



RENSSELAER POLYTECHNIC INSTITUTE

School of Engineering

**BIOMEDICAL
ENGINEERING**

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Biomedical Engineering

Biomedical engineering is a discipline that advances knowledge in engineering, biology and medicine, and improves human health through activities that integrate the engineering sciences with the biomedical sciences and clinical practice. In other words, biomedical engineering is a multidisciplinary field combining engineering, basic sciences and medicine.

Biomedical engineering produces a better understanding of

- How the body works.
- How the body becomes diseased.
- Ways to prevent/protect the body from disease.
- Novel mechanisms to reverse the disease process.
- Novel ways to repair diseased tissue.
- New devices to replace diseased tissue.

Biomedical Engineers develop devices and procedures that solve medical and health-related problems by combining their knowledge of biology and medicine with engineering principles and practices. Many do research, along with medical scientists, to develop and evaluate systems and products such as artificial organs, prostheses (artificial devices that replace missing body parts), instrumentation, medical information systems, and health management and care delivery systems. Biomedical engineers also may design devices used in various medical procedures, imaging systems such as magnetic resonance imaging (MRI), and devices for automating insulin injections or controlling body functions. Some specialties within biomedical engineering are biomaterials, biomechanics, medical imaging, rehabilitation engineering, and orthopedic engineering.

Biomedical Engineers are expected to have employment growth of 27% over the next decade, [much faster than the average](#) for all occupations. The aging of the population and a growing focus on health issues will drive demand for better medical devices and equipment designed by biomedical engineers. Along with the demand for more sophisticated medical equipment and procedures, an increased concern for cost-effectiveness will boost demand for biomedical engineers, particularly in pharmaceutical manufacturing and related industries.

The median salary for biomedical engineers, according to the US Department of Labor (<http://www.bls.gov/ooh/architecture-and-engineering/home.htm>), was \$86,960 as of May 2012.

Educational Objectives

Rensselaer's Biomedical Engineering Department mission is "to educate the biomedical engineering leaders of tomorrow who will apply fundamental engineering principles to the responsible solution of problems in biology and medicine, to contribute to human disease management, and to bring engineering innovation and technology to the clinic while creating knowledge and enhancing global prosperity."

Graduates of the Biomedical Engineering Program will:

1. Be engaged in professional practice in industry, academia or government related to biomedical engineering; and/or
2. Have enrolled in an academic program pursuing a graduate, medical, law, business, or other professional post-graduate degree.

Contact List for Biomedical Engineering

Department Head:	Juergen Hahn (hahnj@rpi.edu)	JEC 7052
Administrative Staff:	Mary Foti (fotim@rpi.edu)	JEC 7049
	Kristen Bryk (brykk@rpi.edu)	JEC 7049
Head Undergraduate Advisor:	Uwe Kruger (krugeu@rpi.edu)	JEC 7048
Dept. Coordinator (for URP):	Uwe Kruger (krugeu@rpi.edu)	JEC 7048
Graduate Program Director:	Guohao Dai (daig@rpi.edu)	CBIS 3123

Biomedical Engineering Faculty

Research Areas and Related Faculty

	Biomolecular Science and Engineering	Biomedical Imaging	Musculo-skeletal Engineering	Neural Engineering	Systems Biology and Bio-computatio n	Vascular Engineerin g
Primary Faculty						
David Corr			√			
Guohao Dai						√
Ryan Gilbert				√		
Juergen Hahn	√				√	
Mariah Hahn			√			√
Xavier Intes		√				
Eric Ledet			√			
Deanna Thompson	√			√		
Deepak Vashishth	√		√			
Leo Wan	√				√	
Ge Wang		√			√	
Joint Faculty						
Steven Cramer	√					
Suvranu De					√	
Jonathan Dordick	√					
Richard Gross	√					
Robert Linhardt	√					
Douglas Swank	√		√			
George Xu		√				
Birsen Yazici		√				

Bachelor's Degree

The bachelor's degree is awarded to students who have pursued successfully, as evaluated by the faculty, a plan of study that encompasses several disciplines. Each plan of study has at least two objectives: first, to reach a pre-professional standing or fundamental mastery in a selected discipline; second, to develop some grounding in knowledge found in liberally educated persons, an appreciation of technology and science, and an openness to ongoing learning.

General Requirements:

- The number of courses and credit hours is prescribed by each curriculum. Minimum requirements are **128 credits for engineering**.
- The minimum grade point average (GPA) is **2.0**.
- To receive a baccalaureate degree, a student must have been admitted to the curriculum corresponding to the degree, must have satisfied the curriculum requirements, and must be enrolled in that curriculum at the time the degree is granted.
- The course content in physical, life, and engineering sciences must total a minimum of **24 credit hours**. For information on additional requirements see the School of Science section of the course catalog.
- The course content in humanities and social sciences must total a minimum of **24 credit hours**, including at least **8 credit hours** in the humanities and **8 credit hours** in the social sciences. For information on additional requirements see the School of Humanities, Arts, and Social Sciences section of the course catalog.
- Every student is required to take at least **two** communication-intensive courses. At least one of these must be in the students' major (automatically fulfilled by BME Design) and at least one of the courses must be taught in the School of Humanities, Arts, and Social Sciences.
- The minimum course concentration in the area of the selected discipline is prescribed by each curriculum but **cannot be less than 30 credit hours**.
- At least **24 credit hours are to be elective**, of which no less than **12 credit hours** are unrestricted electives.
- The student must be registered full-time for a minimum of four semesters. Two semesters of part-time study at Rensselaer will be considered equivalent to one semester of full-time study. In addition, the student must complete a minimum of **48 credit hours** at Rensselaer, all of which will be applied to the baccalaureate degree. If a transfer student elects to study abroad or enroll in the co-op program, no more than 12 such credits may apply to the 48 needed for the bachelor's degree. The student's Plan of Study at Rensselaer must include at least 16 credits of courses above the 1000 level in the major field, or in an approved concentration.
- The student must be careful to satisfy institutes HASS core depth and breadth requirements.

Academic Information and Regulations:

The Institute requires a degree candidate to earn the last 30 credits in courses completed on this campus or through a program formally recognized by the Institute. Transfer courses are limited to two courses or eight credits counting toward the student's last 30 credits and require approval of the director of the Advising and Learning Assistance Center.

Baccalaureate candidates must have passed all of the prescribed academic work and have satisfied the fee requirements. Candidates must also be in good academic and disciplinary standing. Undergraduate students on probation at the time of completion of course work may be required to meet certain

stipulations for removal from probation. However, such requirements may be waived for those students whose cumulative GPAs satisfy the baccalaureate degree requirements. In general, a term's work with grades of not less than C will be required in programs arranged by the Committee on Academic Standing. The director of the Advising and Learning Assistance Center will state requirements to the students in writing.

Degree candidates must be registered during the semester in which they intend to graduate and must file a degree application with the registrar by the dates specified in the academic calendar. Students who previously applied for graduation but did not complete all their requirements on time must submit a new application specifying the new date of graduation.

Double Degrees:

A student may become a candidate for a second baccalaureate degree when he or she has completed: (1) the equivalent of at least two terms (30 credit hours) of additional work beyond the requirements of a single degree, and (2) the courses in the department in which the student is registered and such other courses as are required for the second degree.

Dual Majors:

Undergraduate students who fulfill all the degree requirements for two curricula and who have met the conditions below will have completed a dual major. They will receive one diploma noting both majors.

- The student must designate a first-named and second-named major in writing at least one semester prior to graduation, and have the appropriate department(s) approve this designation prior to filing the dual major form with the registrar.
- Each student will be assigned an adviser in each department who will monitor progress towards degrees in that department.
- The degree clearance officer in the department will certify that the student has met the degree requirements in that department.
- The 24-credit-hour mathematics/science requirement and the 24-credit-hour humanities and social sciences requirement will satisfy the Institute requirements for both majors.

BME Baccalaureate Program with Minor in Management

The BS with Minor in Management can be completed by following the traditional BME Baccalaureate template and choosing appropriate classes from the Lally School for the four Free Electives. A list of acceptable classes for the different Management Minor programs can be found at <http://www.lallyschool.rpi.edu/academics/minors.html>.

Biomedical Engineering Program Templates

Traditional BME Baccalaureate Program

First Year

Fall		Credit hours	Spring		Credit hours
ENGR 1100	Intro to Engineering Anal	4	ENGR 1300	Engineering Processes	1
CHEM 1100	Chemistry I	4	MATH 1020	Calculus II	4
MATH 1010	Calculus I	4	PHYS 1100	Physics I	4
	HASS Elective ¹	4	BIOL 2120	Intro to Cell & Mol Biology	4
ENGR 1200	Eng Graphics & CAD ⁶	1		HASS Elective ¹	4

Second Year

Fall		Credit hours	Spring		Credit hours
CSCI 1190	Begin. Prog. for Engrs.	1	ENGR 2600	Mod. & Analysis of Uncertainty	3
PHYS 1200	Physics II	4	BMED 2100	Biomaterials Science and Eng	4
MATH 2400	Intro to Differential Eq	4	BMED 2540	Biomechanics	4
ENGR 2050	Intro to Eng Design	4	BMED 2300	Bioimaging and Bioinstrument	4
MATH 2010	Multi. Calc and Mat Alg.	4			

Third Year

Fall		Credit hours	Spring		Credit hours
BMED 4200	Modeling of Biomed Sys	4	BMED 4500	Advanced Systems Physiology	4
	Concentration I	4		Free Elective ⁴	3
	HASS Elective ¹	4		Concentration II	4
	Free Elective ⁴	3		HASS Elective ¹	4
				Professional Development II ²	2

Fourth Year

Fall		Credit hours	Spring		Credit hours
BMED 4010	Bioeng Lab ³	4	BMED 4600	BME Design ⁵	3
BMED 4260	BME Prod. Dev & Com	3		Free Elective ⁴	3
	Concentration III	3		Concentration V	3
	Concentration IV	3		HASS Elective ¹	4
	Free Elective ⁴	3	ENGR 4010	Professional Development III	1

The minimum number of credit hours for the degree is 128

¹ Placement of humanities and social science electives can be varied with free electives. The courses counted as free electives must show a minimum of twelve (12) credit hours.

² Professional Development II will be fulfilled from a published list at the start of each semester and can be taken either semester. Professional Development III can be taken either semester of the senior year. Professional Development I is part of ENGR 2050.

³ BMED 4010 may be taken in either Spring Year 3 or Fall Year 4.

⁴ The minimum total credit hours of free electives is twelve (12), with no restrictions on the included number of 3 and 4 credit hour courses.

⁵ Capstone writing-intensive course.

⁶ ENGR 1400 may be taken as alternative to ENGR 1200. This course may be taken either semester.

Premed BME Baccalaureate Program

First Year

Fall		Credit hours	Spring		Credit hours
ENGR 1100	Intro to Engineering Anal	4	ENGR 1300	Engineering Processes	1
CHEM 1100	Chemistry I	4	MATH 1020	Calculus II	4
MATH 1010	Calculus I	4	PHYS 1100	Physics I	4
BIOL 1010	Intro to Biology	4	BIOL 2120	Intro to Cell & Mol Biology	4
ENGR 1200	Eng Graphics & CAD ⁴	1	CHEM 1200	Chemistry II	4

Second Year

Fall		Credit hours	Spring		Credit hours
CSCI 1190	Begin. Prog. for Engrs.	1	ENGR 2600	Mod. & Analysis of Uncertainty	3
PHYS 1200	Physics II	4	BMED 2100	Biomaterials Science and Eng	4
MATH 2400	Intro to Differential Eq	4	BMED 2540	Biomechanics	4
ENGR 2050	Intro to Eng Design	4	BMED 2300	Bioimaging and Bioinstrument	4
MATH 2010	Multi. Calc and Mat Alg.	4			

Third Year

Fall		Credit hours	Spring		Credit hours
BMED 4200	Modeling of Biomed Sys	4	BMED 4500	Advanced Systems Physiology	4
	Concentration I	4		Concentration II	4
PSYC 1200	General Psychology	4	STSS 1520	Sociology	4
CHEM 2250	Organic Chem I	3	CHEM 2260	Organic Chem II	3
				Prof. Development II ¹	2
			BCBP 4760	Molecular Biochemistry ⁵	4

Fourth Year

Fall		Credit hours	Spring		Credit hours
BMED 4010	Bioeng Lab ²	4	BMED 4600	BME Design ³	3
BMED 4260	BME Prod. Dev & Com	3		Concentration V	3
	Concentration III	4		HASS Elective	4
	Concentration IV	3		HASS Elective	4
	HASS Elective	4	ENGR 4010	Professional Development III	1

The minimum number of credit hours for the degree is 130

¹ Professional Development II will be fulfilled from a published list at the start of each semester and can be taken either semester. Professional Development III can be taken either semester of the senior year. Professional Development I is part of ENGR 2050.

² BMED 4010 may be taken in either Spring Year 3 or Fall Year 4.

³ Capstone writing-intensive course.

⁴ ENGR 1400 may be taken as alternative to ENGR 1200. This course may be taken either semester.

⁵ BCBP 4760 should be taken in the summer after the junior year and right before the MCAT.

Mechanical/Biomedical Engineering Dual Degree Program

First Year

Fall		Credit hours	Spring		Credit hours
ENGR 1100	Intro to Engineering Anal	4	ENGR 1300	Engineering Processes	1
CHEM 1100	Chemistry I	4	MATH 1020	Calculus II	4
MATH 1010	Calculus I	4	PHYS 1100	Physics I	4
	HASS Elective	4	BIOL 2120	Intro to Cell & Mol Biology	4
ENGR 1200	Eng Graphics & CAD ⁴	1	ENGR 1600	Materials Science for Engineers	4

Second Year

Fall		Credit hours	Spring		Credit hours
CSCI 1190	Begin. Prog. for Engrs.	1	ENGR 2600	Modeling & Analysis of Uncert.	4
PHYS 1200	Physics II	4	BMED 2100	Biomaterials Science and Eng	4
MATH 2400	Intro to Differential Eq	4	ENGR 2530	Strength of Materials	4
ENGR 2050	Intro to Eng Design	4	BMED 2300	Bioimaging and Bioinstrument	4
MATH 2010	Multi. Calc and Mat Alg.	4	ENGR 2090	Engineering Dynamics	4

Third Year

Fall		Credit hours	Spring		Credit hours
BMED 4200	Modeling of Biomed Sys	4	BMED 4500	Advanced Systems Physiology	4
ENGR 2250	Thermal & Fluids Eng. I	4	ENGR 2350	Embedded Control	4
ENGR 2300	Electronic Instrument.	4	MANE 4010	Thermal & Fluids Eng II	4
	HASS Elective	4	MANE 4020	Thermal & Fluids Eng Lab	2
	Professional Devel. II ¹	2		HASS Elective	4

Fourth Year

Fall		Credit hours	Spring		Credit hours
BMED 4260	BME Prod. Dev & Com	3	BMED 4600	BME Design ³	3
BMED 4540	Biomechanics II	3	BMED 4010	Bioeng Lab ²	4
MANE 4030	Elements of Mech Des.	4	MANE 4050	Modeling & Control of Dyn. Sys.	4
MANE 4040	Mechanical Systems Lab	2		HASS Elective	4
	HASS Elective	4	ENGR 4010	Professional Development III	1

The minimum number of credit hours for the degree is 139

¹ Professional Development II will be fulfilled from a published list at the start of each semester and can be taken either semester. Professional Development III can be taken either semester of the senior year. Professional Development I is part of ENGR 2050.

² BMED 4010 may be taken in either Spring Year 3 or Fall Year 4.

³ Capstone writing-intensive course. Alternatively, MANE 4260 Design of Mechanical Systems can be taken.

⁴ ENGR 1400 may be taken as alternative to ENGR 1200. This course may be taken either semester.

Electrical/Biomedical Engineering Dual Degree Program

First Year

Fall		Credit hours	Spring		Credit hours
ENGR 1100	Intro to Engineering Anal	4	ENGR 1300	Engineering Processes	1
CHEM 1100	Chemistry I	4	MATH 1020	Calculus II	4
MATH 1010	Calculus I	4	PHYS 1100	Physics I	4
	HASS Elective	4	BIOL 2120	Intro to Cell & Mol Biology	4
ENGR 1200	Eng Graphics & CAD ⁴	1		HASS Elective	4

Second Year

Fall		Credit hours	Spring		Credit hours
CSCI 1100	Computer Science I	4	ENGR 2600	Modeling & Analysis of Uncert.	4
PHYS 1200	Physics II	4	BMED 2300	Bioimaging and Bioinstrument	4
MATH 2400	Intro to Differential Eq	4	MATH 2010	Multi. Calc and Mat Alg.	4
ENGR 2050	Intro to Eng Design	4	ECSE 2010	Electric Circuits	4
ENGR 2350	Embedded Control	4	ECSE 2610	Computer Comp. & Operations	4

Third Year

Fall		Credit hours	Spring		Credit hours
BMED 4200	Modeling of Biomed Sys	4	BMED 4500	Advanced Systems Physiology	4
BMED 2540	Biomechanics	4	BMED 2100	Biomaterials Science and Eng	4
ECSE 2100	Fields & Waves I	4	ECSE 2050	Intro Electronics	4
ECSE 2410	Signals and Systems	3	ECSE 2110	Electrical Energy Systems	4
	Professional Devel. II ¹	2	ECSE 2210	Microelectronics Tech.	4
			ECSE 2900	ECSE Enrichment Seminar	1

Fourth Year

Fall		Credit hours	Spring		Credit hours
BMED 4010	Bioeng Lab ²	4	BMED 4600	BME Design ³	3
BMED 4260	BME Prod. Dev & Com	3		EE/BMED Conc. Elec. ⁵	3
	EE/BMED Conc. Elec. ⁵	3		HASS Elective	4
	HASS Elective	4		HASS Elective	4
			ENGR 4010	Professional Development III	1

The minimum number of credit hours for the degree is 141

¹ Professional Development II will be fulfilled from a published list at the start of each semester and can be taken either semester. Professional Development III can be taken either semester of the senior year. Professional Development I is part of ENGR 2050.

² BMED 4010 may be taken in either Spring Year 3 or Fall Year 4.

³ Capstone writing-intensive course. Alternatively, ECSE 4900 ECSE Design can be taken.

⁴ ENGR 1400 may be taken as alternative to ENGR 1200. This course may be taken either semester.

⁵ ECSE -4xxx or ECSE-6xxx course selected to satisfy the BME concentration requirements. Students should contact their BME advisor for selecting this course.

BME Bachelor's Degree Requirements

Core BME Courses

BMED 2100	Biomaterials Science and Engineering	(4CR) (S2)
BMED 2300	Bioimaging and Bioinstrumentation	(4CR) (S2)
BMED 2540	Biomechanics	(4CR) (S2)
BMED 4010	BME Lab	(4CR) (S3 or F4)
BMED 4200	Modeling of Biomedical Systems	(4CR) (F3)
BMED 4260	BME Product Devel. & Commercialization	(3CR) (F4)
BMED 4500	Advanced Systems Physiology	(4CR) (S3)
BMED 4600	BME Design	(3CR) (S4)

Concentrations Courses

Each concentration includes three required courses and two to three elective courses, such that the total number of credit hours for a concentration is equal to or greater than 17. One of the elective courses needs to be concentration-specific while the other one has to be any 4000- or 6000-level BMED course. It is not possible to take the same course at the 4000- and 6000-level.

1) Biomaterials Concentration (3 required courses):

ENGR 1600	Materials Science for Engineers	(4 CR) (F, S)
ENGR 2250	Thermal and Fluids Engineering I	(4 CR) (F, S)
MTLE 2100	Structure of Engineering Materials	(4 CR) (S)

Plus an additional 5 or more credits hours from concentration electives.

2) Biomechanics Concentration (3 required courses):

BMED 4540	Biomechanics II	(3 CR) (F)
BMED 4580/6480	Biomedical Fluid Mechanics	(3 CR) (F)
ENGR 2250	Thermal and Fluids Engineering I	(4 CR) (F, S)

Plus an additional 7 or more credits hours from concentration electives.

3) Bioimaging/Instrumentation Concentration (3 required courses):

ECSE 2010	Electric Circuits	(4 CR) (F, S)
ECSE 2410	Signals and Systems	(4 CR) (F, S)
ENGR 2350	Embedded Control	(3 CR) (F, S)

Plus an additional 6 or more credits hours from concentration electives.

Humanities, Arts, and Social Science Requirements

The total HASS core requirement is 22 credits. Included in these credits are the following:

- A minimum of two 4-credit courses in Humanities
- A minimum of two 4-credit courses in the Social Sciences
- No more than three 1000 level HASS courses may be applied to the HASS core
- No more than 6 credits may be taken Pass/No Credit
- At least one 4 credit course must be at the 4000 level

- Depth requirement: Two 4-credit courses in the same H or SS subject area with at least one above the 1000 level and none on Pass/No Credit
- 2 credits must meet the Professional Development 2 requirement.

Concentration Course Mapping

Class Number	Class Name	# Credit Hours	Offered in Fall/Spring	Concentration		
				Biomaterials	Biomechanics	Bioimaging/ Instrumentation
BMED 4240	Tissue Biomaterial Interactions (not offered every year)	3	S	X		
BMED 4410/6410	BioMEMS	3	S	X		X
BMED 4650/6650	Introduction to Cell and Tissue Engineering	3	S	X		
BMED 4510/6500	Mechanobiology (not offered every year)	3	S	X	X	
BMED 4420/6420	Clinical Orthopedics and Related Research	4	F	X	X	
BMED 4450/6450	Drug and Gene Delivery	3	F	X		
MTLE 4050	Introduction to Polymers	3	F	X		
MTLE 4250	Properties of Engineering Materials II	4	S	X		
MTLE 4470	Processing of Biomaterials (not offered every year)	3	F	X		
BMED 4660/6660	Muscle Mechanics and Modeling	3	S		X	
BMED 4550/6550	Cell Biomechanics	3	F		X	
MANE 4240	Introduction to Finite Elements	3	F, S		X	
MANE 4030	Elements of Mechanical Design	4	F, S		X	
MANE 4670	Mechanical Behavior of Materials I	3	F		X	
BMED 4440/6440	Biophotonics	3	F			X
BMED 4460/6460/ ECSE 6963	Biological Image Analysis	3	S			X
BMED 4590/6590	Medical Imaging	3	F			X
BMED 6968/ MANE 6480	Health Physics and Medical Aspects of Radiation (not offered every year)	3	S			X
ECSE 4090	Mechatronics	3	F			X
ECSE 4480	Robotics I	3	F			X
ENGR 2300	Electronic Instrumentation	4	F, S			X
MANE 4050	Modeling and Control of Dynamic Systems	4	F, S			X
BMED 4240	Tissue Biomaterial Interactions (not offered every year)	3	S	X		
BMED 4410/6410	BioMEMS	3	S	X		X

Prerequisite Chart

Course

Biology, Chemistry, Math, Physics:

BIOL 2120	Cell and Molecular Biology	none
CHEM 1100	Chemistry I	none
MATH 1010	Calculus I	none
MATH 1020	Calculus II	MATH 1010
MATH 2010	Multivariable Calculus and Matrix Algebra	MATH 1020
MATH 2400	Diff Equations	MATH 1020
PHYS 1100	Physics I	none
PHYS 1200	Physics II	PHYS 1100, co-req MATH 1020

Pre requisite

Engineering Core Courses:

CSCI 1190	Beginning Programming for Engineers	none
ENGR 1100	Intro to Engineering Analysis	none
ENGR 1200	Engineering Graphics and CAD	none
ENGR 1300	Engineering Processes	none
ENGR 2050	Intro to Engineering Design	ENGR 1100, ENGR 1200, co-req PHYS 1200
ENGR 2600	Modeling and Analysis of Uncertainty	MATH 1010
ENGR 4010	Professional Development III	Senior standing
PSYC 4170	Professional Development II	ENGR 2050, Junior or Senior standing
STSS 4840	Professional Development II	ENGR 1010

BME Core:

BMED 2100	Biomaterials Science and Engineering	none
BMED 2300	Bioimaging and Bioinstrumentation	PHYS 1200
BMED 2540	Biomechanics	ENGR 1100
BMED 4010	BME Lab	BMED 4200
BMED 4200	Modeling of Biomedical Systems	MATH 2400, PHYS 1200, co-req CSCI 1190
BMED 4260	BME Product Devel. & Commercialization	ENGR 2050, Senior standing
BMED 4500	Advanced Systems Physiology	BIOL 2120
BMED 4600	BME Design	Senior standing

Common Concentration Courses:

BMED 4240	Tissue Biomaterial Interaction	co-req BMED 2100
BMED 4410	BioMEMs	Junior or Senior standing
BMED 4420	Clinical Orthopedics	BMED 4500
BMED 4440	Biophotonics	PHYS 1200
BMED 4450	Drug and Gene Delivery	BMED 2100
BMED 4460	Biological Image Analysis	BMED 2300
BMED 4510	Mechanobiology	BMED 2540
BMED 4540	Biomechanics II	BMED 2540
BMED 4550	Cell Biomechanics	BMED 2540 or ENGR 2530
BMED 4580	Biomedical Fluid Mechanics	ENGR 2250
BMED 4590	Medical Imaging	BMED 2300 or approval of instructor
BMED 4650	Intro to Cell and Tissue Engineering	ENGR 2250 and either BMED 2540 or ENGR 2530
BMED 4660	Muscle Mechanics and Modeling	none
ECSE 2010	Electric Circuits	MATH 2400, PHYS 1200

ECSE 2410	Signals and Systems	ECSE 2010
ECSE 4090	Mechatronics	ENGR 2350, ECSE 2410
ECSE 4480	Robotics I	MATH 2400 and either MATH 2010 or ENGR 1100
ENGR 1600	Mat Science for Engineers	CHEM 1100
ENGR 2250	Thermals and Fluids Engineering I	ENGR 1100, PHYS 1100, co-req MATH 2400
ENGR 2300	Electronic Instrumentation	PHYS 1200, co-req MATH 2400.
ENGR 2350	Embedded Control	CSCI 1010, CSCI 1100 OR CSCI 1190
MANE 4030	Elements of Mechanical Design	MATH 2400, ENGR 2530
MANE 4050	Modeling and Control of Dynamic Systems	MATH 2400, PHYS 1200
MANE 4240	Introduction to Finite Elements	ENGR 2250 or ENGR 2530 or ECSE 4160
MANE 4670	Mechanical Behavior of Materials I	ENGR 2530
MTLE 2100	Structure of Engineering Materials	ENGR 1600
MTLE 4050	Introduction to Polymers	none
MTLE 4250	Mechanical Properties of	ENGR 1600, MTLE 2100
MTLE 4470	Processing of Biomaterials	ENGR 1600

H&SS and PD II – Policies for Engineering Students

Engineering students at Rensselaer are required to successfully complete

- 20 credits of H&SS (Humanities and Social Sciences)
- 2 credits of PD II (Professional Development II)

as well as

- 1 credit of PD I (typically as part of ENGR-2050 Introduction to Engineering Design, or alternatively as ENGR-1010 Professional Development I if ENGR-2050 transferred in as less than a 4 credit course)
- 1 credit of ENGR-4010 PD III

for a total of 24 credits to fulfill the H&SS Core requirement.

ENGINEERING STUDENTS SHALL DISTRIBUTE THE 20 CREDITS OF H&SS AS FOLLOWS.

- ≥ 8 credits of H (ARTS, COMM, IHSS, LANG, LITR, PHIL, STSH, WRIT)
- ≥ 8 credits of SS (COGS, ECON, IHSS, PSYC, STSS)
- ≥ 4 credits at the 4000+ level
- ≤ 3 courses at the 1000 level (but note depth sequence restriction, below)
- ≤ 4 credits from 1-credit courses (e.g., music ensembles)
- ≤ 6 credits as pass/no-credit (but note depth sequence and CI restrictions, below)
- ≤ 2 courses (8 credits maximum) as transfer courses (including AP courses)

a depth sequence of two courses, each of ≥ 4 credits, from the same area code (ARTS, COMM, etc., but not including IHSS) where a minimum of one course (≥ 4 credits) is at an advanced level (2000+), and no courses are taken on a Pass/No Credit basis. STSS and STSH count as the same area code.

In addition, students are required to take at least one HASS course that is “CI” (Communications Intensive – a list of these courses is available from a link on the SIS home page, and here: [http://sfs.rpi.edu/update.do?artcenterkey=208&setappvar=page\(1\)](http://sfs.rpi.edu/update.do?artcenterkey=208&setappvar=page(1))). This course may not be taken on a Pass/No Credit basis. This CI course is not required to be part of the 24 credits of H&SS Core; that is, it may instead be an HASS CI course taken as a free elective

Enrolled Rensselaer students wishing to take an H&SS course for credit at another accredited institution must obtain prior approval for the course from the HASS Manager of Student Services. Applicants must furnish a catalog description of the proposed course and a completed copy of Rensselaer’s Transfer Credit Approval form to the HASS Manager of Student Services to apply for approval.

Cross-listed STSS/STSH courses can be switched (between H and SS) after the course is taken by making a request to the Assistant Registrar.

THE 2-CREDITS OF PD II SHALL BE SATISFIED AS FOLLOWS:

Either of the 2-credit courses, PSYC-4170 or STSS-4840, will satisfy the PD II requirement. **At some future time these will transition to a single 2-credit IHSS-4xxx course that will satisfy the PD II requirement.** Only **one** of these 2-credit PD II courses can be taken for credit.

A 4-credit PD II alternate course at any level (1000-4000) can be substituted for the 2-credit course. A list of these PD II alternate courses is available from a link on the SIS home page, and here: <http://registrar.rpi.edu/update.do?artcenterkey=325>.

A course used to satisfy the PD II requirement may **not** be taken on a Pass/No Credit basis.

In general, the PD II alternate course will be split as follows:

- two credits allocated to satisfy PD II
- the remaining credits allocated to free elective (or “Not Applied” to the degree if free elective credits have been completed)

With restrictions, the credits of a PD II alternate that are not allocated to PD II may be used to fulfill the 20-credits of H&SS. These credits:

- **cannot** count toward the 4000 requirement,
- **cannot** count toward the depth requirement,
- **cannot** increase the number of 1000 level credits past 12.

However,

- they can count toward the overall 20 credits of H&SS,
- they can count toward the H and SS 8-credit minimums,
- they can count toward the H&SS “CI” requirement.

If a student transfers in a course that is in name and course number equivalent to a PD II alternate it counts as that named HASS course, but it does **not** transfer in its status as a PD II alternate. The student would still be responsible for taking PD II or a PD II alternate at Rensselaer.

In the rare case that a student transfers in a course with Professional Development II content nearly identical to that in either PSYC-4170 or STSS-4840 (the 2-credit PD II courses), they may furnish a catalog description of the transfer course and a completed copy of Rensselaer’s Transfer Credit Approval form to the Associate Dean of Engineering to apply for approval. Note that some courses in the Study Abroad program automatically satisfy the PD II requirement, as indicated in the transfer equivalency guide.

The School of Humanities, Arts, and Social Sciences (HASS) Associate Dean of Academic Affairs is:

Mike Kalsher (kalshm@rpi.edu, Sage 4302)

The Assistant Registrar is: **Kim Herkert** (herkek@rpi.edu, Academy Hall 2713)

The Associate Dean of Engineering is Kurt Anderson (anderk5@rpi.edu, JEC 3018)

Need an Extra Credit?

Q: What if I'm short 1-2 credits in H&SS?

A: Use a 4-credit PD II alternate, with 2 credits to PD II, 1-2 credits to H&SS as needed, and any remaining credits to free elective (or "Not Applied" if you have filled all of your free elective credits)

Q: What if I'm short 1-2 credits in Free Electives?

A: Use a 4-credit PD II alternate, with 2 credits to PD II and 2 credits to free elective

Q: Am I really free to choose my free electives?

A: Almost, but not quite – there are restrictions for "free" electives. To count as a free elective, one credit classes must be either

- from the School of Engineering, or
- graded classes (though you can take these on a Pass/No Credit basis),

and

- ROTC courses (USAF, USAR, USNA) must not total more than six credits

One credit classes that are graded Satisfactory / Unsatisfactory (S/U) that are not in the School of Engineering may **not** be used as free electives. For example, PHYS-1010 A Passion for Physics is a 1-credit S/U course that will not count as a free elective.

Options for 1 credit free electives

- independent study (1 credit \approx 3 hours/week \Rightarrow \sim 45 hours of work)
- undergraduate research project (when taken for credit)
- School of Engineering courses, such as
 - CHME-1010 Introduction to Chemical Engineering
 - CIVL-1100 Introduction to Civil and Environmental Engineering
 - CIVL-1960 / ENVE-1960 AutoCAD CIVL 3D
 - ENGR-1300 Engineering Processes (if not required for your major)
 - ENGR-4962 Fortran Programming
 - ISYE-1100 Introduction to Industrial and Systems Engineering
 - MANE-1100 Introduction to Nuclear Engineering
 - MANE-2961 Mechatronics Hardware and Software
 - MTLE-1200 Introduction to Materials Engineering
- School of Science courses
 - ISCI-4510 Origins of Life Seminar (requires Junior standing or higher)
- HASS courses
 - ARTS-2300 Rensselaer Orchestra
 - ARTS-2310 Rensselaer Concert Choir
 - ARTS-2320 Percussion Ensemble
 - ARTS-2330 Jazz Ensemble
 - ARTS-2960 Ensemble Congeros
- ROTC courses (USAF, USAR, USNA, up to six credits maximum)
- most one-credit topics courses (see <http://srfs.rpi.edu/update.do?artcenterkey=305>)

Advising

Faculty Advisor

Each undergraduate student has their own faculty advisor who should be the first line of contact if there are questions or problems. If your advisor is not available or if you have further questions, you may contact the advising coordinator for the department in room JEC 7048.

Student's Responsibilities

- To know their advisor's office hours and advising schedule.
- To make an appointment and prepare for registration advising by reviewing the Catalog, Class-Hour Schedule, and Curriculum Advising & Program Planning (CAPP).
- To formulate questions regarding curriculum, course selections, career options, etc.
- To be aware of their academic and personal needs and to seek assistance when needed.
- To understand that the role of their advisor is to advise them, not to make decisions for them. Each student needs to realize that it's his or her education at stake, and that, with advisement, *they* are ultimately responsible for making any final decisions.

Advisor Responsibilities

- To be accessible to students throughout the year at posted office hours. If an advisor will be away from campus for an extended period of time, he or she should post the names and office locations of alternate advisors outside their offices, so that students will have other advising resources.
- To set aside designated times for registration advising and individual discussions.
- To be knowledgeable about current curriculum requirements, academic policies and procedures, referrals and resources on campus, and career opportunities in the major field.
- To guide students through academic programs that will complement their personal, educational, and professional interests.

Useful Advising Links

- [Advising and Learning Assistance Center](#)
- [Career Development Center](#)
- [Co-Op / Internships](#)
- [Course Catalog](#)
- [International Programs](#)
- [Registrar Forms](#)
- [Student Handbook](#)
- [Student Information System](#)

The HUB

The SoE Student Services HUB is a great place for freshmen and sophomore engineering students to find answers to their most pressing academic and career related questions. The HUB is located in the Ansell Lounge on the third floor in the Jonsson Engineering Center (JEC). The HUB is comprised of experience faculty and staff members who specialize in many of the different engineering majors. The HUB is open weekdays during the academic year during the following hours:

Monday-Thursday 10:00-4:00, Friday 10:00-1:00

HUB personnel have been trained to answer questions regarding all engineering majors, including required courses, prerequisites, different concentrations, optimal time for co-ops and internships, traveling abroad, etc. We especially encourage undeclared engineering students to utilize The Hub as a resource while they decide what major to pursue. Each personnel member will have access to students' CAPP reports and will be able to supply the student with the best advice, or refer them to a more knowledgeable source. HUB personnel will not be able to sign Student-Advisor Meeting (Sam) requirements for students. Their job is to supplement, not replace, the student's appointed academic advisor.

Registration

When: Registration for the Spring semester generally occurs in early November. Registration for the Fall semester occurs the preceding Spring, usually in early April. Exact dates are included in the [Academic Calendar](#).

How: Use the [Student Information System \(SIS\)](#) to register for your courses.

Where: There are no assigned rooms for registration. You can register for your classes using any computer with Internet access.

Time Tickets

As a student here at Rensselaer, you are issued a "time ticket," which assigns you a specific window of time during which you may register for the next semester. Your time ticket will be sent to your RPI email address, 2 - 3 weeks before registration.

School of Engineering

Freshman 0 - 30

Sophomore 31 - 60

Your registration time is assigned based on the number of credit hours you have **earned** as a student. The table to the right shows the range of earned credit hours associated with each class. Please note that classes which are still in progress or courses which have been graded as "incomplete" do *not* count towards earned credits, nor do transferred courses and Advanced Placement (AP) credit.

Junior 61 - 95

Senior 96 - 128

You should receive your time ticket via e-mail approximately four weeks prior to the scheduled registration period. In addition to making the registration assignment, this e-mail message notifies you of any existing holds which may prevent you from registering if you do not resolve them.

CAPP Reports

Your Curriculum Advising and Program Planning (CAPP) report is a planning and advising tool -- available only to undergraduate students -- that allows you to track the progress you're making toward your Bachelor's Degree. You can access your CAPP report via the main menu of the [Student Information System \(SIS\)](#).

Registration Frequently Asked Questions

What do I do if a class I want to register for is full?

Meet with the instructor of the course and request to be admitted to the course. If the class is a core/required course every effort will be made to accommodate the request. If this is an elective course you may be asked to take it in a subsequent semester. In the case of Biomedical Engineering classes, you may also see the advising coordinator for the department in room JEC 7048. Note that for Core Engineering courses (ENGR prefix) there will be an electronic waitlist available at the time of registration which is capped at ten students per section.

How do I add/drop a course?

You may use the [Student Information System \(SIS\)](#) to add or drop courses. Generally speaking, from the beginning of the semester, you will have **two weeks to add** courses and **eight weeks to drop** them. Please refer to the Academic Calendar for specific add and drop deadline dates.

If you wish to petition to add or drop classes after the published deadline, you may do so using a [Late Add/Drop Form](#). Please note that after the instructor's signature (if required), the form must also be approved by the Advising and Learning Assistance Center.

Undergraduate Research Program (URP)

Rensselaer's Undergraduate Research Program (URP) provides real-world, hands-on research experience for students like you. Through this unique program, you have the opportunity to work directly with a faculty member on a bonafide research project.

The program offers many advantages and the opportunity to:

- work on a project whose impact could be worldwide and can lead to patents and/or grants
- interact with some of the most informed and learned professors in the world
- apply knowledge gained in the classroom to actual problems and research situations
- network with faculty beyond the classroom, opening the door to other opportunities
- gain critical leadership, team-building and critical thinking skills
- establish industry connections that could lead to a co-op or future employment
- distinguish yourself from your peers
- publish as an undergraduate
- receive course credit in a more dynamic way or supplement your income

<http://undergrad.rpi.edu/update.do?catcenterkey=77>

URP application: <http://undergrad.rpi.edu/update.do?artcenterkey=117>

Rensselaer has a very strong Undergraduate Research Program. This is a program that allows students to work in a professor's laboratory for credit, cash, or experience. On average, we have 30% of the class taking advantage of these opportunities during their Rensselaer career.

Some examples of projects students have been involved in include:

- Study of Spinal Sclerosis
- Mechanical Loading of the Lumbar Spine
- Schwann Cell Migration
- Cell Based Cancer Research
- Soft Tissue Engineering
- Vascular Regulation

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- work on a project whose impact could be worldwide and can lead to patents and/or grants
- apply knowledge gained in the classroom to actual problems and research situations
- network with faculty beyond the classroom, opening the door to other opportunities
- gain critical leadership, team-building and critical thinking skills
- publish as an undergraduate
- receive course credit in a more dynamic way or supplement your income

How to find a project

Most URP projects are found through direct contact with the faculty member supervising the research. Most undergraduates find projects from faculty members from whom they have taken classes. A good place to start your search is to determine a faculty member with whom you may want to work on a project. Check their website to investigate their field of research. If it sounds interesting, approach them about a possible URP project.

What if I have my own idea for a project?

You may work with a faculty member on an existing research project or on a project based on your own ideas. If you want to pursue your own project, find a faculty advisor who may be interested in your topic since you will be required to have a project advisor.

For credit, funding or the experience?

You can earn from one to four credit hours per semester for your participation in the URP. The number of credit hours you earn is negotiable between you and your faculty sponsor. If you choose this option you and your sponsor need to:

- Determine how many credit hours you will earn
- Decide exactly what is expected of you, such as your time commitment, the type of work to be submitted, etc.
- Agree on how your grade will be determined
- In the past, students who have participated in the URP for pay have earned up to \$3,000 per semester. The majority of participants earn \$400 per semester.

URP funding comes from two sources:

- Your sponsoring faculty member or department
- The Office of Undergraduate Education

The faculty sponsor or department is responsible for the financial support of your research. In addition, the Office of Undergraduate Education pays URP participants a maximum of \$400 per semester in the form of matching funds.

Most projects expect eight to twelve hours of work per week.

The URP application should be submitted to the Department Coordinator, Kristen Bryk; who:

- Checks the URP Application for completeness
- Fills out your payroll paperwork
- Forwards your application and payroll paperwork to the Office of Undergraduate Education for approval
- Will set up a schedule for reporting your hours. You must submit your hours to the Department Coordinator within the same payroll period that you worked. Please keep in mind that if you work and submit hours that exceed your funding allotment, you will not be paid for those hours. Pay checks are issued every other Friday

Applying for the Experience

No deadline specified. You would have the opportunity to apply to gain the experience of working on a research project.

Co-op Opportunities

Numerous Co-op opportunities exist. Please speak to the Center for Career and Professional Development (<http://rpi.edu/dept/cdc/>) to learn more about these opportunities.

International Programs

<http://undergrad.rpi.edu/update.do?catcenterkey=81>

Rensselaer Education Across Cultural Horizons, or REACH, is part of Rensselaer's initiative to provide all undergraduate students with an international experience. Initially launched in spring 2009 as an exchange program for engineering students, REACH has evolved to include all international opportunities for undergraduates, including semester-long study abroad and exchange opportunities, short-term and faculty-led international programs, and other international experiences such as internships and service learning. All students are encouraged and expected to take advantage of some sort of international experience during their four-year undergraduate education.

Academic Requirements and Eligibility - Generally a 3.0 minimum GPA is required. More importantly, students must make sure that a period of study abroad will not delay their graduation date. Although students typically study abroad during the junior year, sophomores and seniors may be eligible.

Application procedures and deadlines - Generally an RPI study abroad application and official transcript as well as an application from the host institution are required. Deadlines vary by program but are typically September for spring and February for fall. You should begin the research process at least one semester prior to the semester of application.

Fees and Billing - Students who participate in affiliated study abroad or exchange programs are charged the cost of regular RPI tuition for their term(s) abroad. Some programs carry an additional fee. Unless otherwise noted, transportation, housing and other living expenses are paid directly by each student and are not billed by RPI.

Financial Aid - With the exception of work-study money, all forms of financial aid can be applied to Rensselaer-affiliated programs. Students must maintain full-time status (the equivalent of 12 Rensselaer credits or above) in order to be eligible for financial aid.

Grades and Credit - Full credit is granted for courses completed with a grade of C- or above. All courses must be approved by the relevant academic department in order for the transfer of credit to take place. With the exception of the Architecture programs, grades earned overseas are not factored into the GPA.

It is important for students to work with their advisor when applying to study abroad. Course mapping for selected REACH programs has been completed but this has not been completed for all of the universities involved. Mapping for the engineering focused schools can be found at: http://sis.rpi.edu/trfequiv/transfer_equiv.pdf

Study Abroad FAQs can be found at: <http://undergrad.rpi.edu/update.do?catcenterkey=124>

Professional and Student Societies

There is currently a very active student chapter of the Biomedical Engineering Society (BMES). The chapter plans many activities throughout the school year including informational meetings, student-faculty mixers, lunches with faculty, and field trips to local industry. The faculty advisor for the chapter is Dr. James Cooper.

Students who become members of the student chapter of the BMES will also receive literature from the National BMES. <http://bmes.org/>

Alpha Eta Mu Beta, the Biomedical Engineering Honor Society, is currently being formed at RPI. Stay tuned for further details on this society.

Co-Terminal Degree and Master Degree:

The Biomedical Engineering Master degree program focuses on engineering fundamentals at an advanced level. In consultation with their faculty advisor, individuals must develop a Plan of Study that satisfactorily meets Institute and Departmental requirements to earn the Master degree. A grade of B or better must be achieved to fulfill a course requirement.

Students interested in pursuing a co-terminal Master's degree (M.Eng.) in Biomedical Engineering are required to submit the following application materials to the Biomedical Engineering Department for consideration. Students must apply before the end of the student's 1st semester of their senior year and must have a GPA > 3.2 for consideration to the co-terminal program. Please refer to the graduate handbook for details. Co-terminal M.Eng. applications should be submitted in duplicate (one original and one photocopy) to the BME departmental office (Mary Foti; JEC 7049) in hard copy form (no emails/soft copies). Applications will be reviewed once a month during the academic year.

Co-terminal application:

http://admissions.rpi.edu/graduate/admission/Co-TerminalBS-MS_Application_and_Procedures.pdf

Information about Master degree:

The Biomedical Engineering Department offers three different routes for Master degrees: (1) The Master of Science (M.S.) is a Master degree that requires a thesis; (2) The Master of Engineering (M.Eng) can be obtained with a research project of limited scope or (3) as a coursework-only M.Eng. Co-terminal students will pursue the M.Eng. degree. The M.Eng. is generally recommended for students who do not plan further graduate studies. Pursuing a M.S. is advised for students who plan to obtain a higher graduate degree or have a strong interest in research. The master's thesis should contribute new knowledge to the field of study and is reviewed by the Masters' committee and submitted to the OGE for review.

Students pursuing a Master degree must complete a minimum of 30 credit hours. The minimum number of credits for coursework for a M.Eng. is 26. At least 4 BME classes at the 6000-level are required for the coursework and no more than 2 classes at the 4000-level can be included. Additionally, one course in the life sciences (biology or physiology) and one course in advanced math are required. In consultation with their advisor, students must develop a Plan of Study that satisfactorily meets Institute requirements and Departmental requirements.

The minimum course work requirements for a M.Eng. (Project M.Eng. or Coursework-only M.Eng.) are as follows:

	Credit hours	
Advanced Mathematics or Statistics	3-4	(1 course)
Advanced Life Sciences	3-4	(1 course)
Technical Depth Courses*	18-20	(5-7 courses)
<i>(*minimum of 5 courses should have the prefix BMED and be at the 6000-level; can include one professional development course; remainder needs to be engineering or science courses)</i>		
	SUBTOTAL	26
Plus any combination of Research Project *M.Eng. project only and	0-4	

Additional BME coursework	0-4
TOTAL	30

The minimum course work requirements for a M.S. degree with thesis are as follows:

	Credit hours	
Advanced Mathematics or Statistics	3-4	(1 course)
Advanced Life Sciences	3-4	(1 course)
Technical Depth Courses*	16-20	(4-7 courses)
<i>(*minimum of 4 courses should have the prefix BMED and be at the 6000-level; can include one professional development course; remainder needs to be engineering or science courses)</i>		
	SUBTOTAL	24-26
Thesis	4-6	
	TOTAL	30

Co-Terminal Degree Frequently Asked Questions

Admission

When do I apply?

Co-terminal applications must be submitted before the end of the student's 1st semester of their senior year. Applicants must have 90 credits (in progress or earned) of coursework towards their undergraduate degree.

Where do I find a Plan of Study?

The Plan of Study is available on-line at the Office of Graduate Education website [Plan of Study Form](#).

What if the courses I list on the Plan of Study change?

If the courses listed change, an updated plan must be filed with the Department, the Office of Graduate Education, and the Office of the Registrar.

Financial Aid, Tuition and Fees

Can I receive both Undergraduate Financial Aid and Graduate TA/RA aid?

No - If you receive a Graduate TA/RA you are no longer eligible for undergraduate financial aid or the co-terminal program.

Do I have to file a FAFSA for my 5th year to get the Undergraduate aid?

Yes - you must file a FAFSA, if you receive need based aid.

I have a TA from my department. Do I need to notify anyone?

No - the department works with the Office of Graduate Education to ensure that your TA is processed appropriately. Once you accept a graduate TA, you are no longer eligible for undergraduate financial aid or the co-terminal program.

Academic

When/how does a student get assigned a graduate adviser?

Co-terminal students will continue to work with their undergraduate adviser and should contact the department to be assigned a graduate advisor.

How many credits will I be eligible to register for?

Since the primary degree you will be pursuing is your bachelor's degree, you will be eligible to register for up to 21 credits.

Can I become a part-time student in the Co-Terminal Program?

Co-terminal student must remain as full time students and cannot shift to part-time status.

Should I apply for my undergraduate degree if I will be registered into an 11th semester?

If you are continuing into an 11th semester, you will no longer be eligible for undergraduate aid. You should apply for your bachelor's degree at that point.

When do I receive my B.S. degree? I was supposed to graduate in May but I will be completing 2 more semesters to receive my Master's degree under the co-terminal program?

You will receive both degrees at the end of your 10th semester. You should file a degree application with the Office of the Registrar for each degree at the beginning of the semester in which you will actually graduate with both degrees. See the academic calendar for deadline information.

Can I use a course for both my undergraduate and graduate degree?

No - credits applied toward satisfying requirements of the undergraduate degree cannot be used to satisfy the requirements for the master's degree.

I finished my 9th semester but decided not to continue in the Master's program. How do I receive my B.S. degree?

You must first, formally withdraw from the co-terminal program. This is done using the [Graduate Student Request for Change of Status](#) form. You must then file a degree application for the next graduation date. Submit your Degree Application online through SIS (Student Menu, Graduation Information section). Rensselaer has three official graduation dates - the end of August, the end of December, and mid-May. Check the academic calendar for application submission deadlines.

Can I still designate courses as Pass/No Credit?

Co-terminal students are subject to graduate degree program guidelines after they've earned the minimum number of credits required for their bachelor's degree (128 for BME). Any courses taken after a student has reached the minimum, will be subject to graduate level policies, and graduate policies prohibit designating a graduate course as Pass/No Credit.

Can I participate in the Commencement ceremony with my class?

You must meet the criteria for participation and file a petition, available in the Registrar's Office.

Frequently Asked Questions

When should I decide my BME concentration?

Normally students choose their concentration during the second semester of the sophomore year. A declaration form will need to be submitted to the registrar to declare the concentration.

When can I choose a minor?

A minor can be chosen anytime as long as the requirements for the minor can be completed before graduation.

Can BME students do a pre-medical, or pre-dental program?

BME students can do pre-medical or pre-dental curricula during their undergraduate program at RPI. The pre-medical program is shown above. The pre-dental program can be constructed with the aid of the advisor.

Is it reasonable for BME students to graduate in four years?

It is not only reasonable but it is accomplished by a majority of students. The suggested four year curriculum is shown above. Exceptions can occur if the student is taking a semester abroad or doing a co-op experience for one semester.

Can a BME dual major in ME, EE or other fields?

A BME student can dual major in other fields. The two most common dual majors are BME-EE and BME-ME. The student will have two advisers, one from BME and the other from the dual major. Each advisor will see that the curriculum in that major is completed. Normally the number of credits needed to complete a dual major is higher than the number of credits needed to complete the BME major only.

Is the BME program accredited?

The BME program is accredited by ABET, the Accreditation Board for Engineering and Technology, which is the organization that accredits all engineering programs.

To whom should I speak about doing a term abroad?

You may speak to your advisor, the advising coordinator (JEC 7048) for the department or contact the Office of International Programs.

To whom should I speak about the premed requirements?

You may speak to the advising coordinator of the department, Dr. Uwe Kruger, (JEC 7048) or Dr. E. Ledet, (JEC 7044).

How do I find out about the URP program and who has open positions?

You can begin by speaking with your advisor or with the advising coordinator for the department (JEC 7048). You can also speak with faculty that are in the concentration area that you are interested in doing a URP.

If I do a Co-op, which semester should I choose and how will it affect my schedule?

Most students choose the spring semester of their junior year or the fall semester of their senior year for a Co-op. This will normally extend your time at RPI by one semester.

By when does a student need to choose a major?

Most students choose a major when entering their freshman year at RPI. For those students who do not choose a major at that time, they become an undeclared student and are given an advisor who can guide the student toward making an informed choice of major. This decision should be made by the end of their freshman year.