

# Engineering to Bioengineering (4+1) Accelerated Master's Program

## About the Program

Qualified Juniors in the engineering disciplines and computer science at the University of Kansas can apply for an accelerated Master's in Bioengineering program. Students who are admitted to this program receive academic credit for their exceptional preparation, reducing the time necessary to complete the MS degree.

Normally, the MS plan of study requires 24 hours of graduate course credit plus 6 hours of thesis work. Students admitted to the accelerated program receive a 6 credit hour reduction upon admission for 700 level or above course work completed as part of the BS curriculum. This course work should be courses that are required for the MS degree in the bioengineering track of interest within the MS Bioengineering program. Typically this coursework is taken as an advanced engineering elective within the BS curriculum.

## Application Process

To take advantage of this accelerated master's program, undergraduate students at KU would be required to apply to the bioengineering program in the spring semester of their junior year after completing at least 75 credit hours towards their undergraduate degree and at least 15 hours from completion. Graduate applications to start the following summer would open on January 1 and close March 15<sup>th</sup>. The applicants overall GPA and engineering GPA should be at least 3.50 at the time of applying for the program. If accepted, the students must maintain at least a 3.50 for all remaining undergraduate courses in their B.S. program. Students must [apply online](#) by the deadline to be considered for this program to ensure an undergraduate course plan is initiated and students are advised appropriately. Application requirements include:

- Complete Graduate Application (GRE scores are not required for these applicants)
- Three Letters of Recommendation (one from the student's identified thesis advisor)
- A Personal Statement with Proposed Research Topic & Bioengineering Track Focus
- An Undergraduate Progress Report Form (showing proposed courses up to BS graduation)
- A Graduate Plan of Study (listing proposed graduate coursework)

\*Students are required to take all Bioengineering general and track prerequisites as undergraduate electives. This typically means taking a biology and/or chemistry course as a general undergraduate elective (professional elective in EECS, list 2 elective in ME.) Students are highly encouraged to participate in undergraduate research prior to their application in order to identify their research topic and advisor. Students with extenuating circumstances or those who fail to meet the application requirements or deadline, should contact the Bioengineering program. Exceptions will be made on a case by case basis.

## Student Advising

This engineering to bioengineering degree option is only available to undergraduate students at KU pursuing an engineering undergraduate degree. Advisors who have students interested in the Bioengineering Accelerated Master's Program should refer to the Course Plan attached or contact Denise Bridwell at [dbridwell@ku.edu](mailto:dbridwell@ku.edu) or call 785-864-5258.

It is important to discuss this option as early as possible, so students do not miss the deadline to apply (in the spring of their junior year). Students will need to be conducting research during the summer and into their senior year and possibly enrolling in extra credit hours (not counted towards their undergraduate BS degree) or co-enrolling as a graduate and undergraduate. If co-enrolling is not feasible, other options are available to acquire the necessary classes in the allotted timeframe.

## Funding Information

Students should follow all financial aid enrollment and GPA requirements during their undergraduate career. Some instances and sources of financial aid do not allow for co-enrollment and it is the student's responsibility to contact the necessary resources to make that determination. If this is the case, the student should not enroll in their graduate career until completion of their undergraduate degree in engineering. Their admission can be deferred for up to one year, at which time they should be finished with the undergraduate degree.

Once admitted to the Bioengineering Graduate Program, students may apply for funding or financial aid as needed, but the program will not consider these applicants for GTA positions, as their curriculum is accelerated and the work load would be difficult and may prolong their enrollment beyond the one year plan. GRA positions may be available at the discretion of the faculty advisor.

## What does Bioengineering at KU look like for undergraduates?

At the University of Kansas, we have three options for undergraduate students interested in Bioengineering and/or Biomedical Engineering:

1. **Chemical Engineering with a Biomedical Concentration**
2. **Mechanical Engineering with a Biomechanics Concentration** and
3. **5 year BS Engineering or Computer Science/ MS Bioengineering program**

The first two of these options allow students to get a degree in one of the traditional engineering disciplines while also exploring bioengineering. The third program allows high achieving students in any engineering discipline or computer science (including those in the Chemical Engineering Biomedical concentration or Mechanical Engineering Biomechanics concentration), to use a fifth year to obtain a master's degree in Bioengineering on top of an undergraduate degree.

Accelerated Program Design (without co-enrollment)

Engineering to Bioengineering 4 + 1 BS>MS Course Plan								
<b>KEY</b>								
Undergrad Credit		Counted towards undergraduate degree program						
MS Preparation		Initial project and skills development						
Graduate Credit		Counted towards graduate degree program						
<b>Junior Year</b>			<b>Senior Year</b>			<b>5th year</b>		
<b>Fall</b>	<b>Spring</b>	<b>Summer</b>	<b>Fall</b>	<b>Spring</b>	<b>Summer</b>	<b>Fall</b>	<b>Spring</b>	<b>Summer</b>
Other Undergraduate Coursework	Apply for Program	Research (volunteer)	Undergraduate Technical Elective -> applied to credit hour reduction in MS	Undergraduate Technical Elective -> applied to credit hour reduction in MS	MS Thesis Research (1)	2 Graduate Courses (6 hours)	3 Graduate Courses (9 hours)	MS Thesis Research (2)
complete prerequisites for BioE			Other Undergraduate Coursework	Other Undergraduate Coursework		BIOE 801 (1)	BioE Colloquium (1)	
Other Undergraduate Coursework	Other Undergraduate Coursework		BioE Colloquium (.5)	BioE Colloquium (.5)		BioE Colloquium (1)	MS Thesis Research (1)	
Participate in Undergraduate Research			Research (volunteer)	Research (volunteer)		MS Thesis Research (2)		

Accelerated Program with Co-Enrollment (senior year)

Engineering to Bioengineering 4 + 1 BS>MS Course Plan								
<b>KEY</b>								
Undergrad Credit		Counted towards undergraduate degree program						
Preparation for MS		Initial project and skill development						
Graduate Credit		Counted towards graduate degree program						
<b>Junior Year</b>			<b>Senior Year</b>			<b>5th year</b>		
<b>Fall</b>	<b>Spring</b>	<b>Summer</b>	<b>Fall</b>	<b>Spring</b>	<b>Summer</b>	<b>Fall</b>	<b>Spring</b>	<b>Summer</b>
Other Undergraduate Coursework	Apply for Program	Research (Volunteer)	Undergraduate Technical Elective -> applied to credit hour reduction in MS	Undergraduate Technical Elective -> applied to credit hour reduction in MS	MS Thesis Research (1)	2 Graduate Courses (6 hours)	3 Graduate Courses (9 hours)	MS Thesis Research (2)
complete prerequisites for BioE			Other Undergraduate Coursework	Other Undergraduate Coursework		BIOE 801 (1)	BioE Colloquium (.5)	
Other Undergraduate Coursework	Other Undergraduate Coursework		BioE Colloquium (.5)	BioE Colloquium (.5)		BioE Colloquium (.5)	MS Thesis Research (1)	
Participate in Undergraduate Research			Research (Volunteer)	Research (Volunteer)		MS Thesis Research (2)		

## Chemical Engineering with a Biomedical Concentration (as of April 2014)

### FRESHMAN YEAR

#### FALL

C&PE 111	Introduction to the Profession	2
CHEM 170	Chem for the Chemical Sciences I	5
ENGL 101	Composition	3
MATH 121	Calculus I	5

#### SPRING

C&PE 121	Intro. Computers Engineering	3
CHEM 175	Chem for the Chemical Sciences II	5
ENGL 102	Composition & Literature	3
MATH 122	Calculus II	5

### SOPHOMORE YEAR

#### FALL

C&PE 211	Material & Energy Balances	3
CHEM 330	Organic Chemistry I	3
CHEM 331	Organic Chemistry I Lab	2
MATH 220	Applied Differential Equations	3
MATH 290	Elementary Linear Algebra	2
PHSX 210	General Physics I for Engineers	3
PHSX 216	General Physics I Laboratory	3

#### SPRING

C&PE 221	Chem. Engr. Thermodynamics I	3
PHSX 212	General Physics II	3
PHSX 236	General Physics II Laboratory	1
BIOL 150	Prin. of Mol. and Cellular Biology	4
_____	KU CORE ELECTIVE	3
_____	Engineering Elective	3

### JUNIOR YEAR

#### FALL

C&PE 511	Momentum Transfer	3
C&PE 512	Chem. Engr. Thermodynamics II	3
C&PE 522	Econ. Appraisal of C&PE Projects	2
CHEM 530	Physical Chemistry I	3
C&PE 656	Introduction to Biomedical Engr.	3
_____	KU CORE ELECTIVE	3

#### SPRING

C&PE 521	Heat Transfer	3
C&PE 523	Mass Transfer	4
C&PE 524	Chem. Eng. Kinetics & Reactor Dsgn	3
CHEM 535	Physical Chemistry II	4
BIOL 246	Principles of Human Physiology	3
	or	
BIOL 646	Mammalian Physiology	4
_____	KU CORE ELECTIVE	3

### SENIOR YEAR

#### FALL

C&PE 613	Chemical Engineering Design I	4
C&PE 615	Intro. to Process Dynamics & Control	3
C&PE 616	Chemical Engineering Laboratory I	3
_____	Engineering Elective	3
BIOL 600	Introductory Biochemistry	4

#### SPRING

C&PE 623	Chemical Engineering Design II	2
C&PE 624	Plant & Environmental Safety	3
C&PE 626	Chemical Engineering Laboratory II	3
_____	Engineering Elective	3
_____	KU CORE ELECTIVE	3

## Mechanical Engineering with a Biomechanical Concentration (as of January 2014)

### FRESHMAN YEAR

#### FALL

CHEM 150	Chemistry for Engineers	5
ENGL 101	Composition	3
MATH 121	Calculus I	5
ME 208	Computer Graphics	3

#### SPRING

PHSX 210	General Physics I for Engr	3
PHSX 216	General Physics I Laboratory	3
ENGL 102	Composition & Literature	3
MATH 122	Calculus II	5
ME 208	Intro Dig Comp Methods	3

### SOPHOMORE YEAR

#### FALL

MATH 220	Applied Differential Eqtns	3
MATH 290	Elementary Linear Algebra	2
ME 312	Basic Engr. Thermodynamics	3
ME 211	Statics & Intro to Biomech	3
PHSX 212	General Physics II	3
PHSX 236	General Physics II Laboratory	1

#### SPRING

EECS 316	Circuits, Electronics & Instrum	3
EECS 318	Circuits & Electronics Lab	1
ME 510	Fluid Mechanics	3
ME 311	Mechanics of Materials	3
ME 320	Dynamics	3
ME 321	Dynamics Lab	1
COMS 130	Speaker-Audience Comm.	3

### JUNIOR YEAR

#### FALL

ME 612	Heat Transfer	3
ME 508	Numerical Analysis	3
ME 412	Thermal Systems	3
ME 306	Science of Materials	3
ME 307	Engineering Materials Lab	2
_____	Statistics Elective	3

#### SPRING

ME 661	Finite Elem Method Stress Anl.	3
ME 628	Mechanical Design	3
ME 501	ME Design Process	3
_____	Ethics Elective	3
_____	Economics Elective	3

### SENIOR YEAR

#### FALL

ME 455	ME Measurements & Experim.	4
ME 682	Control Systems	3
ME 640	Capstone Design (Bio)	2
ME 633	Intro to Biomechanics	3
_____	Arts & Humanities Elective	3
BIOL 150	Prin. of Mol. & Cell Biology	4
	or	
BIOL 152	Prin. of Organismal Biology	4
	or	
BIOL 246	Prin. of Human Physiology	3

#### SPRING

ME 643	Capstone Design (Bio)	3
_____	Adv. Engr Elective (Bio)	3
_____	Human Diversity Elective	3
_____	Global Culture/Aware Elect	3
_____	General Elective	3-4