate from an ABET accredited program.
4. The student must provide at least three recommendation letters from professors at previous institutions or mentors at work. The application can be initially reviewed with just one recommendation letter.
5. The applicant must provide a maximum 300-word statement on their goals and objectives in pursuing the Ph.D. The statement at the least should indicate which of the areas (civil or mechanical) the student is interested in and preferably indicate the sub-discipline the student is interested in as well, such as structures, construction management, biomechanical, HVAC etc.
6. Provisional admission may be granted if the minimum GPA and GRE requirements are not met, but other indicators promise the student's success in the program. To be fully admitted to the Interdisciplinary Ph.D. program, the provisionally admitted student must obtain a grade of B or better in the first nine hours of coursework and submit a satisfactory GRE score within their first year of the program.

5.F. Faculty and Administration

The faculty and administration primarily responsible for the success of the PhD in Civil Engineering program are: Professor Masud Chowdhury, EMS Division Director, Professor John Kevern, NBE Division Director, and Kevin Truman, SSE Dean.

All faculty with teaching responsibilities in the PhD, Civil Engineering program will have a terminal degree, PhD or professional doctoral degree (MD, DDS, PharmD). Full time faculty will teach 100% of coursework/credit hours in the program. Faculty teaching in the program will be expected to engage in professional activities and teaching/learning innovation activities including research, and participation and presentations at professional organizations and societies. Faculty will also be expected to mentor and advise students while enrolled in the program and while engaging in independent research.

5.G. Alumni and Employer Survey

The UMKC Alumni Affairs Office, and External Relations team engage with UMKC alumni and the community through several opportunities designed to maintain connections, gather feedback, provide engagement opportunities, and create an environment of continuous improvement.

Graduating students are surveyed through an exit survey at the point of graduation and followed up with at 6-months post degree conferral if the student was still seeking employment at graduation or did not respond to the initial survey request. Alumni affairs and external relations provides opportunities for alumni to participate in student research competitions such as the

Three Minute Thesis. Alumni are also engaged through on campus events, opportunities to serve on boards, volunteer, and nominate and receive alumni awards.

5.H. Program Accreditation

The proposed Civil Engineering PhD program falls under the purview of the university's institutional accreditation. The university is accredited by the Higher Learning Commission, one of the regional accrediting bodies recognized by the US Department of Education. It ensures that the institution and all its programs, including the proposed PhD program, meet the established standards of academic quality.

To ensure our PhD programs meet the highest standards, we will adhere to guidelines and curricular recommendations provided by influential professional organizations the American Society of Civil Engineers (ASCE). Although not equivalent to accreditation, these guidelines offer a robust framework for maintaining academic and research excellence. Additionally, we will continually monitor and evaluate the program's performance in areas like faculty research output, student success, and alignment with industry trends and demands. This continuous assessment will enhance our program's reputation and ensure we deliver a high-quality education to our doctoral students. Lastly, while there is no specific timeline for accreditation given the context of doctoral programs, we commit to maintaining the university's existing institutional accreditation status and upholding the standards expected by our accrediting body, the Higher Learning Commission.

6. Appendices

- Letters of Support
    - Ian M. Colrain; President and CEO, MRIGlobal
    - Chris Isaacson; EVP & COO, Cboe Global Markets
    - Kevin Truman; Dean, School of Science and Engineering- UMKC
    - Praveen Edara; Interim Dean, College of Engineering- MU
    - Robin Stubenhofer; National Security Campus, Kansas City
    - David Borrok; Vice-Provost and Dean, College of Engineering and Computing- Missouri S&T
    - Jennifer Lundgren; Provost and Executive Vice Chancellor- UMKC
    - Stephen John Dilkes; Associate Dean, School of Graduate Studies- UMKC

Letters of Support for

the PhD Program in

Engineering

MRIGlobal

The science you expect.
The people you know.

Ian M. Colrain, PhD
President & Chief Executive Officer
icolrain@mriglobal.org

To: University of Missouri Board of Curators

MRIGlobal is an independent not for profit research institute in its 80th year, headquartered in Kansas City adjacent to UMKC. Our mission is "to improve the lives of people through innovative scientific and engineering research", and we provide advanced biology, chemistry and engineering services to the US federal government and multiple national and international companies. We are constantly looking to hire Ph.D. level scientists in Kansas City and our other locations.

I am in full support of the re-categorizing UMKC's current iPhD to regular Ph.D.s in Engineering, Computer Science, and the Natural Sciences disciplines—namely Physics, Chemistry, Mathematics and Statistics, Biology, and Earth and Environmental Science. This change will offer multifaceted benefits to your students and to industry.

Ph.D. is standard designation for those completing such an intensive course of graduate study in a specialized area in their chosen field. Employers that hire Ph.D.'s value the degree program and what it represents. When looking for interns, post-doctoral fellows or new hires, the current iPhD designation likely is a hindrance for the student. Funding agencies might also be confused as to what an iPhD program represents. I have reviewed hundreds of NIH grant applications over the past two decades and admit that I would be puzzled by such a degree title, assuming it reflected a less prestigious degree. In the highly challenged current funding environment, it is likely leaving UMKC graduates at a disadvantage when applying for competitive grant mechanisms.

MRIGlobal serves clients from around the world. The current iPhD program designation would be a challenge to explain or categorize to international collaborators or partners. A shift to the more universally understood Ph.D. label will make it clear that students are earning Ph.D.s when they complete their program and that they would be able to add the value to the customer, usually associated with attainment of that degree.

Sincerely,

Ian M. Colrain Ph.D

President and CEO, MRIGlobal.

Professorial Fellow, School of Psychological Sciences, The University of Melbourne, Australia.

Professor of Internal Medicine (Volunteer), KU Medical Center, The University of Kansas.

Cboe
Global Markets

October 9, 2023

To: University of Missouri Board of Curators

Cboe Global Markets (Cboe) is a large, international financial services company. We do hire Ph.D graduates as they have specialized knowledge in various fields that Cboe values. As a member of the School of Science and Engineering (SSE) Executive Advisory Board, Dean Kevin Truman has asked me for a letter of support related to the proposed change from iPhD designation to Ph.D designation for these programs in the SSE.

I am in complete support of this change. It makes sense to change the designation to Ph.D. which is what is on the diploma when the student graduates. I can well imagine the challenges in their home countries and institutions when international students try to explain or categorize the unusual 'iPhD' designation. These likely impact UMKC graduate student recruitment rates as well as hiring decisions made by companies that do not understand what iPhD program means.

It is also my understanding that this change will help UMKC correctly count their awarded doctoral degrees in ranking systems such as Carnegie's. This is expected to elevate their research status, enhance their ranking, and bolster their enrollment figures. Ph.D students are vital to innovation and creative solutions in many industries which require a highly trained workforce.

I have no doubt that this change will improve the reputation of the UM system and the higher education landscape within Missouri. Please feel free to contact me if you need any additional information.

Sincerely,

Chris Isaacson, EVP, COO
Cboe Global Markets

UMKC

School of Science and Engineering
Office of the Dean

September 29, 2023

To: University of Missouri Board of Curators

Re: Support and Commitment to the SSE's iPhD to Ph.D. Transition

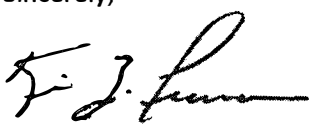
As Dean of the School of Science and Engineering I am writing to express my full commitment to transitioning our interdisciplinary Ph.D. (iPhD) degrees to Ph.D. for the School of Science and Engineering (SSE)'s Computer Science, Engineering, and Natural Sciences programs.

I want to emphasize that this transition primarily consists of code and title changes that do not necessitate allocating new resources. We intend to name programs with industry and academic standards, ensuring that we are appropriately recognized for the exceptional work already underway at our school, and improve our faculty and student recruitment and retention.

By transitioning to standard and well-known Ph.D. designations, we strategically position UMKC to enhance its research status especially through Carnegie ranking: historically, under the iPhD moniker, our related activities have not been correctly recognized given that we could not use the right CIP codes. Further, our international students have struggled to justify this unconventional naming to their host countries and institutions. This no-cost move is essential to rectify these issues, ensuring that our institution receives the recognition it deserves for its outstanding contributions to STEM research in our state and beyond.

In conclusion, I would like to reiterate the dedication of my team and myself to this transition. We believe these changes will strengthen our institution's reputation and bolster our research and enrollment, making us an even more effective member of the UM system. We look forward to accomplishing this positive shift together.

Sincerely,



Kevin Z. Truman, Ph.D., F.ASCE
Dean, School of Science and Engineering

UNIVERSITY OF MISSOURI-KANSAS CITY
Flarsheim Hall, Room 534 | 5110 Rockhill Road | Kansas City, MO 64110
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University of Missouri

Dean's Office
College of Engineering
W1006 Thomas & Nell Lafferre Hall
Columbia, MO 65211
PHONE 573-882-0948
EMAIL muengrdean@missouri.edu
WEB engineering.missouri.edu

October 5, 2023

Dear UM Board of Curators:

I am writing this letter to support Dean Truman's proposal to transition the iPhD program to PhD program at UMKC's School of Science and Engineering. The College of Engineering at MU has partnered with UMKC's Engineering School for many years on both teaching and research initiatives and we look forward to continued collaborations after this transition.

Sincerely,

Praveen Edara

Praveen Edara, Ph.D., P.E.
Interim Dean
College of Engineering
University of Missouri-Columbia
Email: edarap@missouri.edu

KANSAS CITY
KCNSC
National Security Campus

14520 Botts Road
Kansas City, MO 64147
816-488-2000
kcnsc.doe.gov

October 4, 2023

To: University of Missouri Board of Curators

I fully support the proposed change from iPhD designation to Ph.D designation. While there are many reasons to support this change, I will focus on those that are very impactful for the students and the university.

The current designation is confusing to industry as it is unclear what it means. This lack of understanding can hurt the UMKC School of Science and Engineering iPhD graduates during the hiring process. It can also hurt funding opportunities by federal agencies such as NSF, DoD, DoE, etc. because the iPhD is not well understood. Prospective Ph.D students will be easier to recruit leading to more Ph.D graduates. I would expect many positive impacts from changing the name (and CIP coding) of the UMKC iPhD. programs to the traditional Ph.D.

Honeywell has been involved with UMKC programs for several years via senior design programs, career fairs, serving on advisory boards and equipment donations. Please let me know if you need any additional information.

Sincerely,

Robin Stubenhofer

The Department of Energy's Kansas City National Security Campus is managed and operated by Honeywell Federal Manufacturing & Technologies, LLC under contract number DE-NA0002839

Cboe
Global Markets

October 9, 2023

To: University of Missouri Board of Curators

Cboe Global Markets (Cboe) is a large, international financial services company. We do hire Ph.D graduates as they have specialized knowledge in various fields that Cboe values. As a member of the School of Science and Engineering (SSE) Executive Advisory Board, Dean Kevin Truman has asked me for a letter of support related to the proposed change from iPhD designation to Ph.D designation for these programs in the SSE.

I am in complete support of this change. It makes sense to change the designation to Ph.D. which is what is on the diploma when the student graduates. I can well imagine the challenges in their home countries and institutions when international students try to explain or categorize the unusual 'iPhD' designation. These likely impact UMKC graduate student recruitment rates as well as hiring decisions made by companies that do not understand what iPhD program means.

It is also my understanding that this change will help UMKC correctly count their awarded doctoral degrees in ranking systems such as Carnegie's. This is expected to elevate their research status, enhance their ranking, and bolster their enrollment figures. Ph.D students are vital to innovation and creative solutions in many industries which require a highly trained workforce.

I have no doubt that this change will improve the reputation of the UM system and the higher education landscape within Missouri. Please feel free to contact me if you need any additional information.

Sincerely,

Chris Isaacson, EVP, COO
Cboe Global Markets

MISSOURI S&T | College of Engineering and Computing

October 6, 2023

Dear University of Missouri Board of Curators,

I am writing to express my support for the proposed transition of UMKC's interdisciplinary PhD programs within their School of Science and Engineering to several individual Ph.D. programs with new CIP codes.

Our understanding is that this change will correct and improve how their degrees are being counted through the CIP code system. This change should benefit UMKC and the UM System and will have no foreseeable impact at Missouri S&T.

Sincerely,

David Borrok
Vice-Provost and Dean
College of Engineering and Computing

October 5, 2023

Dear University of Missouri Board of Curators-

UMKC aims to achieve Carnegie R1 classification in the next 5-7 years. A critical action step toward this goal is to appropriately classify our research-based doctoral program CIP codes so that they are recognized in the Carnegie classification system. With this goal in mind, I am in full support of the transition of the PhD program in interdisciplinary studies (iPhD; not currently recognized by Carnegie) into eight independent PhD programs that are recognized in the Carnegie classification system. In addition to the critical role these programs will play in our degree program conferral data, this transition aligns with our strategic plan goals of: exceptional student learning, success, and experience (pillar one), helping UMKC become a thriving discovery enterprise (pillar two), transforming our community and region with impactful engagement (pillar three), and preparing students for the global workforce (pillar four). The program transition has been fully considered and planned by the faculty and leadership of UMKC, and is supported by the appropriate curricula, staffing, and market demand.

The **curricula** for the eight PhD programs will remain largely unchanged and is reviewed in detail on a program-by-program basis in the proposal. No additional instructional, student support, library, or assistantship resources will be necessary for this transition to be successful. Students will continue to be supported by existing faculty, staff, and student support structures on campus, and we will transition as many students as possible into the new degree programs by Fall 2024 to maximize doctoral degree conferrals in the coming years. Notably, students who do not want to transition will have the opportunity to remain in the iPhD program through degree completion; if our doctoral program proposal is approved, no new students will be admitted to the iPhD in the future and the program will be closed.

The **market demand** for each of these programs is currently strong, and we anticipate the transition will only enhance it. The 8 programs included in our proposal have the highest rates of student interest, graduation, employment, and long-term research synergy potential at UMKC. While we anticipate demand for each program to remain stable in the short term, the renaming of these programs is likely to have an immediate impact on our national and regional reputation as a

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o: 816-235-1107 | **provost@umkc.edu** | umkc.edu/provost

research institution. Although we will keep our enrollments stable in the early years of this transition, faculty will be expected to increase assistantship funding through externally funded grants, thereby allowing us to increase student enrollment while also supporting our campus research goals.

I'm happy to answer any questions about this overall doctoral program transition or the individual programs included in it.

Best regards,

Jennifer D. Lundgren, PhD
Provost and Executive Vice Chancellor

UMKC

School of Graduate Studies

October 5, 2023

Dear Members of the Board of Curators,

The Graduate Council at UMKC has voted to express its full support for the proposed transition from our current Interdisciplinary Ph D program to PhD's in the areas of Computer Science, Economics, Education, Engineering, Humanities, and Natural Sciences.

We are convinced that this transition would elevate the university's research status by giving us credit for doctoral research in the areas of STEM, Humanities, and Social Sciences. While we would be using new CIP codes and titles, these doctoral degrees can be delivered with existing faculty, courses, and administrative staff. The required courses for the newly titled and coded doctorates are unchanged from those required in the current Interdisciplinary PhD program, except that the secondary disciplines now only require nine hours of courses (under the current system, the "co-discipline" sometimes requires as many as fifteen hours of coursework). This promises to improve completion rates.

This change of codes and titles will better reflect the specialized research and academic focus within these designated areas, which can significantly contribute to elevating the university's research profile. This has the potential to increase funding opportunities from federal agencies, private organizations, and philanthropic sources. With focused academic programs, we can tailor our research proposals to meet the specific needs and priorities of these funding agencies, ultimately increasing our chances of securing research grants and contracts.

We strongly believe that these more narrowly focused doctoral programs will elevate our research reputation, improving our university's standing as a discovery enterprise, attracting a higher caliber of faculty and students, enhancing our regional, national, and international appeal as a go-to institution for advanced research and education.

In sum, because the proposed transition aligns with our university's long-term goals and aspirations, potentially giving us greater research prominence, increased funding, and a more dynamic academic environment that will advance the mission and reputation of UMKC and the entire UM-System, we request the Board of Curators to approve this proposal.

Thanks for your consideration.

Stephen Dilks

Stephen John Dilks,
Associate Dean, School of Graduate Studies
Chair, UMKC Graduate Council.

120 Atterbury | 5000 Holmes Street | Kansas City, MO 64110-2499 | p 816-235-1301 | f 816-235-1310 | sgs.umkc.edu