

TO: The Engineering Faculty

FROM: The Faculty of the Weldon School of Biomedical Engineering

RE: New Engineering Dual Degree Program MD/MS

The Faculty of the Weldon School of Biomedical Engineering has approved the following new MD/MS dual program with Indiana University School of Medicine from the College of Engineering. This action is now submitted to the Engineering Faculty with a recommendation for approval.

TITLE:

MD/MS BME Dual Degree Program

DESCRIPTION:

This proposal is for a dual MD/MS degree. Students who successfully complete this dual degree program will receive a Master of Science in Biomedical Engineering (MS BME) from the Purdue University Weldon School of Biomedical Engineering West Lafayette, Indiana and a Doctorate of Medicine (MD) from the Indiana University School of Medicine. This program has already been established at IUPUI and is important as we move toward our integration with IUPUI. You can find the approved dual degree information here: <https://purdue.curriculog.com/proposal:16761/form>

RATIONALE:

Students earning their MS degree will gain first-hand knowledge of medical technology innovation and strategies for clinical translation. They will strengthen their ability to pursue medical research, to facilitate clinical testing of new therapies, and to collaborate effectively with biomedical industry. With this combined training they will also gain the following: 1) functional understanding of the design and development of biomedical products and processes at the systems level; 2) practical understanding of processes for testing, for approval, and to ensure quality of biomedical products; 3) ability to make well-reasoned, ethical and socially responsible engineering decisions; and 4) ability to clearly communicate, effectively negotiate and strategically collaborate with the health care industry.

The MD/MS dual degree is specifically built for medical students who wish to enhance their knowledge and ability to impact advancing innovative engineering solutions to address challenges in health care.

Students graduating with this dual degree will have a competitive advantage in medical residency matching.

The IUSM pre-clinical courses include:

- Human Structure (9 credits)
- Molecules to Cells and Tissues (7 credits)
- Fundamentals of Health and Disease (6 credits)
- Neuroscience and Behavior (6 credits)
- Transitions 1 (2 credits)
- Host Defense (6 credits)
- Cardiovascular and Hematology (6 credits)
- Renal and Respiratory (6 credits)
- Gastrointestinal and Nutrition (6 credits)
- Musculoskeletal and Dermatology (2 credits)
- Endocrinology and Reproductive Biology (4 credits)

<https://medicine.iu.edu/md/curriculum/curriculum-diagram>



Head/Director of the Weldon School of Biomedical Engineering

Link to Curriculog entry:

<https://purdue.curriculog.com/proposal:22803/form>

Dual Degree MD/MS in BME

Graduate Multiple Degree Program (Combined, Dual, or Joint) (New, Revision, or Expiration)

MULTIPLE DEGREE PROGRAM

BEFORE MAKING YOUR CHOICE OF THE TYPE OF PROGRAM, PLEASE REVIEW OUR POLICY AND GUIDELINES FOR MULTIPLE DEGREE PROGRAMS - <https://catalog.purdue.edu/content.php?catoid=14&navoid=16508#establishing-new-graduate-programs>

Program Type (Always select "Program")* ☒ Program
☐ Shared Core

Type of Multiple Degree Program: * ☐ Combined Degree
☒ Dual Degree (includes Concurrent)
☐ Joint Degree

Proposal Type: * ☒ New Multiple Degree Program
☐ Revision (Explain in Summary text box)
☐ Expiration

TITLE (Example: Combined B.S./M.S. in ECE)* Dual Degree MD/MS in BME

Campus* ☒ West Lafayette
☐ Fort Wayne
☐ Northwest
☐ IUPUI

College*

2nd College (if more than one involved)

Department*

Weldon School of Biomedical Engineering - WL

2nd Department (if more than one involved)

International University (if applicable)

Effective Term*

Fall 2024

Method(s) of Delivery: ☒ RESIDENTIAL (up to 75% on campus)
☐ ONLINE (more than 75% online-per ICHE)
☐ HYBRID (25-75% online)

If Hybrid, explain:

COMBINED DEGREE PROGRAM

1. SUMMARY (describe program)

Summary: (if this is for a Revision or Expiration, use this area to describe action needed)

This proposal is for a dual MD/MS degree. Students who successfully complete this dual degree program will receive a Master of Science in Biomedical Engineering (MS BME) from the Purdue University Weldon School of Biomedical Engineering West Lafayette, Indiana (hereinafter, "Weldon BME") and a Doctorate of Medicine (MD) from the Indiana University School of Medicine (hereinafter, "IUSM").

2. DEGREES TO BE CONFERRED

List specific degrees to be conferred

The MS from Weldon BME and the MD from IUSM are currently offered; no changes to the degree requirements at either institution are needed.

institution are needed.

3. RATIONALE AND NEED Include a description of the impact and benefits of the proposed program and the relationships of the proposed program to the mission and scope of the campus, to already existing campus programs, and to human resource supply and demand.

Rationale and Need:

Students earning their MS degree will gain first-hand knowledge of medical technology innovation and strategies for clinical translation. They will strengthen their ability to pursue medical research, to facilitate clinical testing of new therapies, and to collaborate effectively with biomedical industry. With this combined training they will also gain the following: 1) functional understanding of the design and development of biomedical products and processes at the systems level; 2) practical understanding of processes for testing, for approval, and to ensure quality of biomedical products; 3) ability to make well-reasoned, ethical and socially responsible engineering decisions; and 4) ability to clearly communicate, effectively negotiate and strategically collaborate with the health care industry.

4. OBJECTIVES

Objectives: Students earning their MS degree will gain first-hand knowledge of medical technology innovation and strategies for clinical translation. They will strengthen their ability to pursue medical research, to facilitate clinical testing of new therapies, and to collaborate effectively with biomedical industry. With this combined training they will also gain the following: 1) functional understanding of the design and development of biomedical products and processes at the systems level; 2) practical understanding of processes for testing, for approval, and to ensure quality of biomedical products; 3) ability to make well-reasoned, ethical and socially responsible engineering decisions; and 4) ability to clearly communicate, effectively negotiate and strategically collaborate with the health care industry.

Alignment with the IU School of Medicine Mission

The dual MD/MS degree supports the IUSM mission of being a leader in medical research and education. It advances the mission to prepare healers and transform health in Indiana and throughout the world.

Alignment with Purdue University Weldon School of Biomedical Engineering Mission

The Weldon School of Biomedical Engineering strives to be the premier source of scientific discoveries and of well-educated biomedical engineers, fostering strong academic, industrial, and clinical ties, and achieving significant health care impact. This degree broadens the research programs and capabilities and amplifies the industrial and clinical impact through extramural partnerships and entrepreneurship and will heighten the visibility and recognition of efforts.

National, State, or Regional Need

As the state's only medical school, IUSM is uniquely positioned to graduate students to provide health care in Indiana, but also around the country. Weldon BME and IUSM partnership integrates two disciplines to graduate clinicians and scientists to utilize their skills wherever they may end up practicing or working throughout the state and the country. There is a need for physicians nationwide, and the combined degree positions graduates to be a change agent and provide health care wherever they are.

Employment Outlook

The MD/MS dual degree is specifically built for medical students who wish to enhance their knowledge and ability to impact advancing innovative engineering solutions to address challenges in health care.

Students graduating with this dual degree will have a competitive advantage in medical residency matching.

Program Support

The dual MD/MS degree does not create new teaching or cost demands on IUSM faculty or new demands on IUSM resources. The MS degree already exists in the Purdue University Weldon School of Biomedical Engineering in West Lafayette. It will be offered and sustained within the existing biomedical engineering program. We anticipate that the dual degree will add minimal

incremental burdens on the IUSM Admissions staff to channel applications for those interested. After being accepted to IUSM,

students will complete an application for review by Purdue University Graduate School and admissions committee of the Weldon BME.

5. PROPOSED PROGRAM STRUCTURE

a. admission requirements and process

b. degree requirements

c. scope, size of the program

d. administrative structure -- Include a description of the curriculum for the program, including plans of study for each of the separate programs, with specific notations of courses (numbers and titles) to be used to fulfill requirements for each program in the combined plan.

e. Example plans of study showing overlap (this can be listed or attached as a separate file)

a. Admission requirements and process

Admission to the program will begin at IUSM. Prospective student applicants will complete an Intent to Apply Form, and will then be referred to the Weldon School of Biomedical Engineering graduate program. Applications require an application fee (currently \$60). Prospective student applicants will then be referred to Weldon BME for an independent admission decision.

IUSM students should apply to the Purdue Graduate school by October of their Phase 1, Year 2 or October of Phase 2 medical school curriculum.

Purdue Admissions Requirement

To be admitted to the MS program, candidates must submit one letter of reference, a statement of purpose written by the applicant and access to academic transcripts.

Admission Requirements to the IUSM MD Program

Complete MD Application

Medical school matriculants must have a Bachelor's degree unless they are applying and accepted through an Indiana University School of Medicine program which has waived the requirement.

To apply, applicants must have a minimum of 90 credit hours from a U.S. or Canadian institution and permanent resident visa, as well as the Medical College Admission Test (MCAT). Applicants should shadow a minimum of three physicians and participate in meaningful medical and service-learning activities before applying to IU School of Medicine.

Prerequisite Coursework:

One year of General and Organic Chemistry, Physics, and Biology—minimum two-hour lab

One semester of Biochemistry

One Social Science AND one Behavioral Science course requirements may be in progress at time of application. The MD Admissions Committee reserves the right to determine which courses fulfill program requirements.

Source

<https://medicine.iu.edu/md/admissions/application-requirements>

Submit Additional Materials

MD applicants selected for an interview receive a request for Supplemental and IUPUI Graduate Office materials. These materials must be returned to the IU School of Medicine MD Admissions Office for processing before an interview can be scheduled.

Situational Judgement Assessment

Applicants who are offered an interview must submit CASPer Situational Judgement Assessment Tool results. CASPer is an

online test that assesses non-cognitive skills and interpersonal characteristics that are important for successful students and

graduates of this program. The assessment complements the other tools used for applicant screening. In implementing CASPer, IU School of Medicine is further enhancing fairness and objectivity in the MD Admissions process.

Reserve a Test Date

Sign up to take the CASPer Situational Judgement Assessment.

Application Materials

The materials listed below are required to complete an application file:

- Three letters of recommendation (science, non-science, and personal)
- Dean of Students evaluation form
- MCAT scores
- CASPer Test results
- IU School of Medicine personal interview results
- Legal Disclosure information
- Complete [IU Graduate School application](#) and fee submission

Application Status Tracker

The IU School of Medicine MD program is a competitive medical education program that attracts more than 6,500 applicants each year. Applicants who are invited for an interview can check the status of their materials in the Applicant Portal. Applicants should allow up to eight weeks for materials to be received, processed, and updated in the portal.

b. Degree requirements

- Total Credit Requirements for Combined MD/MS degree: 194

Purdue's West Lafayette MS BME degree program requires 30 credits; the following will be required for this program:

For thesis students:

- 9 coursework credits from Weldon BME (12 coursework credits waived based on Phase 1 medical school courses completed at IUSM)
- 21 research credits from Weldon BME

For professional students:

- 18 coursework credits from Weldon BME (12 coursework credits transferred based on Phase 1 medical school courses completed at IUSM)

c. Scope/Size of the program

Projected Headcount and FTE Enrollments and Degrees Conferred

	Year 1	Year 2	Year 3	Year 4	Year 5
	2023	2024	2025	2026	2027
Enrollment Projection					
Part-Time	0	0	0	0	0
Full-Time	1	2	3	3	3
Degrees Conferred	0	0	1	2	3

d. Administrative structure

Admission to the program will begin at IUSM. Prospective student applicants will complete an Intent to Apply Form, and will then be referred to Purdue University Graduate School. Applications require an application fee (currently \$60). Prospective student applicants will then be referred to Weldon BME for an independent admission decision.

IUSM students should apply to the Purdue Graduate school by October of their Phase 1, Year 2 or October of Phase 2 medical school curriculum.

e. Example plans of study showing overlap (listed or attached)

Dual Counted Courses for thesis students:

<i>Research Track (thesis)</i>	Medical MS BME Degree Program
BME Specialization Area	6 credits
Math / Statistics	3 credits
Life Sciences	(3 credits waived)
Other Graduate	(9 credits waived)

Sample Plan of Study for thesis students:

SUMMER

Area	Course Title	Subject	Course #	Credits
Primary	Research	BME	69800	3
Elective	Design of Experiments	STAT	51400	3

FALL

Area	Course Title	Subject	Course #	Credits
Primary	Research	BME	69800	3
Elective	Biomedical Signal Processing	BME	51100	3

SPRING

Area	Course Title	Subject	Course #	Credits
Primary	Research Thesis	BME	69800	3
Elective	Magnetic Resonance Imaging Theory	BME	55500	3

Dual Counted Courses for thesis students:

<i>Professional Track</i>	Medical MS BME Degree Program
BME Specialization Area	6 credits

Math / Statistics	3 credits
Life Sciences	(3 credits transfer)
Additional Specialization Elective	3 credits (3 credits transfer)
Regulatory / Professional / Other Graduate	6 credits (6 credits transfer)

Sample Plan of study for professional students:

FALL

Area	Course Title	Subject	Course #	Credits
Quantitative	Biostatistics	BME	50100	3
BME	Biomedical Signal Processing	BME	51100	3
Regulatory and Professional Development	Preclinical and Clinical	BME	56100	3

SPRING

Area	Course Title	Subject	Course #	Credits	
Regulatory and Professional Development	Regulatory Compliance	BME	56200	3	
BME	Magnetic Resonance Imaging Theory	BME	55500	3	
Elective	Ethical Engineering	BME	56400	3	

6. SUSTAINABILITY AND IMPACT ON THE STATE AND REGION

Sustainability and Impact

Students earning their MS degree will gain first-hand knowledge of medical technology innovation and strategies for clinical translation. They will strengthen their ability to pursue medical research, to facilitate clinical testing of new therapies, and to collaborate effectively with biomedical industry. With this combined training they will also gain the following: 1) functional understanding of the design and development of biomedical products and processes at the systems level; 2) practical understanding of processes for testing, for approval, and to ensure quality of biomedical products; 3) ability to make well-reasoned, ethical and socially responsible engineering decisions; and 4) ability to clearly communicate, effectively negotiate and strategically collaborate with the health care industry.

7. STAFFING AND INFRASTRUCTURE -- Describe the resources over and above present levels required to initiate the program (space and other physical needs, faculty and staff, fiscal needs, other).

Staffing and Infrastructure

The dual MD/MS degree does not create new teaching or cost demands on IUSM faculty or new demands on IUSM resources. The MS degree already exists in the Purdue University Weldon School of Biomedical Engineering in West Lafayette. It will be offered and sustained within the existing biomedical engineering program. We anticipate that the dual degree will add minimal incremental burdens on the IUSM Admissions staff to channel applications for those interested. After being accepted to IUSM, students will complete an application for review by Purdue University Graduate School and admissions committee of the Weldon BME.

Additional Requirements (list requirements or state NONE)***CONTACT****Contact for this proposal in case questions arise: (include name, email, and phone)***

Tammy Siemers
tsiemers@purdue.edu
765-496-0294