

Program Approval

I. General Information

A. Institution	University of Kansas
B. Program Identification	
Degree Level:	Bachelor's
Program Title:	Pharmaceutical and Biomedical Science
Degree to be Offered:	Bachelor of Science
Responsible Department or Unit:	School of Pharmacy
CIP Code:	51.2010
Modality:	Face-to-Face
Proposed Implementation Date:	Fall 2026

Total Number of Semester Credit Hours for the Degree: 120

II. Clinical Sites: No

III. Justification

The Bachelor of Science in Pharmaceutical and Biomedical Science (PBMS) is an interdisciplinary program that will prepare students for careers in pharmaceutical, biomedical, and healthcare industries. This research-intensive program is designed to meet the growing demand for highly trained professionals with a strong foundation in chemical and biological sciences, integrated with practical experience in drug development and translational research.

The nationally recognized departments of Medicinal Chemistry, Pharmaceutical Chemistry, and Pharmacology and Toxicology within the School of Pharmacy provide a robust academic environment and an unmatched research infrastructure compared to other pharmacy schools in the region. The School is in the top 30 of all schools of pharmacy in National Institutes of Health and total research award dollars granted in 2023. Students will benefit directly from working in laboratories led by faculty engaged in federally and industrially funded research. These faculty members will bring cutting-edge knowledge in drug design, delivery systems, pharmacokinetics, toxicology, and emerging therapeutic modalities (e.g., immunotherapies and personalized medicine). This integration of instruction and active scientific discovery ensures students are immersed in real-world biomedical challenges and solutions throughout their undergraduate training.

The PBMS program's curriculum is intentionally designed to progress from foundational coursework in biology, chemistry, and physics to advanced topics including medicinal biochemistry, pharmacology, drug delivery, and pharmaceutical analysis. Research participation begins in the junior year and culminates in a senior capstone thesis, equipping students with valuable experience in experimental design, data analysis, scientific writing, and oral communication. Alongside scientific training, the program emphasizes ethical reasoning, social responsibility, and responsible scientific practices, all of which align with KU's institutional learning goals.

Graduates of the PBMS program will be highly competitive for a range of future pathways. These include direct entry into research and development roles in pharmaceutical, biotechnology, or diagnostics companies; positions in state and federal agencies; and advanced studies in graduate or professional programs such as Ph.D. programs, medical school, pharmacy, or other health-related fields. With growing demand across the biomedical sector regionally and nationally, this degree provides students with a clear and versatile launchpad into the workforce or further education.

Regionally, KU is well-positioned to lead in pharmaceutical and biomedical science education. The university's proximity to a burgeoning biotechnology sector and major pharmaceutical employers across Kansas and the

greater Midwest provides significant opportunities for student internships, post-graduate employment, and academic-industry collaboration. Unlike other regional programs that lack a strong research component, KU's PBMS degree distinguishes itself through its emphasis on faculty-mentored laboratory research.

In summary, the PBMS program leverages KU's disciplinary strengths, research excellence, and geographic advantages to deliver a forward-looking undergraduate degree that prepares students for impactful careers and graduate study in biomedical science. It will enrich KU's academic portfolio while meeting pressing state and national workforce needs in health and life sciences.

IV. Program Demand:

Market Analysis

The degree is strategically aligned with current regional and national workforce trends. The growing demand for graduates trained at the intersection of pharmaceutical, chemical, and biological sciences has created a clear market opportunity. This program would serve as a pipeline for careers in pharmaceutical research, biotechnology, biomedical science, regulatory affairs, and health-related graduate programs, including PharmD, MD, and PhD.

National Market and Program Benchmarks - Nationally, programs with a similar focus, such as Pharmaceutical Sciences, Biomedical Sciences, and Pharmacology, are showing steady growth in enrollment and program expansion. According to IPEDS data (National Center for Education Statistics, 2025):

- The University of Southern California Pharmaceutical Sciences B.S. program enrolls over 200 undergraduate students annually.
- Northeastern University offers a B.S. in Pharmaceutical Sciences with an average enrollment of approximately 150–180 students.
- The University of Wisconsin, Madison's Pharmacology and Toxicology program enrolls approximately 40 students per cohort, yet maintains high selectivity and placement outcomes.

These programs benefit from strong ties to academic health centers, established pharmacy schools, and proximity to biotechnology hubs. Similarly, KU's highly ranked School of Pharmacy, the presence of the KU Medical Center, and established research infrastructure position the university well for offering a comparable degree.

Regional Comparison and Strategic Fit - Within the Midwest, there are relatively few dedicated undergraduate programs that integrate pharmaceutical sciences with biomedical science, and no programs in Kansas have the same CIP Code. The degree program most comparable to the proposed PBMS program in this region is the Bachelor of Science in Pharmaceutical Science at Purdue University. However, Purdue's program places a strong emphasis on transitioning students into its pharmacy program, with limited focus on student research experience. Approximately 200 students enroll in Purdue's program annually, with the majority (~75%) continuing to complete the PharmD, while around 50 students graduate each year with a BS in Pharmaceutical Science.

Programs such as The University of Iowa's Biomedical Sciences B.S. and Saint Louis University's B.S. in Investigative and Medical Sciences do not offer the same deep integration of pharmaceutical content and drug discovery that the KU PBMS degree would provide. This creates an opening in the regional academic market for KU to offer an interdisciplinary undergraduate program that draws both in-state and regional students seeking strong preparation for careers in biomedical and pharmaceutical fields.

V. Projected Enrollment for the Initial Three Years of the Program

Year	Total Headcount Per Year		Total Sem Credit Hrs Per Year	
	Full- Time	Part- Time	Full- Time	Part- Time
Year 1	15	0	480	0
Year 2	25	0	770	0
Year 3	35	0	1055	0

VI. Employment

National employment in healthcare, biotechnology, and the life sciences is projected to grow between 7–13% over the next decade, reflecting increasing demand for therapeutics, diagnostics, and a highly trained biomedical workforce (U.S. Bureau of Labor Statistics, 2023 and 2024). This trend is mirrored regionally across Kansas, the Kansas City metropolitan area, and neighboring states, where the expansion of research institutions, pharmaceutical companies, and healthcare systems continues to create robust employment opportunities.

Graduates of the PBMS program will be well-prepared for a broad range of career paths, including roles such as clinical research coordinator, regulatory affairs associate, pharmaceutical sales representative, quality assurance analyst, and laboratory research technician. Entry-level positions in these fields typically offer competitive starting salaries ranging from \$50,000 to \$75,000, with strong potential for career advancement.

This degree will also provide students with the necessary research experience to be immediately productive in graduate studies or as employees in the private sector (e.g., pharmaceutical and biotechnology industries) or public sector (e.g., government laboratories such as NIH, CDC, or state health departments). The curriculum emphasizes hands-on laboratory training, critical thinking, and interdisciplinary coursework in chemistry, biology, pharmacology, and toxicology, positioning students for success in PhD programs, health professional schools (PharmD, MD, DO, PA), and other advanced scientific training.

Regionally, the Kansas City metro area is a growing hub for biosciences and clinical research, home to institutions such as MRIGlobal, KU Medical Center, BioNexus KC, and the Stowers Institute for Medical Research, as well as a concentration of contract research organizations (CROs) and pharmaceutical companies. The nearby KC Animal Health Corridor, the largest cluster of animal and human health companies in the world, further enhances opportunities for industry engagement. In Lawrence, the KU School of Pharmacy and KU Innovation Park provide additional infrastructure for experiential learning, research, and translational collaboration.

The PBMS program addresses both the growing demand for a skilled biomedical workforce and the academic needs of students pursuing graduate or professional education. It offers a strategic opportunity to enhance the regional talent pipeline and position KU as a leader in undergraduate pharmaceutical and biomedical training.

VII. Admission and Curriculum

A. Admission Criteria

Incoming first-year students can be directly admitted if they have a 3.5+ high school GPA

B. Curriculum

Degree Plan for Students who place into Calculus

Year 1: Fall

SCH = Semester Credit Hours

Course #	Course Name	SCH=15
MATH 115	Calculus I – KBOR Math Pathway	3
CHEM 130	General Chemistry I	5
PHAR 101	Introduction to Medications in Healthcare	1
BIOL 150	Principles of Molecular & Cellular Biology	3
	KBOR English Discipline Area	3

Year 1: Spring

Course #	Course Name	SCH=17
CHEM 135	General Chemistry II	5
MATH 116	Calculus II	3
	KBOR Arts & Humanities Discipline Area	3

	KBOR English Discipline Area	3
	KBOR Communications Discipline	3

Year 2: Fall

Course #	Course Name	SCH=15
CHEM 330	Organic Chemistry I	3
CHEM 331	Organic Chemistry I Laboratory	2
	KBOR Natural & Physical Sciences Discipline Area	4
	KBOR Social & Behavioral Sciences Discipline Area	3
	KBOR Institutionally Designated Discipline Area	3

Year 2: Spring

Course #	Course Name	SCH=15
CHEM 335	Organic Chemistry II	3
CHEM 336	Organic Chemistry II Laboratory	2
PHSX 114	College Physics I	4
BIOL 546	Mammalian Physiology	3
	KBOR Institutionally Designated Discipline Area	3

Year 3: Fall

Course #	Course Name	SCH=15
MDCM 602	Medicinal Biochemistry	3
PHCH 630	Biopharmaceutics & Pharmacokinetics	3
PHAR 503	Research	3
	KBOR Arts & Humanities Discipline Area	3
	KBOR Social & Behavioral Sciences Discipline Area	3

Year 3: Spring

Course #	Course Name	SCH=14
MDCM/P&TX 650	MedChem & Pharmacology I	4
PHCH 670	Pharmaceutical Analysis	3
PHCH 632	Drug Delivery	3
PHAR 503	Research	3
PHAR 601	Seminars	1

Year 4: Fall

Course #	Course Name	SCH=16
MDCM/P&TX 651	MedChem & Pharmacology II	4
PHPR 628	Research Design Biostatistics	2
PHAR 603	Research	6
PHAR 602	Scientific Communication	1
	PBMS Elective I	3

Year 4: Spring

Course #	Course Name	SCH=13
MDCM/PHCH 652	Immunotherapies	3
PHAR 603	Research	6
PHAR 605	Journal Club	1
	PBMS Elective II	3

Total Number of Semester Credit Hours{120}

*****Degree plan for students who are not Calc-ready *****

Year 1: Fall

SCH = Semester Credit Hours

Course #	Course Name	SCH=16
MATH 101	College Algebra – KBOR Math Pathway	3
PHAR 101	Introduction to Medications in Healthcare	1
	KBOR Communications Discipline	3
	KBOR Arts & Humanities Discipline Area	3
	KBOR English Discipline Area	3
	KBOR Social & Behavioral Sciences Discipline Area	3

Year 1: Spring

Course #	Course Name	SCH=17
MATH 115	Calculus I – KBOR Math Pathway	3
CHEM 130	General Chemistry I	5
BIOL 150	Principles of Molecular & Cellular Biology	3
	KBOR Arts & Humanities Discipline Area	3
	KBOR English Discipline Area	3

Year 2: Fall

Course #	Course Name	SCH=17
CHEM 135	General Chemistry II	5
MATH 116	Calculus II	3
	KBOR Social & Behavioral Sciences Discipline Area	3
	KBOR Institutionally Designated Discipline Area	3
	KBOR Institutionally Designated Discipline Area	3

Year 2: Spring

Course #	Course Name	SCH=16
CHEM 330	Organic Chemistry I	3
CHEM 331	Organic Chemistry I Laboratory	2
PHSX 114	College Physics I	4
BIOL 546	Mammalian Physiology	3
	KBOR Natural & Physical Sciences Discipline Area	4

Year 3: Fall

Course #	Course Name	SCH=14
CHEM 335	Organic Chemistry II	3
CHEM 336	Organic Chemistry II Laboratory	2
MDCM 602	Medicinal Biochemistry	3
PHCH 630	Biopharmaceutics & Pharmacokinetics	3
PHAR 503	Research	3

Year 3: Spring

Course #	Course Name	SCH=14
MDCM/P&TX 650	MedChem & Pharmacology I	4

PHCH 670	Pharmaceutical Analysis	3
PHCH 632	Drug Delivery	3
PHAR 503	Research	3
PHAR 601	Seminars	1

Year 4: Fall

Course #	Course Name	SCH=16
MDCM/P&TX 651	MedChem & Pharmacology II	4
PHPR 628	Research Design Biostatistics	2
PHAR 603	Research	6
PHAR 602	Scientific Communication	1
	PBMS Elective I	3

Year 4: Spring

Course #	Course Name	SCH=13
MDCM/PHCH 652	Immunotherapies	3
PHAR 603	Research	6
PHAR 605	Journal Club	1
	PBMS Elective II	3

Total Number of Semester Credit Hours.....{123}

VIII. Core Faculty

Note: * Next to Faculty Name Denotes Director of the Program, if applicable

FTE: 1.0 FTE = Full-Time Equivalency Devoted to Program

Faculty Name	Rank	Highest Degree	Tenure Track Y/N	Academic Area of Specialization	FTE to Proposed Program
Mark Farrell*	Associate Professor	PhD	Y	Medicinal Chemistry	0.2
John Stobaugh	Professor	PhD	Y	Pharmaceutical Chemistry	0.1
Jai Subramanian	Associate Professor	PhD	Y	Pharmacology & Toxicology	0.1
Nicholas Britt	Associate Professor	PharmD	Y	Pharmacy Practice	0.1
Luke Erber	Assistant Professor	PhD	Y	Medicinal Chemistry	0.1
Zijun Wang	Assistant Professor	PhD	Y	Pharmacology & Toxicology	0.1
Thomas Tolbert	Associate Professor	PhD	Y	Pharmaceutical Chemistry	0.1
Michael Wang	Professor	PhD	Y	Pharmaceutical Chemistry	0.1
Honglian Shi	Associate Professor	PhD	Y	Pharmacology & Toxicology	0.1
Shyam Sathyamoorthi	Associate Professor	PhD	Y	Medicinal Chemistry	0.1

Number of graduate assistants assigned to this program.....1

IX. Expenditure and Funding Sources

A. EXPENDITURES	First FY	Second FY	Third FY
1. Personnel – Reassigned or Existing Positions			
Faculty	\$70,548	\$72,664	\$163,655
Administrators (<i>other than instruction time</i>)	-	-	-
Graduate Assistants	-	-	-

Support Staff for Administration (<i>e.g., secretarial</i>)	\$4,345	\$4,475	\$4,609
Fringe Benefits (<i>total for all groups</i>)	\$21,719	\$22,370	\$48,720
Other Personnel Costs	-	-	-
Total Existing Personnel Costs – Reassigned or Existing	\$96,612	\$99,509	\$216,984
2. Personnel – New Positions			
Faculty	-	-	-
Administrators (<i>other than instruction time</i>)	-	-	-
Graduate Assistants	\$28,682	\$29,542	\$30,428
Support Staff for Administration (<i>e.g., secretarial</i>)	-	-	-
Fringe Benefits (<i>total for all groups</i>)	\$2,007	\$2,067	\$2,130
Other Personnel Costs	-	-	-
Total Existing Personnel Costs – New Positions	\$30,689	\$31,609	\$32,558
3. Start-up Costs - One-Time Expenses			
Library/learning resources	-	-	-
Equipment/Technology	-	-	-
Physical Facilities: Construction or Renovation	-	-	-
Other – marketing/recruiting	\$15,000	\$15,000	\$15,000
Total Start-up Costs	\$15,000	\$15,000	\$15,000
4. Operating Costs – Recurring Expenses			
Supplies/Expenses	\$5,000	\$5,000	\$5,000
Library/learning resources	-	-	-
Equipment/Technology	-	-	-
Travel	\$2,500	\$2,500	\$2,500
Other – marketing/recruiting, faculty professional development, instructional resources	\$5,000	\$5,000	\$5,000
Total Operating Costs	\$12,500	\$12,500	\$12,500
GRAND TOTAL COSTS	\$154,801	\$158,618	\$277,042

B. FUNDING SOURCES (<i>projected as appropriate</i>)	Current	First FY (New)	Second FY (New)	Third FY (New)
Tuition / State Funds	-	\$297,034	\$476,491	\$652,855
Student Fees	-	\$4,650	\$7,600	\$106,791
Other Sources	-	-	-	-
GRAND TOTAL FUNDING		\$301,684	\$484,091	\$759,646
C. Projected Surplus/Deficit (+/-) (Grand Total Funding <i>minus</i> Grand Total Costs)		\$146,883	\$325,473	\$482,604

X. Expenditures and Funding Sources Explanations

A. Expenditures

1. Personnel – Reassigned or Existing Positions

The PBMS program will primarily use existing science courses offered by the College of Liberal Arts & Sciences (CLAS) in the first two years of the degree program, which will permit students to obtain fundamental knowledge that will be essential for the students' learning of program-specific topics in years

three and four. In the first two years, teaching by the School of Pharmacy faculty will be minimal; however, effort has been allocated for Farrell, Stobaugh, and Subramanian (0.1 FTE) for program administration, organization, and student mentorship. From year three onward, faculty from the School of Pharmacy will be required to contribute effort to the development and teaching of program-specific courses and to mentor students in their laboratories for the research-intensive component of this degree program. Additionally, effort has been allocated for secretarial support (0.1 FTE).

2. Personnel – New Positions

A graduate student (1 FTE) is required to assist with the program’s operational tasks.

3. Start-up Costs – One-Time Expenses

To ensure the successful launch of the program, we have allocated \$15,000/year for the first three years for marketing and recruiting efforts.

4. Operating Costs – Recurring Expenses

Operating costs include general program supplies, travel for recruiting, and operating expenses for instructional resources, recruitment, and marketing efforts.

B. Revenue: Funding Sources

The program will be fully funded through standard tuition and fee revenue. AY 2025-2026 standard tuition for Lawrence Campus students is \$376.60 per credit hour for resident students and \$1005.90 per credit hour for non-resident students. Consistent with the overall undergraduate student credit hour distribution on the Lawrence campus, it is estimated that 61.5% of student credit hours will be from resident students and 38.5% from non-resident students, and revenue projections from base tuition were calculated using a weighted average of \$ 618.82 per credit hour. Student fees were calculated based on the \$10 per credit hour course fee for courses in CLAS, and \$289.25 course fee for School of Pharmacy courses, with the exception of PHAR 101.

C. Projected Surplus/Deficit

The program will have a budget surplus from year one based on projected enrollment numbers.

XI. References

National Center for Education Statistics. Integrated Postsecondary Education Data System (IPEDS). U.S. Department of Education. Retrieved July 1, 2025, from <https://nces.ed.gov/ipeds/>

U.S. Bureau of Labor Statistics. (2023). Employment projections: 2022–2032 summary. U.S. Department of Labor. <https://www.bls.gov/news.release/ecopro.nr0.htm>

U.S. Bureau of Labor Statistics. (2024). Occupational Outlook Handbook. U.S. Department of Labor. <https://www.bls.gov/ooh/>