INTERDISCIPLINARY STUDIES: CONCENTRATION IN NANOMEDICINE (MS)

This program was approved for students entering the university in the Summer 2025-Spring 2026 catalog year. For more information about catalog year, go to Catalog Year Information (https://catalog.louisville.edu/undergraduate/university-wide-unit-specific-policies/catalog-year/).

Master of Science in Interdisciplinary Studies, concentration in Nanomedicine
Unit: Graduate School (https://louisville.edu/graduate/)
Academic Plan Code(s): IS_MS_NAN

Program Information

The goal of the Master of Interdisciplinary Studies, Concentration in Nanomedicine program is to provide students with skills and knowledge in nanotechnology, bioengineering, pharmacology, toxicology, and medicine, with an emphasis on interdisciplinary collaboration. The field of nanomedicine integrates bioengineering with pharmacology to apply engineering to develop innovative biological/medical solutions to sustain, restore, or improve human life. The program focuses on the benefits to healthcare gained through nanotechnology-based solutions to address disease detection, prevention, and treatment. A nanomedicine-based approach may be used to improve therapy efficacy while reducing side effects and enabling treatment personalization.

Students with a bachelor's degree in engineering, physics, biology, biochemistry, or a health care-related field are eligible to apply. The program is particularly relevant to students interested in the field of nanomedicine and those seeking to enter professional programs (medical, dental, pharmacy, nursing, etc.), since it provides a non-thesis MS degree that would strengthen an applicant's CV.

The program can typically be completed in one full year (three semesters), with emphasis on mastery of skills required to design, develop, and test nanotechnology for biological/medical purposes. The program is offered in person with some courses available online.

Admission Requirements

Entry into the Nanomedicine Track in the Interdisciplinary Master's Program requires a bachelor's degree in science (such as biology, biochemistry, chemistry, physics), bioengineering, or related discipline, from an accredited university. The Nanomedicine track targets students interested in earning advanced knowledge in the field of nanotechnology, with the goal to apply this knowledge to health care.

Successful applicants will typically have a 3.00 cumulative GPA in the courses of their major. Applicants with a GPA of 2.75 will be considered for provisional acceptance; however, they must maintain a 3.00 GPA at a minimum in their first semester of study or they will not be allowed to continue in the program.

Applicants must submit the documentation required for Master's programs at the University of Louisville, including:

1. application to the graduate school (https://graduate.louisville.edu/admission/)
2. transcripts of all college-level courses
3. a written statement by the applicant describing previous experience related to their undergraduate major or health care and how the Master's Program will allow them to fulfill their career goals
4. two letters of recommendation. Students whose native language is non-English or degree is from a non-US accredited institution are required to submit TOEFL scores (administered by the Educational Testing Service). A minimum TOEFL score of 79 or higher on the internet-based test or 550 or higher on the paper-based test is required. Alternatively, a minimum of 6.5 on the International English Language Testing System (IELTS) or a Duolingo score of 105 or higher will be accepted.

International applicants with transcripts that are not in English, in addition to submitting official copies of native language records, must also submit a notarized, verbatim translation in English prepared by an appropriate university or government official. The records must show both the degree granted and all coursework taken during the course of study. Applicants who have attended colleges, universities, postsecondary programs outside of the United States. Currently, all international students must have their credentials reviewed by an approved evaluation company that can provide an evaluation of their transcripts. Approved evaluation agencies are listed at NACES (https://naces.org/members/) or AICE (https://aice-eval.org/endorsed-members/).

Program Requirements

Code	Title	Hours
PHTX 671	Nanomedicine 1: Nanopharmacology Fundamentals	3
PHTX 681	Nanomedicine 2: Nanopharmaceutical Translation	3
BE 553	Nanoscale Bioengineering: Application and Methodology of Nanobiomaterials in Bioengineering	3
BE 650	Advanced Biomaterials	3
BE 691	Bioengineering Non-thesis Design/Research Project	3
Electives: Select from the list below		15
BE 522	Biomedical Acoustics	
BE 524	LabVIEW for Bioengineers	
BE 540	Machine Learning in Medicine	
BE 603	Bioengineering Research Ethics	
BE 605	Tissue and Molecular Biology Techniques Laboratory	
BE 670	Cellular Mechanobiology in Cancer	
BE 693	Independent Study in Bioengineering	
BE 695	Bioengineering Research Design & Methods	
PHTX 632	Analysis of Parametric & Non-parametric Data	
PHTX 644	Organ Toxicology	
PHTX 661	Molecular Mechanisms of Toxicology	
PHTX 816	Special Project-Pharmacology	
Minimum Total Hours		**30**