Rensselaer

School of Engineering

Undecided Engineering

Class of 2023

Advising Handbook

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The Arch

https://info.rpi.edu/the-arch

The Arch is a unique approach for student development and growth that prepares students to meet the multifaceted challenges of the 21st century. The Arch will augment academic and experiential programs, and provide an even more robust-and transformative-educational experience for undergraduate students.

Students in the Class of 2023 will be required to participate in the Arch program in summer 2021. There is an exception process for athletes, ROTC, and a few other select cases.

The Arch is a restructuring of the Rensselaer academic calendar. It creates additional opportunities for experiential learning that complement curricular and co-curricular offerings at Rensselaer.

Rising juniors will attend a full summer semester, The Arch, between their sophomore and junior years. Juniors then spend a semester away during either the fall or spring semester of their junior year, still only taking 8 semesters to graduate.

This will allow students to take advantage of the numerous experiential learning activities available off campus, including international travel, internships, co-ops, research opportunities, and engagement in community service projects.

Academic Semester Experience

YEAR	FALL	SPRING	SUMMER
Freshman	Required	Required	Optional
Sophomore	Required	Required	Required
Junior	*	*	Optional
Senior	Required	Required	Graduate

* option for an "away" semester

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 $88,550 as of 2018.

Contact List for Biomedical Engineering

Department Head:	Juergen Hahn (hahnj@rpi.edu)	JEC 7052
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Traditional BME Baccalaureate Program

Fall Semester				Spring Semester		
First Year						
CHEM-1100	Chemistry I	4		BIOL-2120	Intro to Cell & Molecular Biology	4
ENGR 1100	Intro to Eng Analysis	4		ENGR-1300	Engineering Processes	1
ENGR-1200	Eng Graphics & CAD[6]	1		MATH-1020	Calculus II	4
MATH-1010	Calculus I	4		PHYS-1100	Physics I	4
IHSS-####	Hum., Arts or Soc. Sci. Elective[1]	4			Hum., Arts or Soc. Sci. Elective[1]	4
Second Year						
Fall Semester				**Spring Semester**		
CSCI-1190	Beginning Programing for Engrs	1		BMED-2100	Biomaterials Science & Engineering	4
ENGR-2050	Intro to Engineering Design	4		BMED-2300	Bioimaging & BioInstrumentation	4
MATH-2010	Multivar Calculus & Matrix Alg	4		BMED-2540	Biomechanics	4
MATH-2400	Intro Differential Equations	4		ENGR-2600	Modeling & Analysis Uncertainty	3
PHYS-1200	Physics II	4				
Third Year						
Summer Semester (choose 4 from list below)				**Fall OR Spring Semester**		
BMED-4010	Biomed Engineering Lab[3]	4		BMED-4500	Advanced Systems Physiology	4
BMED-4200	Modeling of Biomedical Systems7	4		STSS-4100	Professional Development II[2]	2
	Concentration I	4			Concentration II	4
	Free Elective[4]	4			Free Elective[4]	4
	Hum., Arts or Soc. Sci. Elective[1]	4			Hum., Arts or Soc. Sci. Elective[1]	4
Fourth Year						
Fall Semester				**Spring Semester**		
BMED-4260	Biomed Product Dev & Comm	3		BMED-4600	Biomedical Engineering Design[5]	3
	BME Tech Elective I	3		ENGR-4010	Professional Development III	1
	Concentration III	3			BME Tech Elective II	3
	Free Elective[4]	4			Hum., Arts or Soc. Sci. Elective[1]	4

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, Fall Year 4, or as part of the Summer Arch.

[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.

[7] BMED 4200 may be taken in either as part of the Summer Arch or Fall Year 3, or Spring Year 4.

Core BME Courses

Core BME Courses (and recommended semesters for taking them)

All of these courses are required for a BME degree and they need to be taken for a letter grade. No substitutions with other courses offered at Rensselaer are allowed.

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, F4, or Arch Summer)
BMED 4200	Modeling of Biomedical Systems	(4CR) (F3 or Arch Summer)
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 consists of three required courses which have to be taken for a letter grade.

1) Biomaterials Concentration:

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

2) Biomechanics Concentration:

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

3) Bioimaging/Instrumentation Concentration:

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

BME Technical Electives

Two BME Technical Elective courses need to be taken. These courses need to be 3 or 4 credit hour courses and they have to be taken for a letter grade. The BME Technical Elective courses can be chosen from the attached list or they can be any formal 4000- or 6000-level BMED course, i.e., no “Studies in BME”, “Topics in BME” or research courses. It is not possible to take the same course at the 4000- and 6000-level, nor is it possible to get credit twice for a course (once as an elective and once as a concentration course). BME Technical Electives can be taken to either add depth to an existing concentration or to add breadth to the degree.

Premed BME Baccalaureate Program

Fall Semester				Spring Semester		
First Year						
BIOL1010/1015	Intro to Biology + Lab	4		BIOL-2120	Intro to Cell & Molecular Biology	4
CHEM-1100	Chemistry I	4		CHEM-2100	Chemistry II	4
ENGR 1100	Intro to Eng Analysis	4		ENGR-1300	Engineering Processes	1
ENGR-1200	Eng Graphics & CAD[4]	1		MATH-1020	Calculus II	4
MATH-1010	Calculus I	4		PHYS-1100	Physics I	4
Second Year						
Fall Semester				**Spring Semester**		
CHEM-2250	Organic Chemistry I + Lab	4		BMED-2100	Biomaterials Science & Engineering	4
CSCI-1190	Beginning Programing for Engrs	1		BMED-2300	Bioimaging & BioInstrumentation	4
MATH-2010	Multivar Calculus & Matrix Alg	4		BMED-2540	Biomechanics	4
MATH-2400	Intro Differential Equations	4		ENGR-2600	Modeling & Analysis Uncertainty	3
PHYS-1200	Physics II	4				
Third Year						
Summer Semester				**Spring Semester**		
BCBP-4760	Molecular Biochemistry I	4		BMED-4500	Advanced Systems Physiology	4
BMED-4200	Modeling of Biomedical Systems	4		ENGR-2050	Intro to Engineering Design	4
CHEM-2260	Organic Chemistry II + Lab	4		PSYC-1200	General Psychology	4
STSS-1520	Sociology	4		STSS-4100	Professional Development II[1]	4
					Concentration I	4
Fourth Year						
Fall Semester				**Spring Semester**		
BMED-4260	Biomed Product Dev & Comm	3		BMED-4600	Biomedical Engineering Design[3]	3
BMED-4010	Biomed Engineering Lab[2]	4		ENGR-4010	Professional Development III	1
	BME Tech Elective I	3			BME Tech Elective II	3
	Concentration II	4			Concentration III	4
	Hum., Arts or Soc. Sci. Elective[5]	4			Hum., Arts or Soc. Sci. Elective[5]	4
					Hum., Arts or Soc. Sci. Elective[5]	4

The minimum number of credit hours for the degree is 136

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. Two of the HASS Electives need to be either COMM, LITR, or WRIT to satisfy the English requirement that most medical schools have.

Chemical & Biological Engineering

The major educational objective in the Howard P. Isermann Department of Chemical and Biological Engineering is to prepare students to enter their engineering practice dealing with chemical as well as physical processes to meet the challenges for the future. The curriculum, which builds on chemistry, biology, mathematics, basic sciences, and engineering science, culminates in professional applications in which theory is tempered by engineering art and economic principles. Through this curriculum, graduates are prepared equally well for professional practice or for advanced study.

Opportunities for creative and satisfying practice in chemical and biological engineering can be found in conception, design, control, or management of processes involving chemical and/or biochemical transformations. These processes range from the more conventional conversion of crude oil into petrochemicals and plastics, to the development of novel processes for the production of biopharmaceuticals, to the creation of lab on chip devices using nanomaterials. The chemical conversion of resources into new, more useful forms has been the traditional concern of chemical engineers. In recent years there has developed a critical concern with the depletion of resources, leading to increased efforts to conserve, recycle, and find alternatives. Concurrently with high-technology advances in biochemical and semiconductor processing, these developments pose challenges that fall on the chemical engineering profession.

An undergraduate degree that works! Our chemical engineering graduates are well prepared for advanced graduate study and for professional practice. The companies employing Rensselaer chemical engineering graduates during the past decade are:

Amgen (biopharmaceuticals),	BioGen-IDG (biopharmaceuticals),
Centocor (biopharmaceuticals),	ExxonMobil (oil and chemicals),
General Electric (plastics),	Human Genome Sciences (biopharmaceuticals),
IBM (semiconductors),	Intel (semiconductors),
Genzyme (pharmaceuticals)	Millipore (biopharmaceuticals),
Merck (pharmaceuticals),	Procter & Gamble (consumer products)
Regeneron (pharmaceuticals)	Sanofi (pharmaceuticals)

Diverse career choices exist not only in the chemical industry, but in virtually all processing industries, including agricultural, biotechnology, biomedical, chemical, food, nuclear, semiconductor processing, and environmental operations. By emphasizing basic principles, the program prepares its graduates for positions spanning the spectrum of activities from research and development, to process and project engineering, to production, or to technical marketing. Chemical engineering also provides an excellent background for entering medical school and law school.

Contact List for ChBE

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	Todd Przybycien	BT 4105
Transfer Student Advisor:		
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Chemical and Biological Engineering Curriculum Checklist

Fall 2019				Spring 2020			
CHME-1010	Intro to Chemical Engineering [1]	1		BIOL-2120	Intro to Cell & Molecular Biology [3]	4	
CHEM-1110	Chemistry I with Advanced Lab	4		ENGR-1100	Intro to Engineering Analysis	4	
MATH-1010	Calculus I	4		ENGR-1400	Engineering Communications [2]	1	
PHYS-1100	Physics I [2]	4		MATH-1020	Calculus II	4	
IHSS-####	Hum., Arts or Soc. Sci. Elective	4			Hum., Arts or Soc. Sci. Elective	4	
Fall 2020				**Spring 2021**			
CHEM-2250	Organic Chemistry I	3		CHEM-2260	Organic Chemistry II	3	
CHME-2010	Material, Energy & Entropy Balances	4		**CHME-2020**	Energy, Entropy, and Equilibrium	3	
ENGR-1010	Professional Development I	1		**CHME-2050**	Intro to Computational Chemical Eng	3	
MATH-2400	Intro to Differential Equations	4		ENGR-2600	Modeling and Analysis of Uncertainty	3	
PHYS-1200	Physics II	4			Hum., Arts or Soc. Sci. Elective	4	
Summer 2021				**Fall 2021 or Spring 2022**			
CHEM-4530	Modern Techniques in Chemistry	4		CHEM-4420	Microscopic Physical Chemistry	3	
CHME-4010	Transport Phenomena I	4		**CHME-4020**	Transport Phenomena II	4	
CHME-4030	Chemical Process Dynamics and Control	4		STSS-4100	Professional Development II [4]	2	
	Hum., Arts or Soc. Sci. Elective	4			Free Elective I	4	
					Hum., Arts or Soc. Sci. Elective	4	
Fall 2022				**Spring 2023**			
CHME-4040	Chemical Engineering Separations	3		**CHME-4050**	Chemical Process Design	4	
CHME-4150	Chemical Engineering Lab I	3		CHME-4160 or 4170	Chemical Engineering Lab II or Bioprocessing Lab	3	
CHME-4500	Chemical Reactor Design	3		ENGR-4010	Professional Development III	1	
CHME 4###	Chemical Engineering Elective [5]	3			Engineering Elective [6]	4	
	Free Elective II	4			Free Elective III	4	

Electives

The chemical engineering elective must be 4000-level and above chemical engineering or in an approved, advanced chemical engineering subject.

The engineering elective cannot be a chemical engineering course; it must be at least 2000-level and contain 4 credits of engineering topics. This elective cannot be ENVE 2110 or ENGR 2250.

Footnotes

1. *May be replaced by "ENGR 1300 Engineering Processes", although CHME 1010 is recommended.*
2. *May be taken in either order. ENGR 1200 Engineering Graphics and CAD may replace ENGR 1400.*
3. *May be replaced with BIOL 1010, but BIOL 2120 is recommended for those who have had biology in high school and who have had Chemistry I.*
4. *Will be fulfilled from a list of courses published at the beginning of each semester.*
5. *4000-level or higher.*
6. *Cannot be a chemical engineering course; it must be at least at the 2000 level and contain 3 credits of engineering topics. This elective cannot be ENVE 2110 or ENGR 2250.*

Civil Engineering

Civil engineers are involved in providing the physical infrastructure that supports civilization, including shelter, transportation, water supply and waste disposal and/or recycling. Constructed facilities, their planning, analysis, design, construction, maintenance and operation, are the forte of civil engineering. Civil engineers use computational tools, engineered and natural materials, and human creativity to design, construct, and maintain the physical infrastructure, which supports the quality of life of the Earth's population.

For the individual who has a strong interest in innovative planning, design and construction, civil engineering offers far ranging opportunities for applying knowledge and creativity in making the world a better place to live.

Students in civil engineering study the common two year core curriculum in engineering, followed by core civil engineering courses in structural engineering, geotechnical engineering, transportation engineering, and environmental engineering. These courses are supplemented by elective concentrations in any one of the sub-areas listed above.

Contact List for CEE

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Civil Engineering Curriculum

FALL			FIRST YEAR	SPRING	
CHEM 1100	Chemistry I	4	CIVL 1100	Intro to Civil & Environmental Eng[3]	1
CIVL 1200	Eng. Graphics for Civil Eng[1]	1	ENGR 2600	Modeling &Analysis of Uncertainty	3
ENGR 1100	Intro. to Eng. Analysis	4	MATH 1020	Calculus II	4
MATH 1010	Calculus I	4	PHYS 1100	Physics I	4
IHSS ####	Hum., Arts or Soc. Sci Elective[2]	4		Hum., Arts or Soc. Sci Elective	4
FALL			**SECOND YEAR**	**SPRING**	
ENGR 2250	Thermal & Fluids Engineering I	4	CIVL 2030	Intro to Transportation Engineering	4
ENGR 2530	Strength of Materials	4	CIVL 2630	Intro to Geotechnical Engineering	4
MATH 2400	Intro. to Differential Eqns.	4	CIVL 2670	Intro to Structural Engineering	4
PHYS 1200	Physics II	4	ENVE 2110	Intro to Environmental Engineering	4
ARCH			**THIRD YEAR**	**SPRING**	
ENGR 2050	Intro to Engineering Design	4	CSCI 1190	Beginning C Programming for Eng.[4]	1
ENGR 4760	Engineering Economics	3	ENGR 2090	Engineering Dynamics	4
ENVE 4310	Applied Hydrology & Hydr.	4	STSS 4100	Professional Development II[5]	2
	Hum., Arts or Soc. Sci Elective	4		CE Design Elective[6]	3
				Free Elective	4
FALL			**FOURTH YEAR**	**SPRING**	
	CE Design Elective[6]	3	CIVL 4920	CE Capstone Design	3
	CE Technical Elective[6]	3	ENGR 4010	Professional Development III	1
	Math and Science Elective[7]	4		Basic Science Elective[8]	4
	Free Elective	4		Free Elective	4
	Hum., Arts or Soc. Sci Elective	4		Hum., Arts or Soc. Sci Elective	4

[1] CIVL 1200 may be replaced with ENGR 1200.

[2] The five HASS Electives may be taken in any semester; it is recommended to schedule one in each of the first two semesters and one in the Arch Summer. Students should take a HASS Inquiry course during their first year; for a listing of HASS Inquiry courses, go to https://info.rpi.edu/hass-inquiry. Students should take a HASS Communications Intensive course during their first three semesters; refer to the link "Communications Intensive (CI) Requirement" on the Registrar's "Academic Planning" web page.

[3] CIVL 1100 may be replaced with ENGR 1300.

[4] CSCI 1190 may be replaced with CSCI 1100.

[5] For a list of courses that satisfy the PD II requirement, refer to the link "Professional Development II Courses" on the Registrar's "Academic Planning" web page.

[6] Allowable courses are listed under Design Electives and Technical Electives.

[7] Any 4-credit course in the School of Science with a prefix of ASTR, BCBP, BIOL, CHEM, ERTH, MATH or PHYS.

[8] Any 4-credit course in the School of Science with a prefix of ASTR, BIOL or ERTH.

128 credits minimum

CE DESIGN ELECTIVES Students must take at least two CE design electives in one area of concentration.

Structural Engineering
CIVL 4070 Steel Design
CIVL 4080 Concrete Design

Geotechnical Engineering
Students *must take:* CIVL 4010 Foundation Engineering
And must choose a second course from the following:
CIVL 4140 Geoenvironmental Eng.
CIVL 4150 Experimental Soil Mechanics

Environmental Engineering
Students *must choose two* of the following courses:
ENVE 4200 Solid and Hazardous Waste Eng.
ENVE 4330 Introduction to Air Quality
ENVE 4340 Physicochemical Processes in Env. Eng.
ENVE 4350 Biological Processes in Env. Eng.

Transportation Engineering
Students *must choose two* of the following courses:
CIVL 4620 Mass Transit Systems
CIVL 4640 Transp. System Planning
CIVL 4660 Traffic Engineering
CIVL 4670 Highway Engineering

CE TECHNICAL ELECTIVES
Any of the design electives listed above may be taken to satisfy the CE Technical Elective requirement, provided the necessary pre-requisites have been satisfied. The following courses may also be taken to satisfy the CE Technical Elective requirement:
CIVL 2040 Professional Practice
CIVL 4240 Intro. to Finite Elements
CIVL 4270 Construction Management
CIVL 4280 Design for Constructability
CIVL 4440 Matrix Structural Analysis
CIVL 4450 Conceptual Structural Systems
CIVL 4570 System Modeling for Civil and Env. Engineering

To satisfy the CE Technical Elective requirement, students may choose an additional CE Design Elective within any concentration or, with adviser approval, courses from related disciplines. These related disciplines include architecture, environmental engineering, earth and environmental sciences, mechanical engineering, chemical engineering, industrial engineering, and operations research. A representative list of such courses is as follows:
ENVE 4110 - Aqueous Geochemistry
ERTH 2120 - Structural Geology
ERTH 2330 - Earth Materials
ERTH 4710 - Groundwater Hydrology
MATH 4800 - Numerical Computing

Civil Engineering Curriculum Helpful Hints

Students who follow the Civil Engineering curriculum template will graduate with a BSCE degree in 4 years. Transfer students and those electing Co-op or Semester Abroad experiences may need to deviate from the template; however, it is often still possible to graduate in 4 years. Guidance is provided below on which deviations from the standard template are possible and which should be avoided to ensure timely completion of the BSCE degree.

1) Students that bring a number of transfer credits (including AP credits) to their academic careers are encouraged to contact the Office of Civil and Environmental Engineering (518-276-6360; JEC 4049) early in their academic career.
2) ENGR 2530 (Strength of Materials) is a prerequisite for both CIVL 2630 (Intro. to Geotechnical Engineering) and CIVL 2670 (Intro. to Structural Engineering). Hence, ENGR 2530 should be taken no later than Fall/Sophomore year. If that is not possible, please consult with your academic adviser.
3) The four CE Intro. courses – CIVL 2030, CIVL 2630, CIVL 2670 and ENVE 2110 – are only offered spring semester. It is best to take these spring semester of the Sophomore year. If taking all four during Spring/Sophomore year is not possible, then take the Intro. courses in your specific area of interest and defer others (e.g., if you are interested in structural engineering, take CIVL 2670, and maybe CIVL 2630, during Spring/Sophomore year and defer CIVL 2030 or ENVE 2110 to Spring/Junior year).
4) CIVL 4920 (CE Capstone Design) is only offered spring semester. If you will be taking 4 ½ years to complete your degree, arrange your courses so that the Capstone pre-requisites (two design course sequence) are completed prior to Spring/Senior year.
5) Except for ENGR 2530 (Strength of Materials), students can take most required ENGR courses, specifically ENGR 2090, 2250, 2600, and 4760, whenever the prerequisite/corequisite is completed.
6) If you are planning to be away from campus for either the Co-op or Study Abroad program, the best time to participate in these programs is the fall semester of Junior year.
7) Maximize job opportunities in civil engineering by taking CIVL courses to satisfy the free elective course requirements.

Environmental Engineering

The Environmental Engineering program brings together dedicated people to study and work on the pressing environmental issues of our time. We prepare students for environmental careers in consulting engineering practice, private industry, national and international research laboratories, government agencies, and academia, as well as in many cross-disciplinary areas of engineering, science, and public policy. The department maintains close ties with people and organizations in all these career venues through an active research agenda and a vibrant alumni community. Student needs and career objectives are met through a well-crafted, rigorous, and interdisciplinary curriculum that stresses hands-on learning, grounding in fundamentals, and practical experience.

Our long-standing tradition of education in environmental problem solving at Rensselaer spans from the pioneering work on water analysis by William Pitt Mason in the later 1800's to the visionary environmental engineering ideas of Edward J. Kilcawley who introduced environmental engineering as an option in the mid-1940's and as a degree program in the mid-1950's. In addition to the Department of Civil and Environmental Engineering, there are faculty members at Rensselaer with teaching and research interests in environmental problem solving in the departments of Biology, Chemical Engineering, Chemistry, Earth and Environmental Sciences, and Applied Math.

Contact List for the CEE Department

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Environmental Engineering Curriculum

FALL			FIRST YEAR	SPRING		
CHEM 1100	Chemistry I	4		CIVL 1100	Intro to Civil & Environmental Eng. [3]	1
CIVL 1200	Eng. Graphics for Civil Eng [1]	1		MATH 1020	Calculus II	4
ENGR 1100	Intro. to Engineering Analysis	4		PHYS 1100	Physics I	4
MATH 1010	Calculus I	4			Science Elective I [2]	4
IHSS ####	Hum., Arts or Soc. Sci. Elective [10]	4			Hum., Arts or Soc. Sci. Elective	4
			SECOND YEAR			
ENGR 2250	Thermal and Fluids Eng.[5]	4		ENVE 2110	Intro to Environmental Engineering	4
MATH 2400	Intro. to Differential Equations	4		ENGR 2600	Modeling & Analysis of Uncert	3
PHYS 1200	Physics II	4		CSCI 1190	Beginning Prog. for Eng.[6]	1
CHEM 2250	Organic Chemistry I	3			Science Elective II [4]	4
					Hum., Arts or Soc. Sci. Elective	4
Arch			THIRD YEAR	Spring		
ENGR 2050	Intro to Engineering Design	4		ENVE 4320	Environmental Chemodynamics	4
ENVE 4310	Applied Hydrology & Hydr.	4		ENVE 4340	Physiochemical Processes in ENVE	4
ENGR 4010	Professional Development III	1		STSS 4100	Professional Development II[7]	2
	Hum., Arts or Soc. Sci. Elective	4			Multidisciplinary Eng. Elective[8]	3
	Free Elective I	4			Technical Elective[9]	3
			FOURTH YEAR			
ENVE 4330	Intro to Air Quality	4		ENVE 4180	Environmental Process Design	3
ENVE 4350	Biological Processes in ENVE	4		ERTH ####	Earth Science Elective[10]	4
	Technical Elective[9]	3			Free Elective III	4
	Free Elective II	4			Hum., Arts or Soc. Sci. Elective	4

1. *CIVL 1200 may be replaced with ENGR 1200 or ENGR 1400.*
2. *Choose CHEM 1200 and either BIOL 1010 or another biology course chosen in consultation with adviser. Order does not matter.*
3. *CIVL 1100 may be replaced with ENGR 1300 ENGR 2250 may be replaced by CHME 4010.*
4. *ENGR 2250 may be replaced with CHME 4010.*
5. *CSCI 1190 may be replaced with CSCI 1100 or CSCI 1010.*
6. *This course will be fulfilled from a list published at the start of the semester.*
7. *Multidisciplinary engineering elective: must be a 3 or 4 credit engineering course, chosen in consultation with the adviser (e.g., CIVL 2030, CIVL 2630, ENGR 1600, ENGR 2530, ENGR 4760, ISYE 4140).*
8. *Technical electives must be an engineering course 2000 level or above, selected in consultation with the program adviser (e.g., ENVE 4110, ENVE 4200, ENVE 4210, ENVE 4240). With adviser approval, courses from other disciplines may also be taken. These include Civil Engineering and Chemical Engineering (for example, CHME 4030, CIVL 2630, CIVL 4150, and others)..*
9. *Earth Science Elective: must be an Earth Science course 2000-level or above. Choose from ERTH 2140, ERTH 2330, ERTH 4070, or ERTH 4500.*
10. *May be taken in either semester.*

EnvE Multidisciplinary Engineering Electives

Core Engineering
ENGR 1600 Materials Science
ENGR 2530 Strength of Materials
ENGR 4760 Engineering Economics

Transportation Engineering
CIVL 2030 Intro. to Transportation Engineering

Geotechnical Engineering
CIVL 2630 Intro. to Geotechnical Engineering

Industrial and Systems Engineering
ISYE 4140 - Statistical Analysis
ISYE 4240 - Engineering Project Management.

Mechanical, Aerospace and Nuclear Engineering
MANE 2710 Thermodynamics

EnvE Technical Electives

Environmental Engineering
ENVE 4110 Aqueous Geochemistry
ENVE 4200 Solid and Hazardous Waste Eng.
ENVE 4240 Bench Scale Design
ENVE 4360 Geomicrobiology
ENVE/ERTH 4560 Isotope Geochemistry
ENVE/ERTH 4710 Groundwater Hydrology
ENVE 496X Special Topics announced each semester

Civil Engineering
CIVL 2630 Intro. to Geotechnical Engineering
CIVL 4140 Geoenvironmental Engineering

Chemical Engineering
CHME 4030 Chemical Process Dynamics & Control
CHME 4400 Chromatographic Separation Processes

128 credits minimum

Environmental Engineering Curriculum Helpful Hints

Students who follow the ENVE curriculum template will graduate with a B.S. ENVE degree in 4 years. Transfer students and those electing Co-op or Semester Abroad experiences may need to deviate from the template; however, it is often still possible to graduate in 4 years. Guidance is provided below on which deviations from the standard template are possible and which should be avoided to ensure timely completion of the B.S. ENVE degree.

1) Students that bring a number of transfer credits (including AP credits) to their academic careers are encouraged to contact the Office of Civil and Environmental Engineering (518-276-6360; JEC 4049) early in their academic career.

2) ENGR 2250 Thermal and Fluids Engineering I is a prerequisite for courses in the Junior year. It is also a corequisite for Intro to Environmental Engineering. Therefore, it should be taken in the fall of Sophomore year.

3) There are two science electives in the Environmental Engineering curriculum. Students must choose Chemistry II (CHEM 1200) and a biology course; order does not matter. Courses that fulfill the biology requirement include BIOL 1010 - Introduction to Biology and BIOL 2120 - Introduction to Cell and Molecular Biology. Neither course has a prerequisite. With permission of the instructor, BIOL 4310 - Microbiology may also be selected.

4) Students interested in environmental issues related to soils (landfill design, soil remediation) are encouraged to take CIVL 2630 Intro. to Geotechnical Engineering. Note that it is only be offered in the spring semester. Note that ENGR 2530 Strength of Materials is a prerequisite. ENGR 2530 will fulfill the Multidisciplinary Engineering elective requirement.

5) ENVE 4180, Environmental Process Design, is a capstone design course offered only in the spring semester. You should arrange your courses to complete ENVE design courses prior to taking ENVE 4180. These include ENVE 4200 Solid and Hazardous Waste, ENVE 4330 Introduction to Air Quality, ENVE 4310 Applied Hydrology and Hydraulics, ENVE 4340 Physicochemical Processes, and ENVE 4350 Biological Processes.

6) If you are planning to be away from campus for either the Co-op or Study Abroad program, the preferred semester for ENVE students is fall semester of Junior year. CHEM 2250 Organic Chemistry I should be taken in your sophomore year or in the summer between the Sophomore and Junior year. The RPI equivalents of various courses offered by our overseas partners are listed on the Registrar website. If you wish to take a course for which an equivalency has not been established, use the Transfer Credit form and supply the syllabus to the department on campus that teaches the Rensselaer version.

7) Maximize job opportunities in Environmental Engineering by filling free elective course requirements with ENVE courses or courses related to ENVE.

Electrical Engineering

Electrical Engineering is a dynamic and broad field that applies physics and mathematics to the creative design, research, development, testing and monitoring of diverse products prevalent in society today. From cell phones to smart cars, light emitting diodes to autonomous robots, nano to macro, electrical engineering continues to grow as an integral part of our multidisciplinary, technological society.

Computer & Systems Engineering

Computer and Systems Engineering is a dynamic field that creatively applies computers and mathematics to the design, development, testing and implementation of a wide range of products. From secure wireless networks to medical imaging systems, from autonomous mobile robots to face recognition security systems, from aircraft control systems to mapping the world, from distributed underwater pollution sensors to the next generation Internet, from handheld games to drones, these systems are built by RPI computer engineers.

Contact List for ECSE

Department Head:	John Wen (wenj@rpi.edu)	JEC 6052
Administrative Coordinator:	Gina Moore (gina@ecse.rpi.edu)	JEC 6050
Administrative Assistant:	Priscilla Magilligan (pris@ecse.rpi.edu)	JEC 6009
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Transfer Student Advisor	Paul Schoch (schocp@rpi.edu)	J-bldg. 4203
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	Fred Schubert efschubert@rpi.edu)	CII 7111
	Rena Huang (huangz3@rpi.edu)	CII 6207

Electrical Engineering Curriculum Checklist

	First Year							
CSCI-1100	Computer Science I	4			ENGR-1200 OR ENGR-1400	Eng. Graphics & CAD [1] OR Eng. Communications [1]	1	
ECSE-1010	Intro. to ECSE [6]	4			MATH-1020	Calculus II	4	
MATH-1010	Calculus I	4			PHYS-1100	Physics I	4	
IHSS-####	Hum., Arts or Soc. Sci. Elective	4				Science Elective	4	
						Hum., Arts or Soc. Sci. Elective	4	
	Second Year							
ENGR-2050	Intro. to Eng. Design	4			ECSE-2010	Electric Circuits	4	
MATH-2400	Intro. to Differential Eqns.	4			ECSE-2610	Computer Components & Operations	4	
PHYS-1200	Physics II	4			ENGR-2350	Embedded Control	4	
	Hum., Arts or Soc. Sci. El.	4			MATH-2010	Multivariable Calc & Matrix Algebra	4	
ARCH SEMESTER			**Third Year**			**Fall or Spring**		
ECSE-2050	Intro. to Electronics	4			ECSE-2100	Fields & Waves I	4	
ECSE-2410	Signals & Systems	3			ECSE-2110	Electrical Energy Systems	3	
ECSE-2500	Engineering Probability	3			ECSE-2210	Microelectronics Tech.	3	
STSS-4100	Professional Development II [1,3]	2			ECSE-2900	ECSE Enrichment Seminar	1	
	Free Elective [2]	3-4				Math/Science Elective	4	
	Fourth Year							
ECSE-4900	Multidisc. Capstone Design [1]	3				Free Elective [1,2]	3-4	
ENGR-4010	Professional Development III [1]	1				Free Elective [1,2]	3-4	
	Lab Elective [1,4]	3				Free Elective (if needed)[2]	3-4	
	Restricted Elective [1,4,5]	3				Hum., Arts or Soc. Sci. Elective	4	
	Restricted Elective [1,4,5]	3				Hum., Arts or Soc. Sci. Elective	4	
	Technical Elective [1,4,5]	3-4						

1 May be taken either term.
2 The free electives must total to at least 12 credits.
3 This course will be fulfilled from a list published at the start of each semester.
4 It is recommended that students use electives to form a concentration. See the ECSE Web page for concentration listings.
5 No more than one Independent Study course may be used to when satisfying the combined Technical and Restricted Elective requirements.
6 May be replaced with ENGR-1100 Introduction to Engineering Analysis

128 credits minimum

RESTRICTED ELECTIVE
Any 3 or 4 credit hour course with the designation ECSE-4xxx or ECSE-6xxx.

TECHNICAL ELECTIVE
Any 3- or 4-credit-hour course in engineering, mathematics, or science at the 4000 level or higher.

LAB ELECTIVES
ECSE 4090 Mechatronics
ECSE-4130 Electric Power Eng. Lab
ECSE-4220 VLSI Design
ECSE-4760 Real-Time Cntrl & Comm.
ECSE-4770 Cptr H'ware Design
ECSE-4790 Microprocessor Systems
ENGR-4710 Adv. Manufacturing Lab I

SCIENCE ELECTIVE
CHEM-1100 Chemistry I
BIOL-1010/1015 Introduction to Biology/Lab
BIOL-2120 Cell and Molecular Bio.

MATH/SCIENCE ELECTIVE
A 4-credit-hour course (or a 3-credit-hour course with a 1-credit-hour laboratory) in Science (ASTR, BIOL, CHEM, ERTH, PHYS) or Mathematics (MATH, MATP). An independent Study course cannot be used to satisfy this requirement.

Computer and Systems Engineering Curriculum Checklist

	First Year						
CSCI-1100	Computer Science I	4		CSCI-1200	Data Structures	4	
ECSE-1010	Intro. to ECSE[7]	4		MATH-1020	Calculus II	4	
ENGR-1200 OR ENGR-1400	Eng. Graphics & CAD[1] OR Eng. Communications[1]	1			Science Elective	4	
MATH-1010	Calculus I	4			Hum., Arts or Soc. Sci. Elective	4	
IHSS-####	Hum., Arts or Soc. Sci. Elective	4					
	Second Year						
CSCI-2200	Foundations of Comp. Sci.	4		CSCI-2300	Intro to Algorithms	4	
ECSE-2610	Cptr. Comp. & Operations	4		ECSE-2660	Cptr Arch, Nets, & Op Sys	4	
ENGR-2350	Embedded Control	4		MATH-2400	Intro. to Differential Equations	4	
PHYS-1100	Physics I	4		PHYS-1200	Physics II	4	
	Arch Semester		**Third Year**		**Fall or Spring**		
ECSE-2010	Electric Circuits	4		ECSE-2050	Intro. to Electronics	4	
ENGR-2050	Intro. to Eng. Design	4		ECSE-2410	Signals & Systems	3	
MATH-2010	Multivar Calc & Matrix Alg.	4		ECSE-2500	Engineering Probability	3	
	Hum., Arts or Soc. Sci. Elective	4		ECSE-2900	Enrichment Seminar	1	
					Free Elective[2]	3-4	
					Hum., Arts or Soc. Sci. Elective	4	
	Fourth Year						
ENGR-4010	Professional Development III[1]	1		STSS-4100	Professional Development II[1,3,4]	2	
ECSE-4900	Multidisc. Capstone Design[1]	3			Free Elective[2]	3-4	
	Computer Eng Elective[1,4]	3-4			Free Elective[2]	3-4	
	Restricted Elective[1,5,6]	3-4			Free Elective (if needed) [2]	3-4	
	Restricted Elective[1,5,6]	3-4			Hum., Arts or Soc. Sci. Elective	4	
	Technical Elective[1,5,6]	3-4					

1 May be taken either term.
2 The free electives must total at least 12 credits.
3 This course may be fulfilled from a list published at the start of each semester.
4 May be taken in the third year.
5 It is recommended that students use electives to form a concentration. See the ECSE Web page for concentration listings.
6 No more than one Independent Study course may be used when satisfying the combined Technical and Restricted Elective requirements.
7 May be replaced with ENGR 1100 Introduction to Engineering Analysis.

RESTRICTED ELECTIVE
Any 3 or 4 credit hour course with the designation ECSE-4xxx or ECSE-6xxx.

TECHNICAL ELECTIVE
Any 3- or 4-credit-hour course in engineering, mathematics, or science at the 4000 level or higher.

COMPUTER ENGINEERING ELECTIVES

ECSE-4670	Computer Comm. Networks	ECSE-4750	Computer Graphics
ECSE-4770	Computer Hardware Design	ECSE-4790	Microprocessor Systems
CSCI-4380	Database Systems	CSCI-4440	Software Design & Doc

SCIENCE ELECTIVE
BIOL-1010/1015 Introduction to Biology +Lab
BIOL-2120 Intro to Cell and Molecular Biology
CHEM-1100 Chemistry I

Industrial and Management Engineering

The most distinctive aspect of IME is the flexibility it offers. Whether it's shortening a rollercoaster waiting line, streamlining an operating room procedure, distributing products worldwide, or manufacturing superior automobiles, all these challenges share the common goal of saving money and increasing efficiencies which is a core focus of this discipline. Industrial engineering encompasses service industries as well as manufacturing, with IMEs employed in entertainment industries, shipping and logistics businesses, and health care organizations. The integration of people, materials, capital, equipment, and energy into productive systems is the IME's main concern. An IME may be involved in scheduling crews and flights at an airline, planning production at a manufacturing plant, designing automation solutions in a distribution warehouse or building information systems to support organizational decision making.

As companies adopt management philosophies of continuous productivity and quality improvement to survive in the increasingly competitive world market, the need for IME's is growing. IME's are the only engineering professionals trained specifically to be productivity and quality improvement specialists. Many practitioners say that an IME education offers the best of both worlds: a combination of engineering and business education. This is why many industrial engineers end up being promoted into senior management positions.

IMEs make processes better through:

- More efficient and more profitable business practices
- Better customer service and product quality
- Making work safer, faster, easier, and more rewarding
- Helping companies produce more products quickly
- Making the world safer through better designed products and processes
- Reducing costs associated with new technologies

The U.S. Bureau of Labor Statistics [BLS] has described a typical IME's function as follows:

> *Industrial engineers determine the most effective ways for an organization to use the basic factors of production-people, machines, materials, information, and energy-to make or process a product. They are the bridge between management and operations. They are more concerned with increasing productivity through the management of people, methods of business organization, and technology than are engineers in other specialties, who generally work more with products or processes.*

Contact List for IME

Department Head:	Al Wallace (wallaw@rpi.edu)	CII 5117
Administrative Staff:	Jamie Auger (augerj@rpi.edu)	CII 5015

Industrial & Management Engineering Curriculum Checklist

Fall Semester					Spring Semester			
		FIRST			**YEAR**			
CHEM-1100	Chemistry I	4			CSCI-1100	Computer Science 1	4	
ENGR-1100	Intro to Eng Analysis	4			ENGR-1200	Engineering Graphics & CAD [1]	1	
ENGR-1300	Engineering Processes [1]	1			MATH-1020	Calculus II	4	
MATH-1010	Calculus I	4			PHYS-1100	Physics I	4	
IHSS-####	Hum. or Soc. Sci. Elective	4				Hum. or Soc. Sci. Elective	4	
		SECOND			**YEAR**			
ENGR 2050	Intro to Engineering Design[8]	4			ENGR 2600	Modeling & Analysis of Uncertainty	3	
MATH 2400	Intro. to Differential Equations	4			ISYE-2210	Production & Operations Mgt. [2]	3	
PHYS 1200	Physics II	4			MATH-2010	Multivariable Calc & Mat Algebra	4	
	Hum., Arts or Soc. Sci. Elective	4				Science Elective [3]	4	
						Management Elective [4]	4	
	Summer Arch	**THIRD**			**YEAR**	**Fall or Spring**		
ISYE-4140	Statistical Analysis	4			ISYE-4290	Discrete Event Simulation	4	
ISYE-4600	Operations Research Methods	4				Technical Elective I [7]	3	
ENGR-4760	Engineering Economics	3				Technical Elective II [7]	3	
STSS-4100	Professional Development II [5]	2				Free Elective I	4	
	Hum., Arts or Soc. Sci. Elective	4				Hum., Arts or Soc. Sci. Elective	4	
		FOURTH			**YEAR**			
ISYE-4530	Information Systems [6]	4			ISYE-4270	Multidisciplinary Capstone Design[9]	3	
	Technical Elective III [7]	3			ISYE-4210	Design & Analysis of Supply Chains	3	
	Technical Elective IV[7]	3			ENGR-4010	Professional Development III [9]	1	
	Free Elective II	4				Technical Elective V [7]	3	
						Free Elective III	4	

1. *ENGR 1200 and ENGR 1300 may be taken in either order. ENGR 1300 may be replaced with ISYE 1100 Introduction to Industrial and Systems Engineering. ENGR 1200 may be replaced with ENGR 1400 Engineering Communications.*
2. *This course is only offered in the spring semester.*
3. *IME majors may select any 4-credit course with the designation ASTR, BCBP, BIOL, CHEM, ERTH, MATH, or PHYS to satisfy the science elective requirement.*
4. *IME majors must select one of the following restricted electives to satisfy the Management Elective:*
   ECON 1200 Introductory Economics
   MGMT 1100 Introduction to Management
   MGMT 2300 Fundamentals of Accounting for Decision Making
   MGMT 4510 Invention, Innovation, and Entrepreneurship
   MGMT 4520 Introduction to Technological Entrepreneurship
   PSYC 1200 General Psychology
5. *This course can be fulfilled by taking a 2-credit or 4-credit course from a list of courses approved to satisfy the PD II requirement. This list is published each semester at the start of the preregistration period.*
6. *This course is only offered in the fall semester.*
7. *IME majors must select five courses from the following list of technical electives. A minimum of three of these courses must have an ISYE prefix. Note that not all courses are offered every year*
   ENGR 1600 Materials Science for Engineers
   ENGR 2090 Engineering Dynamics
   ENGR 2250 Thermal and Fluids Engineering I
   ENGR 2300 Electronic Instrumentation
   ENGR 2350 Embedded Control
   ENGR 2530 Strength of Materials
   ENGR 2710 General Manufacturing Processes
   ENGR 4710 Manufacturing Processes & Systems Laboratory I
   ENGR 4720 Manufacturing Processes & Systems Laboratory II
   ISYE 4200 Design and Analysis of Work Systems
   ISYE 4220 Optimization Algorithms and Applications
   ISYE 4230 Quality Control
   ISYE 4240 Engineering Project Management
   ISYE 4250 Facilities Design & Industrial Logistics
   ISYE 4260 Human Performance Modeling and Support
   ISYE 4280 Decision Focused Systems Engineering
   ISYE 4300 Complex Systems Models for Industrial & Systems Engineering
   ISYE 4310 Ethics of Modeling for Indus. & Systems Eng
   ISYE 4320 Theory of Scheduling
   SYE 4330 Design of Experiments
   ISYE 4760 Mathematical Statistics
   ISYE 4810 Computational Intelligence
   Special undergraduate sections or regular graduate sections of 6000-level ISYE courses can also serve as technical electives except for ISYE 6600, ISYE 6610, and ISY 6620.
8. *IME majors may substitute ENGR-2050 with MANE 2220 Inventor's Studio 1*
   IME majors may substitute ENGR-4010 and ISYE-4270 with MANE-4220 Inventor's Studio 2

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Materials Science & Engineering

Materials Science and Engineering is an interdisciplinary branch of engineering that investigates the performance and properties of materials through manipulation of matter at the atomic and molecular length scales. This discipline has helped to define the technological sophistication of human history as discoveries of new materials enable new technologies that help to improve our day-to-day lives. This rich tradition of discovery continues to this day through our research in metals, semiconductors, ceramics, polymers, composites, biomaterials, materials for energy, and nanomaterials.

As a materials engineer you will help to discover and synthesize materials for applications across all industries. The materials that surround us and help us to live healthy lives, work safely, and travel are products of our ability to manipulate matter at the atomic scale.

At the core of our discipline we understand and leverage the interrelationship between material structure, processing, properties and performance. Understanding this relationship allows a materials engineer to design and synthesize new materials for new and improved applications.

Contact List for MSE

Department Head:	Pawel Keblinski (keblip@rpi.edu)	MRC 102
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	Edmund Palermo (palere@rpi.edu)	MRC 206
	R. Sundararaman (sundar@rpi.edu)	MRC 208B
	Daniel Gall (galld@rpi.edu)	MRC 204
Department Coordinator (for URP)	Lorinda Law (lawl@rpi.edu)	MRC 142
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Graduate Advising	Minoru Tomozawa (tomozm@rpi.edu)	MRC 109B

MATERIALS SCIENCE & ENGINEERING CURRICULUM CHECKLIST

Fall Semester					Spring Semester			
FIRST YEAR								
CHEM 1100	Chemistry I	4			ENGR 1600	Materials Science[1]	4	
ENGR 1100	Intro. to Engineering Analysis	4			MATH 1020	Calculus II	4	
MATH 1010	Calculus I	4			PHYS 1100	Physics I	4	
MTLE 1200	Intro to Materials Science[2]	1				Hum., Arts or Soc. Sci. Elective	4	
IHSS-####	Hum., Arts or Soc. Sci. Elective	4						
SECOND YEAR								
ENGR 1200	Engineering Graphics & CAD[3]	1			CSCI 1190	Beginning Programing for Engs	1	
MATH 2400	Intro. to Differential Equations	4			ENGR 2050	Intro to Engineering Design	4	
MTLE 2100	Structure of Engineering Materials[1]	4			ENGR 2250	Thermal and Fluids Eng. I	4	
PHYS 1200	Physics II	4			MTLE 4200	Electrical & Optical Prop of Mtls	4	
	Hum., Arts or Soc. Sci. Elective	4				Science Elective	4	
	Arch Semester*	**THIRD YEAR**				**Spring**		
ENGR 2600	Modeling & Analysis of Uncertainty	3			MTLE 4100	Thermodynamics of Materials	4	
MTLE 2500	Materials Laboratory Skills	1			MTLE 4910	Materials Selection	3	
MTLE 4250	Mechanical Props of Materials	4			STSS-4100	Professional Development II[4]	2	
	Restricted Elective	4				Free Elective I	4	
	Hum., Arts or Soc. Sci. Elective	4				Hum., Arts or Soc. Sci. Elective	4	
FOURTH YEAR								
ENGR 4010	Professional Development III	1			MTLE 4400	Materials Synthesis & Processes	4	
MTLE 4150	Kinetics in Materials Sys.	4			MTLE 4920	Multidisciplinary Capstone Design[1]	3	
MTLE 4500	Computational Materials Design	3				Materials Elective II	3	
	Materials Elective I [1]	3				Free Elective III	4	
	Free Elective II [1]	4						

129 credits minimum

RESTRICTED ELECTIVES (4 Credits Each)

ECSE 2010 - Electric Circuits
ENGR 2090 - Engineering Dynamics
ENGR 2300 - Electronic Instrumentation
ENGR 2350 - Embedded Control
ENGR 2530 - Strength of Materials
BMED 2540 - Biomechanics[5]

MATERIALS ELECTIVES (3 Credits Each)

MTLE 4030 – Glass Science
MTLE 4050 – Introduction to Polymers
MTLE 4310 – Corrosion
MTLE 4430 – Fundamentals Alloy Systems
MTLE 4440 – Thin Films
MTLE 4460 – Materials for Energy
MTLE 4470 – Biology in Materials Science
MTLE 4520 – Materials Extreme Cond.
MTLE 4720 – Applied Mathematical Methods in Materials
MTLE 4960 – Topics in Materials Engineering

Note: The courses in the Materials Electives list may be substituted with any MTLE 4000- or 6000-level course. In order to take a 6000-level course, students may be required to obtain formal approval from the Office of Graduate Education, as specified in the course catalog. The free electives must total at least 12 credits.

1. This course can be taken in either semester.
2. May be replaced by ENGR 1300 or another engineering exploration course.
3. May be replaced by ENGR 1400.
4. This course may be fulfilled from a list published at the start of each semester.
5. This restricted elective option is available to dual MTLE/BMED majors only.

*Students who are officially exempt from the Arch will take these courses in the fall semester. ENGR 1300 will replace MTLE 2500. Students should speak with their advisor, as other substitutions may be needed.

Note this checklist is to be used as a guide to developing the registration plan for Materials Science & Engineering students. It is not a replacement for the Rensselaer Course Catalog.

Aeronautical/Aerospace Engineering

Today's aerospace engineers not only develop airplanes and rockets, they design high-speed trains, submarines, hydrofoils, wind turbines, and cars. Rensselaer graduates have helped to develop the engines that propel jumbo jets, the lunar lander for the Apollo spacecraft, and the Rover for the Mars Exploration Mission.

At Rensselaer you will begin with core engineering, basic science, computing, and the fundamentals of flight. These will prepare you for further studies of fixed-wing and rotary-wing aircraft, lightweight structures, propulsion, and space vehicle design. Our programs place emphasis on research, design, development, and operation of flight vehicles for aeronautical and space applications. In the senior year undergraduates may focus on fixed-wing aircraft, rotary-wing aircraft, or spacecraft design, though none of these choices precludes employment or graduate work in any other focus area. Our graduates choose careers in industry or government laboratories, doing research in anything from high-speed aerodynamics or high-temperature strength of jet engine blades, to the sale of aircraft and aircraft components. (And head coach of an NFL football team.)

Mechanical Engineering

Mechanical engineers design, develop, manufacture, sell, and maintain machinery. Air conditioning and heating systems, automobiles, jets, power plants, spacecraft, and oil drilling equipment all bear the imprint of the mechanical engineer.

As an undergraduate you'll follow the core engineering curriculum in your first two years, gaining a solid grounding in mathematics, physics, and chemistry, as well as taking introductory courses in computing and mechanical engineering. You can then opt for technical electives in aeronautics, applied mechanics/mechanics of materials, control systems, energy systems, manufacturing and design, or space technology. Many mechanical engineering graduates assume positions of management, while others prefer a career along technical lines.

Nuclear Engineering

Nuclear engineering focuses on methods, devices, and systems to get benefits from the peaceful use of nuclear energy and radiation. At Rensselaer, you'll begin with fundamentals in chemistry, physics, mathematics, core engineering, computing, and Nuclear Phenomena for Engineering Applications. These will prepare you for further studies in nuclear energy production, energy systems, health physics, and radiation technology.

Areas of research pursued at Rensselaer include reactor engineering, thermal-hydraulics, health and medical physics, dosimetry, radiation transport, neutron scattering, and x-ray production. Careers in nuclear engineering include electricity production, food safety, medical diagnostics and treatment, space and underwater propulsion applications, and non-destructive testing for industry.

A note about the MANE Office of Undergraduate Student Services:

In addition to your academic advisor, the MANE Office of Undergraduate Student Services can assist you with many advisement and registration-related tasks. Our office provides all necessary Registrar forms and can help you complete them. We provide assistance with Registration issues; help with curriculum and course selection. If, after using this booklet, you still have questions or concerns or just want to know more about how we can help you, stop by JEC 2012 to say hello.

Contact List for MANE

MANE Department Offices		
Department Head	Suvranu De	des@rpi.edu
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Undergraduate Student Resources		
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Aeronautical Engineering

Minimum credit hour requirements for the Bachelor's Degree in Aeronautical Engineering: 130

FIRST YEAR					
	FALL SEMESTER (17 CREDITS)	Credits		SPRING SEMESTER (17 CREDITS)	Credits
ENGR-1100	Introduction to Engineering Analysis [1]	4	CHEM-1100	Chemistry I [1]	4
ENGR-1200	Engineering Graphics and CAD [1,2]	1	MANE-1060	Fundamentals of Flight [4]	1
MATH-1010	Calculus I	4	MATH-1020	Calculus II	4
PHYS-1100	Physics I	4	PHYS-1200	Physics II	4
IHSS-####	HASS Core Elective [3]	4	HASS	HASS Core Elective [3]	4
SECOND YEAR					
	FALL SEMESTER (16 CREDITS)	Credits		SPRING SEMESTER (17 CREDITS)	Credits
ENGR-1200	Engineering Processes [6]	1	ENGR-2600	Modeling and Analysis of Uncertainty [1,6]	3
SoE-2###	Engineering Design Elective [1,5,6]	4	MANE-2110	Numerical Methods and Programming [1]	3
ENGR-2530	Strength of Materials [1]	4	MANE-2720	Fluid Mechanics [1]	3
MANE-2710	Thermodynamics [1]	3	MATH-2010	Multivariable Calculus and Matrix Algebra [1]	4
MATH-2400	Introduction to Differential Equations [1]	4	HASS	HASS Core Elective [3]	4
THIRD YEAR [9]					
	SUMMER ARCH SEMESTER (16 CREDITS)	Credits		FALL OR SPRING (16 CREDITS)	Credits
ENGR-2090	Engineering Dynamics	4	MANE-4500	Modeling & Control of Dynamic Systems [6]	3
MANE-4060	Aerospace Structures and Materials	4	MANE-4900	Aeroelasticity and Structural Vibrations	3
MANE-4070	Aerodynamics I	4	MANE-4910	Fluid Dynamics Laboratory [8]	2
HASS	HASS Core Elective [3]	4	MANE-4920	Aerospace Structures and Controls Lab [8]	2
			STSS-4100	Professional Development II [1,6,7]	2
				Free Elective [6,9]	4
FOURTH YEAR					
	FALL SEMESTER (16 CREDITS)	Credits		SPRING SEMESTER (15 CREDITS)	Credits
MANE-4080	Propulsion Systems [1]	3	ENGR-4010	Professional Development III [1,6]	1
MANE-4510	Control Systems Laboratory [1,8]	2	MANE-4….	Capstone Design Elective [9,12]	3
MANE-4….	Computation Elective [1,6,10]	3	MANE-4….	Aerospace Technical Elective [1, 13]	3
MANE-4….	Flight Mechanics Elective [9,11]	4	HASS	HASS Core Elective [3]	4
	Free Elective	4		Free Elective	4

[1] These required courses may be taken in any order in the academic year shown (or in a previous year) given the pre-requisites are met.

[2] Choice of ENGR-1200 Engineering Graphics & CAD, ENGR-1400 Engineering Communication, or CIVL-1200 Engineering Graphics for Civil Engineers; Engineering Graphics & CAD is preferred for Aerospace Engineers.

[3] The five HASS Electives may be taken in any semester; it is recommended to schedule one in each of the first two semesters and one in the Arch Summer. Students should take a HASS Inquiry course during their first year; for a listing of HASS Inquiry courses go to https://info.rpi.edu/hass-inquiry. Students should take a HASS Communications Intensive course during their first three semesters; refer to the link "Communications Intensive (CI) Requirement" on the Registrar's "Academic Planning" web page.

[4] Any 1 credit engineering exploration elective ("Introduction to [major]") may be substituted.

[5] Choice of ENGR-2050 Introduction to Engineering Design or MANE-2220 Inventor's Studio 1; both have ENGR-1010 Professional Development I embedded in them.

[6] These courses may be taken in the Arch Summer semester (if the summer schedule permits).

[7] For a list of courses that satisfy the PD II requirement refer to the link "Professional Development II Courses" on the Registrar's "Academic Planning" web page. It should be completed before the capstone design course.

[8] These three laboratory courses may be taken any semester in the junior or senior year, provided all prerequisites have been completed.

[9] Aeronautical Engineering students should start planning for their Flight Mechanics/Capstone Design track prior to the Arch summer.

- Space Flight track. Plan to take MANE 4100 Spaceflight Mechanics during junior year fall or spring semester (in place of the free elective). Plan to take MANE 4250 Space Vehicle Design senior year fall semester, though a limited number of seats will be available in the spring semester of senior year. Spaceflight Mechanics is not a prerequisite for Space Vehicle Design but it is strongly recommended.
- Fixed-Wing track. Plan to take MANE 4090 Flight Mechanics junior or senior year fall semester. Plan to take MANE 4230 Air Vehicle Design senior year spring semester. Flight Mechanics is a prerequisite for Air Vehicle Design, though in select cases this may be waived with the instructor's permission.
- Rotorcraft track. In the junior or senior year plan to take either MANE 4120 Helicopter Aerodynamics and Performance in fall of an even-year or MANE 4130 Multirotor Aerial Vehicles in fall of an odd year. (Interested students may choose to take both, applying the second to the Aerospace Technical Elective and/or Free Elective credits.) Plan to take MANE 4210 VTOL Aircraft Design senior year spring semester. One of either Helicopter Aerodynamics and Performance or Multirotor Aerial Vehicles must be taken as a prerequisite to VTOL Aircraft Design, though in select cases this may be waived with the instructor's permission.

[10] Choice of MANE-4140 Intro to Computational Fluid Dynamics (spring only), MANE-4240 Introduction to Finite Elements (fall, spring, and summer), or MANE-4280 Numerical Design Optimization (fall only).

[11] Choice of MANE 4090 Flight Mechanics, MANE 4100 Spaceflight Mechanics, MANE 4120 Helicopter Aerodynamics and Performance, or MANE 4130 Multirotor Aerial Vehicles.

[12] Choice of MANE 4210 VTOL Aircraft Design, MANE 4230 Air Vehicle Design, or MANE 4250 Space Vehicle Design.

[13] Aerospace Technical Elective

- The Aerospace Technical Elective is a MANE 4000-level or higher course or research related to Aerospace Engineering that is taken for 3 credits or more.
- Aerospace Technical Electives may not be taken on a Pass/No Credit basis.

Mechanical Engineering

Minimum credit hour requirements for the Bachelor's Degree in Mechanical Engineering: 129

FIRST YEAR					
	FALL SEMESTER (17 CREDITS)	Credits		SPRING SEMESTER (17 CREDITS)	Credits
CHEM-1100	Chemistry I	4	ENGR-1200	Engineering Processes [1]	1
ENGR-1100	Introduction to Engineering Analysis [1]	4	ENGR-1600	Materials Science	4
ENGR-1200	Engineering Graphics and CAD [1,2]	1	MATH-1020	Calculus II	4
MATH-1010	Calculus I	4	PHYS-1100	Physics I [1]	4
IHSS-####	HASS Core Elective [3]	4		HASS Core Elective [3]	4
SECOND YEAR					
	FALL SEMESTER (17 CREDITS)	Credits		SPRING SEMESTER (15 CREDITS)	Credits
ENGR-2530	Strength of Materials [1]	4	MANE-2110	Numerical Methods & Programming [1]	3
MANE-2710	Thermodynamics [1]	3	SoE-2###	Engineering Design Elective [1,5,6]	4
MATH-2400	Introduction to Differential Equations [1]	4	ENGR-2300	Electronic Instrumentation [1]	4
PHYS-1200	Physics II	4	MATH-2010	Multivariable Calc. & Matrix Algebra [1,6]	4
STSS-4100	Professional Development II [1,4]	2			
THIRD YEAR					
	ARCH SUMMER SEMESTER (15 CREDITS)	Credits		FALL OR SPRING (17 CREDITS)	Credits
ENGR-2090	Engineering Dynamics	4	ENGR-2600	Modeling & Analysis of Uncertainty [6]	3
MANE-2720	Fluid Mechanics	3	MANE-4040	Mechanical Systems Laboratory [7]	2
MANE-4030	Elements of Mechanical Design	4	MANE-4500	Modeling & Control of Dynamic Sys. [6]	3
	HASS Core Elective [3]	4	MANE-4730	Heat Transfer	3
			MANE-4740	Thermal & Fluids Eng. Laboratory [7]	2
				Free Elective [6]	4
FOURTH YEAR					
	FALL SEMESTER (16 CREDITS)	Credits		SPRING SEMESTER (15 CREDITS)	Credits
ENGR-4010	Professional Development III [1]	1	SoE/S-4###	Technical Elective II [1,9]	3
MANE-4260	Multidisciplinary Capstone Design [1,8]	3		HASS Core Elective [3]	4
MANE-4510	Control Systems Laboratory [1,7]	2		Free Elective	4
MANE-4….	Computation Elective [1,6,9]	3		Free Elective	4
MANE-4….	Technical Elective I [1,9]	3			
	HASS Core Elective [3]	4			

[1] These required courses may be taken in any order in the academic year shown (or in a previous year) given the pre-requisites are met.

[2] Choice of ENGR-1200 Engineering Graphics & CAD, ENGR-1400 Engineering Communication, or CIVL-1200 Engineering Graphics for Civil Engineers; ENGR-1200 Engineering Graphics & CAD is preferred for Mechanical Engineers.

[3] The five HASS Electives may be taken in any semester; it is recommended to schedule one in each of the first two semesters and one in the Arch Summer. Students should take a HASS Inquiry course during their first year; for a listing of HASS Inquiry courses go to https://info.rpi.edu/hass-inquiry. Students should take a HASS Communications Intensive course during their first three semesters; refer to the link "Communications Intensive (CI) Requirement" on the Registrar's "Academic Planning" web page.

[4] For a list of courses that satisfy the PD II requirement refer to the link "Professional Development II Courses" on the Registrar's "Academic Planning" web page. It should be completed before the capstone design course.

[5] Choose from ENGR-2050 Introduction to Engineering Design and MANE-2220 Inventor's Studio 1; both have ENGR-1010 Professional Development I embedded in them.

[6] These courses may be taken in the Arch Summer semester (if the summer schedule permits).

[7] These laboratory courses may be taken any semester in the junior or senior year, provided all prerequisites have been completed.

[8] Mechanical Engineering students may alternatively take MANE-4220 Inventor's Studio 2, MANE-4210 VTOL Aircraft Design, MANE-4230 Air Vehicle Design, or MANE-4850 Space Vehicle Design as alternative capstone design experiences, provided all prerequisites have been completed or given permission by the instructor.

[9] Computation and Technical Electives

- The Computation Elective must be chosen from the following list of courses: MANE-4240 Introduction to Finite Elements (fall, spring, and summer), MANE- 4140 Introduction to Computational Fluid Dynamics (spring only), MANE-4280 Design Optimization (fall only), or MTLE-4500 Computational Methods for Materials Design (spring only).
- The first Technical Elective must be selected from any upper-level (4000 or above) MANE course.
- The second Technical Elective may be selected from any upper-level (4000 or above) course in the School of Engineering or the School of Science. An independent study course, such as a design project or an undergraduate research project in the School of Engineering or the School of Science may also be used to satisfy this requirement.

Computational and Technical Electives may not be taken on a Pass/No Credit basis.

Nuclear Engineering

Minimum credit hour requirements for the Bachelor's Degree in Nuclear Engineering: 130

FIRST YEAR					
	FALL SEMESTER (17 CREDITS)	Credits		SPRING SEMESTER (17 CREDITS)	Credit
ENGR-1100	Introduction to Engineering Analysis [1]	4	CHEM-1100	Chemistry I [1]	4
ENGR-1200	Engineering Graphics & CAD [1,2]	1	MANE-1100	Introduction to Nuclear Engineering [4]	1
MATH-1010	Calculus I	4	MATH-1020	Calculus II	4
PHYS-1100	Physics I	4	PHYS-1200	Physics II	4
IHSS-####	HASS Core Elective [3]	4		HASS Core Elective [3]	4
SECOND YEAR					
	FALL SEMESTER (17 CREDITS)	Credits		SPRING SEMESTER (17 CREDITS)	Credit
MANE-2710	Thermodynamics [1]	3	MANE-2110	Numerical Methods & Programming [1]	3
MANE-2830	Nuclear Phenom. for Eng. Applications	4	MANE-2720	Fluid Mechanics [1,5]	3
MATH-2010	Multivariable Calc. & Matrix Algebra [1,5]	4	MANE-2400	Fundamentals of Nuclear Engineering	4
MATH-2400	Introduction to Differential Equations [1]	4	MANE-4350	Nuclear Instrumentation & Measurement	3
STSS-4100	Professional Development II [1,5,6]	2	SoE ####	Materials Science Elective [1,5,7]	4
THIRD YEAR					
	ARCH SUMMER SEMESTER [9] (14 CREDITS)	Credits		FALL ONLY (16 CREDITS)	Credit
SoE-2###	Engineering Design Elective [8]	4	ENGR-4010	Professional Development III [5,9]	1
ENGR-2600	Modeling & Analysis of Uncertainty	3	MANE-4400	Nuclear Power Systems Engineering	4
MANE-4500	Modeling & Control of Dynamic Sys.	3	MANE-4470	Radiological Engineering	3
	HASS Core Elective [3]	4	MANE-4480	Physics of Nuclear Reactors	4
				HASS Core Elective [3]	4
FOURTH YEAR					
	FALL SEMESTER (16 CREDITS)	Credits		SPRING SEMESTER (16 CREDITS)	Credit
MANE-4380	NE Senior Design Project I	1	MANE-4390	NE Senior Design Project II	2
MANE-4370	Nuclear Engineering Laboratory	4	MANE-4###	Nuclear Engineering Laboratory II [10]	3
MANE-4###	NE Technical Elective I [1,11]	3	MANE-4###	NE Technical Elective II [1,11]	3
	HASS Core Elective [3]	4		Free Elective [1]	4
	Free Elective [1]	4		Free Elective [1]	4

[1] These required courses may be taken in any order in the academic year shown (or in a previous year) given the pre-requisites are met.

[2] Choice of ENGR-1200 Engineering Graphics & CAD, ENGR-1400 Engineering Communication, or CIVL-1200 Engineering Graphics for Civil Engineers.

[3] The five HASS Electives may be taken in any semester; it is recommended to schedule one in each of the first two semesters and one in the Arch Summer. Students should take a HASS Inquiry course during their first year; for a listing of HASS Inquiry courses go to https://info.rpi.edu/hass-inquiry. Students should take a HASS Communications Intensive course during their first three semesters; refer to the link "Communications Intensive (CI) Requirement" on the Registrar's "Academic Planning" web page.

[4] Any 1 credit engineering exploration elective (e.g., "Introduction to [major]" or ENGR-1200 Engineering Processes) may be substituted.

[5] These courses are options that may be taken in the Arch Summer semester (if the summer schedule permits).

[6] For a list of courses that satisfy the PD II requirement refer to the link "Professional Development II Courses" on the Registrar's "Academic Planning" web page. It should be completed before the capstone design course.

[7] Choose from MANE-4460 Engineering Materials for Nuclear Applications or ENGR-1600 Materials Science.

[8] Choose from MANE-2220 Inventor's Studio 1 or ENGR-2050 Introduction to Engineering Design; both have ENGR-1010 Professional Development I embedded in them.

[9] Students restricted from Arch (e.g., ROTC, certain athletes) will delay PD III until senior year, after the Professional Development I content in the Engineering Design Elective.

[10] Choose from MANE-4440 Critical Reactor Lab or MANE-4961 LINAC Lab

[11] NE Technical Electives

- NE Technical Electives are MANE 4000-level or higher courses related to Nuclear Engineering that are taken for 3 credits or more.
- The NE Technical Electives allow you to focus on your technical interest or area of specialization within the Nuclear Engineering field.
- If you have questions regarding whether a specific course satisfies your NE Technical Elective requirements, please consult with your academic advisor.
- An independent study course, such as a design project or an undergraduate research project with a Nuclear Engineering instructor, may be used to satisfy one of the NE Technical Electives.
- NE Technical Electives may not be taken on a Pass/No Credit basis.

Foundational Mathematics, Science, and Core Engineering Courses

All engineering majors require math and science courses and in some cases those courses act as pre-requisites for other courses within the major. Those courses vary from one major to the next with the exceptions of Calculus I and II, Introduction to Differential Equations, and Physics I and II which all majors require. All Engineering majors require Introduction to Engineering Analysis.

Below is a breakdown (by major) of the required math, science, and core engineering courses.

					CEE			ECSE			MANE				
Credits	Dept	#	Name	BME	CivE	EnvE	ChBE	EE	CSE	IME	Aero	Mech	Nucl	MatE
3	BIOL	1010	Introduction to Biology			√ o_{11}	o_{12}	o_{13}	o_{13}					
4	BIOL	2120	Introduction to Cell and Molecular Biology	√			√ o_{12}	o_{13}	o_{13}					
4	CHEM	1100	Chemistry I	√	√	√	√a	o_{13}	o_{13}	√	√	√	√	√
4	CHEM	1200	Chemistry II			√								
3	CHEM	2250	Organic Chemistry I			√	√							
3	CHEM	2260	Organic Chemistry II				√							
4	CSCI	1010	Introduction to Computer Programming			o_{10}								
4	CSCI	1100	Computer Science I		o_9	o_{10}		√	√	√				
1	CSCI	1190	Beginning Programming for Engineers	√	o_9	o_{10}								√
4	CSCI	1200	Data Structures						√					
4	ENGR	1100	Introduction to Engineering Analysis	√	√	√	√	o_1	o_1	√	√	√	√	√
1	ENGR	1200	EG&CAD or 1 ENGR-1400 Engineering Communication	√2	o_2	o_2	√4	√	√	√2	√2	√2	√	√2
1	ENGR	1300	Engineering Processes	√	o_3	o_3				√ o_3	√	√	o_3	o_3
4	ENGR	1600	Materials Science	o_5		o_4				o_4		√	o_8	√
4	ENGR	2050	Introduction to Engineering Design (with Professional Development I)	√	√	√		√	√	√	o_7	o_7	o_7	√
4	ENGR	2090	Engineering Dynamics		√					o_4	√	√		o_4
4	ENGR	2250	Thermal and Fluids Engineering I	o_5	√	√ o_6				o_4				√
4	ENGR	2300	Electronic Instrumentation							o_4		√		o_4
4	ENGR	2350	Embedded Control	o_5				√	√	o_4				o_4
4	ENGR	2530	Strength of Materials		√	o_4				o_4	√	√		o_4
3	ENGR	2600	Modeling and Analysis of Uncertainty	√	√	√	√			√	√	√	√	√
4	ENGR	2710	General Manufacturing Processes							o_4				
1	ENGR	4010	Professional Development III	√	√	√	√	√	√	√	√	√	√	√
4	ENGR	4760	Engineering Economics		√	o_4				√				
4	MATH	1010	Calculus I	√	√	√	√	√	√	√	√	√	√	√
4	MATH	1020	Calculus II	√	√	√	√	√	√	√	√	√	√	√
4	MATH	2010	Multivariate Calculus and Matrix Algebra	√				√	√	√	√	√	√	
4	MATH	2400	Introduction to Differential Equations	√	√	√	√	√	√	√	√	√	√	√
4	PHYS	1100	Physics I	√	√	√	√	√	√	√	√	√	√	√
4	PHYS	1200	Physics II	√	√	√	√	√	√	√	√	√	√	√
4			Math / Science Elective (ASTR, BCBP, BIOL, CHEM, ERTH, MATH, MATP, PHYS)		4(1000)			4(1000)		4(1000)				4(1000)
4			Basic Science Elective (ASTR, BIOL, ERTH)		4(1000)									
4			Earth Science Elective (ERTH)			4(2000)								

Legend

- √ - named required course for major
- √ o_i - preferred choice, but see note "i" for additional options
- √2 - ENGR-1200 Engineering Graphics & CAD is preferred
- √4 - ENGR-1400 Engineering Communication is preferred
- √a - Chemistry I is with Advanced Lab

o_j : (j=1, 13) optional/elective course(s) with rules specific to indicated program. Please see specific rule defined below for details.

o_1 : ENGR-1100 may replace ECSE-1010 Introduction to ECSE

o_2 : CIVL-1200 EG for CivE may be replaced by ENGR-1200 EG&CAD

o_3 : Introduction to _____ Engineering may be replaced with ENGR-1300 Engineering Processes

o_4 : may be selected as Technical Elective, Restricted Elective, or Multidisciplinary Engineering Elective (among other options)

o_5 : required in certain BME concentration options

o_6 : ENGR-2250 may be replaced by CHME-4010 Transport Phenomena I

o_7 : ENGR-2050 or MANE-2220 Inventor's Studio 1

o_8 : ENGR-1600 or MANE-4460 Engineering Materials for Nuclear Applications

o_9 : CSCI-1190 may be replaced by CSCI-1100 Computer Science I

o_{10} : CSCI-1190 may be replaced by CSCI-1100 Computer Science I or CSCI-1010 Introduction to Computer Programming

o_{11} : BIOL 1010 or other Biology course chosen in consultation with advisor.

o_{12} : BIOL-2120 is recommended for those who have had biology in High School and have had Chemistry I; may be replaced with BIOL-1010

o_{13} : choose BIOL-1010, BIOL-2120, or CHEM-1100 as Science Elective

(#) - credits required (minimum level)

HASS and PD II – Policies for Engineering Students

As part of their B.S. degree program, all Rensselaer undergraduates take a selection of HASS courses referred to as the HASS Core.

The HASS Core consists of:

- 24 credits distributed to afford students a breadth of perspective across the various disciplines (See footnotes 1 below).
    - A maximum of 12 credits at the 1000-level can be counted toward the HASS core.
    - A maximum of 8 AP or transfer credits can be counted toward the HASS core. (See footnotes 3 and 5 below)
    - A maximum of 8 credits can be designated as P/NC.
- An approved 12-credit area of focus known as an Integrative Pathway, which is designed to add depth and coherence to the HASS Core, enhance students' majors, and optimize students' degree curriculum. Students can choose from a list of either disciplinary or interdisciplinary Pathways.
    - Courses counting toward the Pathway may not be designated as P/NC.
- One four-credit 4000-level course (See footnote 4 below)
- One HASS Communication Intensive course
    - Students should take their HASS Communication Intensive course during their first three semesters.
    - P/NC designation may not be used to satisfy this requirement.
- One HASS Inquiry course
    - Students should take an Inquiry course during their first year. These courses cultivate a deep appreciation of the ethical and moral imperatives that are the foundation of integrative knowledge that spans the humanities, arts, and social sciences. Students learn the habits of mind that illuminate contemporary global issues from a diversity of perspectives using an interdisciplinary, integrative, and collaborative approach. For a listing of HASS Inquiry courses go to: *https://info.rpi.edu/hass-inquiry*
- Breadth
    - Students should take at least one course from the humanities and one course from the social sciences.
    - Completion of a HASS Inquiry course (typically an IHSS course), in addition to the previously stated HASS Core requirements, satisfies the requirement.

Footnotes:

1. *Engineering majors must complete 20 credits of HASS courses in addition to the credits earned associated with the three-course sequence of professional development (PD) courses entitled PD1 (either ENGR 1010 or as part of ENGR 2050), PD2, and PD3 (ENGR 4010).*
2. *Transfer credit limit may be waived for transfer students if courses were taken at the previous institution, however, the limit for AP credits still applies.*
3. *Students who transfer into Rensselaer can satisfy this through a three- or four-credit course at their prior institution or a four-credit course at Rensselaer.*
4. *Students enrolled at Rensselaer who wish to take a HASS course for credit at another accredited institution must obtain prior approval for the course from the HASS Associate Dean for Academic Affairs. Applicants must furnish a catalog description of the proposed course and syllabus, and a completed copy of Rensselaer's Transfer Credit Approval Form to the HASS Student Services Hub on the 4th floor of the Sage building.*

Humanities	Code	Social Sciences	Code
Arts	ARTS	Cognitive Science	COGS
Communication	COMM	Economics	ECON
Games and Simulation Arts & Sciences	GSAS	Games and Simulation Arts & Sciences	GSAS

Human-Centered Design	HCDE	Human-Centered Design	HCDE
Interdisciplinary Studies	IHSS	Interdisciplinary Studies	IHSS
Languages	LANG	Psychology	PSYC
Literature	LITR	Science and Technology Studies, Social Science	STSS
Philosophy	PHIL		
Science and Technology Studies, Humanities	STSH		
Writing	WRIT		

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

STSS -4100 PD2 Tech Issues and Solutions, will satisfy the PD II requirement.

A 4-credit PD II alternate course at any level (2000-4000) can be substituted for the 2-credit STSS -4100 PD2 Tech Issues and Solutions course. A list of these PD II alternate courses is available on the registrar website.

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 HASS. These credits:

- cannot count toward the 4000 requirement,
- cannot count toward the depth requirement,

However,

- they can count toward the overall 20 credits of HASS,
- they can count toward the H and SS credit minimums,
- they can count toward the HASS "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 of STSS -4100 PD2 Tech Issues and Solutions, they may furnish a syllabus 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: **Brett Fajen** (fajenb@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: There are some nominal 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 ≈ 3 hours/week ⇒ ~ 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-1200 Engineering Graphics for Civil Engineers
  - ENGR-1300 Engineering Processes (if not required for your major)
  - ENGR-1700 Intro to Better World Engineering
  - ISYE-1100 Introduction to Industrial and Systems Engineering
  - MANE-1100 Introduction to Nuclear Engineering
  - MANE-1090 Introduction to Mechanics 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-2360 Roots of Africa Music Ensemble
- ROTC courses (USAF, USAR, USNA, up to six credits maximum)
- most one-credit topics courses (see http://srfs.rpi.edu/update.do?artcenterkey=305)

HASS Checklist for Engineers

What departments are in the School of Humanities, Arts, and Social Sciences (HASS)?

ARTS: Arts and Music	LITR: Literature
COGS: Cognitive Science	PHIL: Philosophy
COMM: Communication & Media	PSYC: Psychology
ECON: Economics	STSH: Science, Technology, and Society – Social Science - Humanities
GSAS: Gaming and Simulation Arts and Sciences	STSS: Science, Technology, and Society – Social Science
IHSS: Interdisciplinary HASS	WRIT: Writing
LANG: Language	

What are my requirements?

Check off each completed requirement. If all boxes are checked and you haven't violated the restrictions below, you are done!	
	HASS Inquiry Course: Have you taken a course with an IHSS prefix? *Must be taken in your first academic year.*
	Communication Intensive Course: Have you taken a course with the "communication intensive" designation (found in SIS class search on the right side of the screen)? Note: This course can be one you took for your integrative pathway or your inquiry course. *Should be taken within your first 3 semesters, no P/NC allowed.*
	Integrative Pathway: Pick one pathway from this link (https://info.rpi.edu/hass-pathways/pathways-topics/#Choosefromover40topics) and write it here: Keep track of your pathway courses in the boxes below, check each off as it's completed. This requirement is done when you finish all three courses. *No P/NC allowed at any point in your integrative pathway.* ☐ ☐ ☐
	4000-Level Requirement: Have you taken a course at the 4000 level? Note: This course can be one you took for your integrative pathway.
	Credit Requirement: Have you taken 20 total HASS credits?

What are the restrictions?

1) No more than 3 classes can be taken at the 1000 level.
2) No more than 8 credits can be transferred into the HASS core.
3) No more than 2 courses can be designated as P/NC.

Responsibilities

"We are at the very beginning of time for the human race. It is not unreasonable that we grapple with problems. But there are tens of thousands of years in the future. Our responsibility is to do what we can, learn what we can, improve the solutions, and pass them on." **Richard Feynman (1918 - 1988)**

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 Degree Works worksheet.
- 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

- 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.

The HUB

http://eng.rpi.edu/students/hub

The School of Engineering Advising Hub is the primary source of academic advising for all engineering students during their first two semesters at RPI. Beginning with the third semester students will be assigned a faculty advisor within their major. The Hub is located in the Ansell lounge on the third floor of the Jonsson Engineering Center (JEC) and is staffed by experienced advisors who will offer academic assistance for all engineering majors. Hub advisors assist students in establishing a foundation for academic success through student responsibility and planning. The Hub is a resource for all advising purposes including:

- Semester course planning
- Clear Student Advising Meeting (SAM) holds
- Major/minor declaration or changes
- Form approvals
- Registrar Protocol
- Arch planning
- HASS and other course requirements

Beginning with their third semester students will transition to a faculty advisor specific to the student's major. The faculty advisor will then contribute to the student's academic success by offering valuable perspective on internships, research and job prospects in addition to graduation requirements.

The Advising Hub hours are Monday, Tuesday, Thursday, and Friday 9am-4pm, by appointment.

Walk-in Wednesdays offer 20 minute meetings with no appointment necessary.

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 **eight credit hours** in the humanities and **eight 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 and at least one of the courses must be taught in the School of Humanities, Arts, and Social Sciences. Courses used to fill the communication-intensive requirement may not be taken as Pass/No Credit.
• 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 **64 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 64 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.

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. From the School of Engineering's perspective, students considering a Double Degree may want to instead consider a Co-terminal where they obtain a B.S. in one major and an MS in the same major or another discipline. The ability to obtain a graduate level degree by taking 30 credits beyond the Bachelor's degree should be seriously considered rather than taking 30 additional credits and still ending up with a Bachelor's 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.
(1) 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.
(2) Each student will be assigned an adviser in each department who will monitor progress towards degrees in that department.
(3) The degree clearance officer in the department will certify that the student has met the degree requirements in that department.
(4) 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.
(5) Some departments such as BMED and CHEG strongly discourage dual majors due to scheduling issues preventing students from graduating in eight semesters.

Minors

Within the distributional requirements described, the student may elect any courses that meet his or her personal or professional needs. Courses can be chosen to form a minor-that is, a set of courses coherent based on subject, methodology, or other factors. Many departments offer one or more such minors; several of the minors are interdisciplinary. A student wishing to complete a minor should consult with the adviser for that minor before completing the second course in it (departmental secretaries have this information). Minors vary in their requirements from 15 to 21 credit hours. Courses for the minor may not be taken on a Pass/No Credit basis. No course which is required for a major can be used for a minor requirement. No course which is required for one minor can be used for another minor requirement.

Pass/No Credit

The purpose of the Pass/No Credit option is to allow you to take courses outside of your normal curriculum or minor program which you might otherwise not consider taking because of grade considerations. Please note that the Pass/No Credit option is not available to graduate students or nonmatriculated students.

Submission procedures and deadlines
If you wish to take a course with the Pass/No Credit designation, you must file an approved Pass/No Credit Form, with the Registrar's before deadline date specified in the academic calendar. Similarly, if you have elected to take a course on this basis, you must choose to drop the Pass/No Credit designation by filing a Remove Pass/No Credit Designation Form by the same deadline. Please refer to Rensselaer's academic calendar for specific dates by which you must add or remove Pass/No Credit designations.

Undergraduate students may elect to take courses on a Pass or No Credit basis, for which the grade is either "P" (Pass) or "NC" (Fail). In general:

•You may take no more than 12 credit hours of courses designated as Pass/No Credit courses, and no more than six credits of these may be Humanities and Social Sciences courses used to satisfy the requirements of the undergraduate courses in these fields. You cannot use a pass/no credit course in the HASS depth requirement.
•You may not use the Pass/No Credit designation for any courses, which you have previously failed, or for any courses which are specifically required by name or which are required to be chosen from a list of named courses in your curriculum or minor.
•You may not take any courses at the 6000 level on a Pass/No Credit basis.
•Communication Intensive courses cannot be taken as Pass/No Credit. (Effective for students who enter Fall 2010 or later)

Registration

When: Registration for the Spring semester generally occurs in early November. Registration for the Summer semester generally occurs in the preceding Spring, usually in mid March, and 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. Your registration time is assigned based on the number of credit hours you have earned as a student. 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. The table to the right shows the range of earned credit hours associated with each class.

School of Engineering	
Freshman	0 - 30
Sophomore	31 - 60
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.

Degree Works

Your Degree Works worksheet 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 Degree Works via the main menu of the Student Information System (SIS).

FAQs for registration

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

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. 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://info.rpi.edu/undergraduate-research

URP application: http://info.rpi.edu/undergraduate-research/undergraduate-research-program-academic-year/#Apply

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 or funding?

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, 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

Frequently Asked Questions

Who do I contact for information regarding RPI concerns?
General Links:
Advising and Learning Assistance Center: http://info.rpi.edu/advising-learning-assistance/
Bursar Office: http://finance.rpi.edu/update.do?catcenterkey=33
Career Development Center: http://www.rpi.edu/dept/cdc/
Co-Op / Internships: https://www.rpi.edu/dept/cdc/students/experience/coop/index.html
Course Catalog: http://www.rpi.edu/academics/catalog/
Financial Aid/Workstudy: http://www.rpi.edu/dept/admissions/aid/index.html
International Programs: http://info.rpi.edu/international-programs
Registrar Forms: http://registrar.rpi.edu/update.do?catcenterkey=29
Student Handbook: http://www.rpi.edu/dept/doso/resources/judicial/docs/2014-2016RPIHandbookofStudentRightsandResponsibilitiesAUGUST2014.pdf
Student Information System: https://sis.rpi.edu/

Where can I find information on jobs for engineering majors?
The US Department of Labor (http://www.bls.gov/oes/current/oes_nat.htm#17-0000) provides information on the various fields of engineering and statistics concerning salary and job outlooks.

By when does a student need to choose the major?
Students have two semesters in which to declare a major and still be able to graduate in four years.

How do I change my major?
It is important to meet not just with your current advisor but also with the advisor in your prospective department. He or she will help you determine what requirements you will need to meet and whether they involve additional courses or credit hours. The Undergraduate Change of Major/Change of Status form must be completed and signed by the Associate Dean in JEC 3018.

What help is there available to make an informed choice of major?
The Advising & Learning Assistance Center (ALAC) has set up a one credit Freshman seminar to help students make a decision about a major. As part of this seminar interest tests are given and reviewed with each student individually. Faculty and students from all of the schools are available during the seminar to meet with students.

What major should I take?
There are many factors involved in deciding a major but the most important one is what interests you. The Advising & Learning Assistance Center can help with this process. Meeting with the advisors in the departments that interest you is a good step as well as taking introductory courses to familiarize yourself with the various fields of study within the schools.

What classes should I take?
First year classes are generally specified by the curriculum of the school you are enrolled in.
For students enrolled in the School of Engineering this includes completing core courses as well as the required courses determined by the institute. Once you have declared a major your advisor will work with you on which courses to take. For those students who have not declared a major several departments offer one credit introductory courses that provide students with the basics of that particular field.

Can I substitute a different class for a required course?
Substitutions must be approved by the Degree Clearance Officer (DCO) within the department and written notification is sent to the Registrar's Office. You should meet with your advisor and/or the DCO to determine which substitutions are most commonly approved.

Can a program requirement be waived?
Waivers must be approved by the Degree Clearance Officer. Your advisor may recommend that a requirement be waived, but this may not be possible if accreditation issues are involved.

Can I repeat a course?
Yes, if you repeat the identical course as an undergraduate at Rensselaer, both grades will appear on your student record and transcript. However, keep in mind that:

- •The grade received in the repeated course is always the one used in computing your GPA.
  Note! If a student repeats a course that they previously passed, and fails the course, the failure takes precedence and the student has not completed the course requirements for graduation purposes.
- •The course credit will count only once.
- •Independent Study courses, courses taken on a P/NC basis, or courses taken at another institution cannot be used to replace the original course grade.
- •Repeating a course for which a "WI" grade was originally received will not replace that grade in determining the GPA.

The recalculation of GPAs to account for repeated courses occurs at the end of the semester after all grades for all students have been processed.

Under Rensselaer's Repeated Courses Policy, courses taken at another college are not eligible to replace the Rensselaer grade in calculating the QPA.

How do undergraduates get involved in research? Can they? Do they all?
The best way to get involved in a research project is to approach instructors in classes you have or are taking. Visit their web sites and see what research they are working on to see if it interests you. Even if you cannot find a project that interests you in your major field, you will find that faculty in all the Institute's schools conduct research and may need undergraduate researchers to assist them.

How do I get an internship?
Internships and Cooperative Education (Co-Op) are both managed by the Career Development Center. An important first step is to officially register in the co-op program. You will then have access to JobLink, the CDC's on-line recruiting system, where you can link to employers who are looking for co-op students, and read about those whose requirements you meet.

When should a co-op be taken?
Many courses in the some majors are offered only once a year and some courses have to be taken in sequence. Therefore, students going to Co-op require a careful planning. Probably the best time for students to go to Co-op would be the third year, either fall or spring.

Can freshmen have cars on-campus?
Parking is hard to find, and freshmen are not allowed to purchase Rensselaer parking passes. If you do choose to bring your car, you must park it on the street, which may be difficult. For more information, see http://www.rpi.edu/dept/parking/.

Will I have time for extracurricular activities?
Absolutely. Just do not overdo it by signing up for everything at once—academics come first. Extracurricular are a great place to meet people and relieve stress, so do not miss out.

Arch FAQs

When will I be expected to take The Arch?
Students in the Class of 2022 will be required to participate in the Arch program in summer 2020.

Does this mean it will take more than four years to graduate?
With the exception of students in the five-year bachelor of architecture program, matriculation to degree completion is not intended to take more than eight terms at Rensselaer. To accelerate your academic progress, and graduate in fewer than eight semesters, you may take classes elsewhere prior to enrollment at Rensselaer, obtain AP/IB credit from high school, take summer courses in subsequent summers, study abroad during the away semester, or some combination of these options.

Do I have to pay tuition during my "away" semester?
No. The semester away is an opportunity to pursue internships, co-ops, and collaborative research, as well as athletic, entrepreneurial, philanthropic, and community service activities.

What will I do on my semester "away" from Rensselaer?
You can take advantage of numerous co-curricular and experiential activities available off campus, including international travel, internships, co-ops, research opportunities, and engagement in community service projects.

Will I have help in finding a co-op or internship?
Students seeking a co-op or internship experience during their "away" semester will have the full resources of the Center for Career and Professional Development available to assist them in their search.

What if I want to study abroad?
Formal study abroad through our exchange programs would not be considered an away semester as students' pay Rensselaer tuition.

Students can, however, also pursue study abroad during their away semester through non-affiliated programs. In that case, students pay tuition to the host institution.