Rensselaer

School of Engineering

Industrial and Management Engineering

Class of 2022
Advising Handbook

http://www.ise.rpi.edu/

Contents

Introduction
This document provides information and guidance to students either interested in or enrolled in Rensselaer's Industrial and Management Engineering (IME) Bachelor's degree in the department of Industrial and Systems Engineering (ISE).* Guidance covers the four undergraduate years and the fifth year if students continue to a Master's degree under Rensselaer's Co-Terminal program.

Topics covered include an introduction to the profession of Industrial and Management Engineering, the engineering foundation semesters, the major semesters, and cooperative education options, international experiences, continuing to a Masters degree under the Co-Terminal program, academic advising, and course descriptions.

What is Industrial and Management Engineering (IME)?

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.*

*This document is for information only – Refer to the Rensselaer catalog (http://catalog.rpi.edu) for a complete description of the IME program.

Are you a candidate for IME?

IME's are curious about how and why systems work the way they do. They typically have an interest in planning, organizing, and implementing worthwhile projects. Additionally, they have a strong desire to serve human needs by finding practical solutions to problems and they enjoy working with other people. Numerous professional industrial engineers have underscored the notion that IME's often help coordinate the actions of various types of engineers and managers in order to make a project successful.

Objectives of Our Undergraduate Curriculum

The IME curriculum seeks to prepare IME's for successful careers in the 21st Century. The IME bachelor's degree program provides students with a strong technical skill base in operations engineering, computer information systems, data analysis, computational modeling, mathematical analysis of business and engineering systems and management principles. Additionally, IME students gain experience in the use of a variety of technologies, including computer-aided design tools, simulation modeling tools, and statistical and operations research analysis packages. The program educational objectives of the bachelor's program in IME are stated as follows:

Graduates of the undergraduate program in Industrial and Management Engineering will be prepared to:

- *Pursue professional positions in industry and/or graduate study programs in their areas of interest.*
- *Contribute to the body of knowledge in their professional discipline through problem-solving, discovery, leadership, and responsible application of technology.*
- *Continue to develop both professionally and personally through activities such as participation in professional societies, continuing education, and community service.*

Rensselaer's IME program has an outstanding national and international reputation and has won many regional and national awards for excellence from Alpha Pi Mu, the international academic honor society for industrial engineering.

Employment

IMEs are employed in a wide variety of industries as well as the public sector. IME's work for traditional manufacturing firms as well as service providers such as insurance companies, banks, hospitals, airlines, retail organizations, government agencies and as business consultants. In the past five years, our graduates have accepted positions in a wide variety of firms including Citicorp, Accenture, United Parcel Service, Sandia National Laboratories, Proctor & Gamble, IBM, United Technologies, General Electric, American Airlines, General Motors, Intel, and many others.

Rensselaer's Curriculum

An essential part of an IME's training is the development of modeling skills. A model is an abstraction of a real-world process such as package delivery, customer service or behavior of currency markets. Sound analysis of a model's output can help improve a company's performance.

Rensselaer's IME program requires a minimum of 131 credit hours of coursework building on the common foundation of Core Engineering courses taken by all Rensselaer engineering disciplines. While coursework is extensive, the program provides the opportunity, generally in the junior year, for a 9-month cooperative education experience working as an engineer at a local or national company and/or for study abroad opportunities.

ISE Department

Faculty members in the Department of Industrial and Systems Engineering department are active in research and scholarship in the areas shown in the table below.

	Agent based simulation/optimization	Automated storage/retrieval systems	Data analysis, data mining, time series, and knowledge acquisition	Emergency and disaster management	Energy efficiency optimization and control	Enterprise systems engineering	Error analysis in large scale systems	Homeland security/intelligence analysis decision optimization	Knowledge engineering, expert system	Modeling ethics	Optimization and scheduling in networks	Power markets	Robotics, Human-Robot Interaction	Service and replacement parts inventory optimization	Social networks, Service networks	Supply chain information sharing, uncertainty and optimization
Mark J. Embrechts Associate Professor embrem@rpi.edu			√						√							
Martha Grabowski Research Professor grabowsk@lemoyne.edu		√	√				√	√								
Cheng K Hsu Professor hsuc@rpi.edu					√				√						√	
Charles J. Malmborg Professor malmbc@rpi.edu		√									√					
Jennifer Pazour Assistant Professor pazouj@rpi.edu		√									√			√		√
Sergio Pequito Assistant Professor			√		√		√		√		√		√		√	
Thomas C Sharkey Assistant Professor sharkt@rpi.edu				√				√			√					
William A. Wallace Professor wallaw@rpi.edu	√			√				√		√					√	
John T. Wen Professor and Head wenj@rpi.edu					√								√			

Contact Information

Department Head:	John Wen (wenj@rpi.edu)	CII 5015
Administrative Staff:	Jamie Auger (augerj@rpi.edu)	CII 5015

Advising Model

Academic advising is a shared responsibility and service between the student and departmental faculty. Students seeking the undergraduate IME degree are assigned an academic advisor based on graduation year beginning with the fourth semester, entrance as a transfer admission, and entry into the co-terminal program. In addition, special advising for students in preparation and on return from study abroad is assigned in the department.

Graduation Year Advising All entering IME degree seeking freshman and students who change to the IME degree from other departments who share the same graduation year are assigned the same faculty advisor. This faculty member remains their advisor until graduation. This advisor is the primary source for academic and career counseling. The advisor is a recipient of all academic concern warnings issued through Rensselaer's Electronic Warning System, EWS. While action steps for addressing the concern remain with the student, outreach efforts are often the consequence of such notice to the advisor and others.

Meeting with your academic advisor is required at Rensselaer. Failure to meet regularly with the advisor will result in suspension of registration privileges. A meeting is required in the twelve-month period prior to the registration period. In addition to general advising, the advisor also is required to approve and sign many academic program forms such as pass / no credit election, minor forms, and co-op forms.

Transfer Admitted Students All students who enter the IME degree through a transfer admission are initially assigned to the Undergraduate Program Director for course consultation. The UPD then determines the appropriate class year for the transfer student and assigns the corresponding IME class advisor who will serve as that student's advisor until graduation. This advisor is the primary source for academic and career counseling.

Co-Terminal Advising The co-terminal program enables Rensselaer undergraduates with strong academic records to study for a Master's degree while completing their Bachelor's degree(s) in the same or a different department or school. The co-terminal advisor becomes the student advisor for the Master's degree portion of the program. The student maintains their relationship with their undergraduate advisor. First contact with the co-terminal advisor is required in the junior year as part of the application process to the program.

Study Abroad Advising A period of study abroad allows students to develop a broader perspective on their academic field of study while earning credit towards a Rensselaer degree. Because of the large number of options available to students, a special advisor has been designated in ISE to work with students planning the study abroad experience and to complete the paperwork for posting study abroad courses to the Rensselaer degree. This advisor works in a consultancy role only. The student retains their academic advisor.

Advising Responsibilities

The shared responsibility between the faculty academic advisor and the student involves the following parameters:

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 the 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 *they* are ultimately responsible for making any final decisions.

Advisor's Responsibilities

- To be accessible to students throughout the year at posted office hours. If an advisor will be away from campus for an extended period of time, he or she should post the names and office locations of alternate advisors outside their offices, so that students will have other advising resources.
- To set aside designated times for registration advising and individual discussions.
- To be knowledgeable about current curriculum requirements, academic policies and procedures, referrals and resources on campus.
- 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 three semesters at RPI. 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

The Advising Hub will offer academic support to students through the end of the fall semester of their sophomore year. At that time, 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.

.

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 IME department's perspective, students considering a Double Degree may want to instead consider a Co-terminal or regular Master's degree. 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 each 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. The ISE department encourages dual majors pairing IME with other undergraduate programs. Limited course substitutions may be allowed that vary with the second major selected. Students interested in a dual major pairing IME with another undergraduate major should contact the IME Program Director for guidance.

H&SS and PD II – Policies for Engineering Students

Engineering students at Rensselaer are required to successfully complete
– 20 credits of HASS (Humanities, Arts, and Social Sciences)
– 2 credits of PD II (Professional Development II)
as well as
– 1 credit of PD I (typically as part of ENGR-2050 Introduction to Engineering Design, or alternatively as ENGR-1010 Professional Development I if ENGR-2050 transferred in as less than a 4 credit course)
– 1 credit of ENGR-4010 PD III
for a total of 24 credits to fulfill the HASS Core requirement.

ENGINEERING STUDENTS SHALL DISTRIBUTE THE 20 CREDITS OF HASS AS FOLLOWS.

- A minimum of 8 credits of Humanities/Arts (see table below)
- A minimum of 8 credits of Social Science (see table below)
- At least 4 credits must be 4000+ level
- No more than 3 courses at the 1000 level (but note depth sequence and CI restriction below)
- No more than 4 credits can come from 1 credit courses (e.g. music ensemble)
- No more than 2 courses (8 credits total) can be from transfer courses (including AP/IB and study abroad classes)
- No more than 8 credits can be from Pass/No credit courses (note depth sequence and CI restriction below)

HUMANITIES:	SOCIAL SCIENCE:
ARTS (ARTS, MUSIC)	**COGS** (COGNITIVE SCIENCE)
COMM (COMMUNICATION & MEDIA)	**ECON** (ECONOMICS)
LANG (LANGUAGE)	**PSYC** (PSYCHOLOGY)
LITR (LITERATURE)	**STSS** (ANTHROPOLOGY)
PHIL (PHILOSOPHY)	**STSS** (SOCIOLOGY)
STSH (HISTORY)	**STSS** (SCIENCE & TECHNOLOGY)
STSH (SCIENCE & TECHNOLOGY)	
WRIT (WRITING)	
IHASS (INTERDISCIPLINARY HASS)	**IHASS** (INTERDISCIPLINARY HASS)

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

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

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

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

Through careful planning and course selection, students may fulfill more than one requirement with a single course. For example, a 4000 level CI course can cover both the CI requirement and the 4000 level requirement. Another example is a 4000 level course that can satisfy the depth requirement as long as it shares the same prefix as another course at a lower level. If that course is communications intensive it can also be used to satisfy the CI requirement, thus fulfilling three requirements with a single course. However, even though a single course may be used to fulfill more than one requirement, Engineering students MUST STILL have 20 credits of HASS overall.

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

STSS -496# (number to be assigned each semester) course specifically titled 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 course. A list of these PD II alternate courses is available from a link on the SIS home page, and here: http://registrar.rpi.edu/update.do?artcenterkey=325.

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

In general, the PD II alternate course will be split as follows:
  – two credits allocated to satisfy PD II
  – the remaining credits allocated to free elective (or "Not Applied" to the degree if free elective credits have been completed)

With restrictions, the credits of a PD II alternate that are not allocated to PD II may be used to fulfill the 20-credits of 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 8-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 -496# (number to be assigned each semester) course specifically titled 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:
Mike Kalsher (kalshm@rpi.edu, Sage 4302)
The Assistant Registrar is: **Kim Herkert** (herkek@rpi.edu, Academy Hall 2713)
The Associate Dean of Engineering is: **Kurt Anderson** (anderk5@rpi.edu, JEC 3018)

Need an Extra Credit?

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

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

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

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

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

A: Almost, but not quite – there are restrictions for "free" electives. To count as a free elective, one credit classes must be either
- from the School of Engineering, or
- graded classes (though you can take these on a Pass/No Credit basis),

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

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

Options for 1 credit free electives
- independent study (1 credit ≈ 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)

Checklist for HASS Core Requirements	Yes	No
Distribution Requirement		
Have you completed the Humanities distribution requirement? (Minimum of 8 credits in courses with a Humanities and/or IHSS departmental prefix) **NOTE:** PD2 or alternative PD2 cannot be used		
Have you completed the Social Sciences distribution requirement? (Minimum of 8 credits in courses with a Social Science and/or IHSS departmental prefix) **NOTE:** PD2 or alternative PD2 cannot be used		
Depth Requirement		
Have you completed two 4-credit HASS courses with the same departmental prefix, one of which is above the 1000 level? Example COMM 1510 and COMM 2210 **NOTE:** Pass/No credit is not allowed Can be two courses at the 2000 level.		
Communication Intensive (CI) Requirement		
Have you completed at least one HASS course designated as CI? Courses designated as CI are listed online at https://sis.rpi.edu/ **NOTE:** Transfer credit and Pass/No Credit are not typically allowed.		
4000 Level Requirement		
Have you completed at least one 4 credit HASS course at the 4000 level?		
Restrictions: Are you meeting….		
A maximum of three 1000 level courses may be applied to the HASS Core		
A maximum of eight transfer/AP/IB credits may be counted towards the HASS core		
A maximum of two courses may be taken Pass/No Credit		
Have you completed a total of 24 credits of HASS courses? **NOTE:** Engineering is 22 and Architecture is 20		
If you have answered all of the questions with "Yes", then you have met the HASS Core Requirements		

IME Baccalaureate Program Curriculum

The first two years of the IME curriculum provide a strong foundation in the basic sciences, engineering science, mathematics, and the humanities and social sciences. In years three and four, students concentrate on building expertise in statistics, operations research, manufacturing and services systems engineering, and industrial engineering methods and models.

Through the appropriate choice of electives, students can focus on areas of interest. Design projects include problems in manufacturing, services and public systems. It is advisable to develop a Plan of Study leading to the desired degree and concentration by the beginning of the third year. The department recommends that students declare their intent to major in industrial and management engineering as early as possible in their academic career.

The 131 credit hour IME curriculum requires completion of the course requirements shown in the typical four-year program presented below.

The Arch

The Arch program 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 2022 will be required to participate in the Arch program in summer 2020. 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, 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
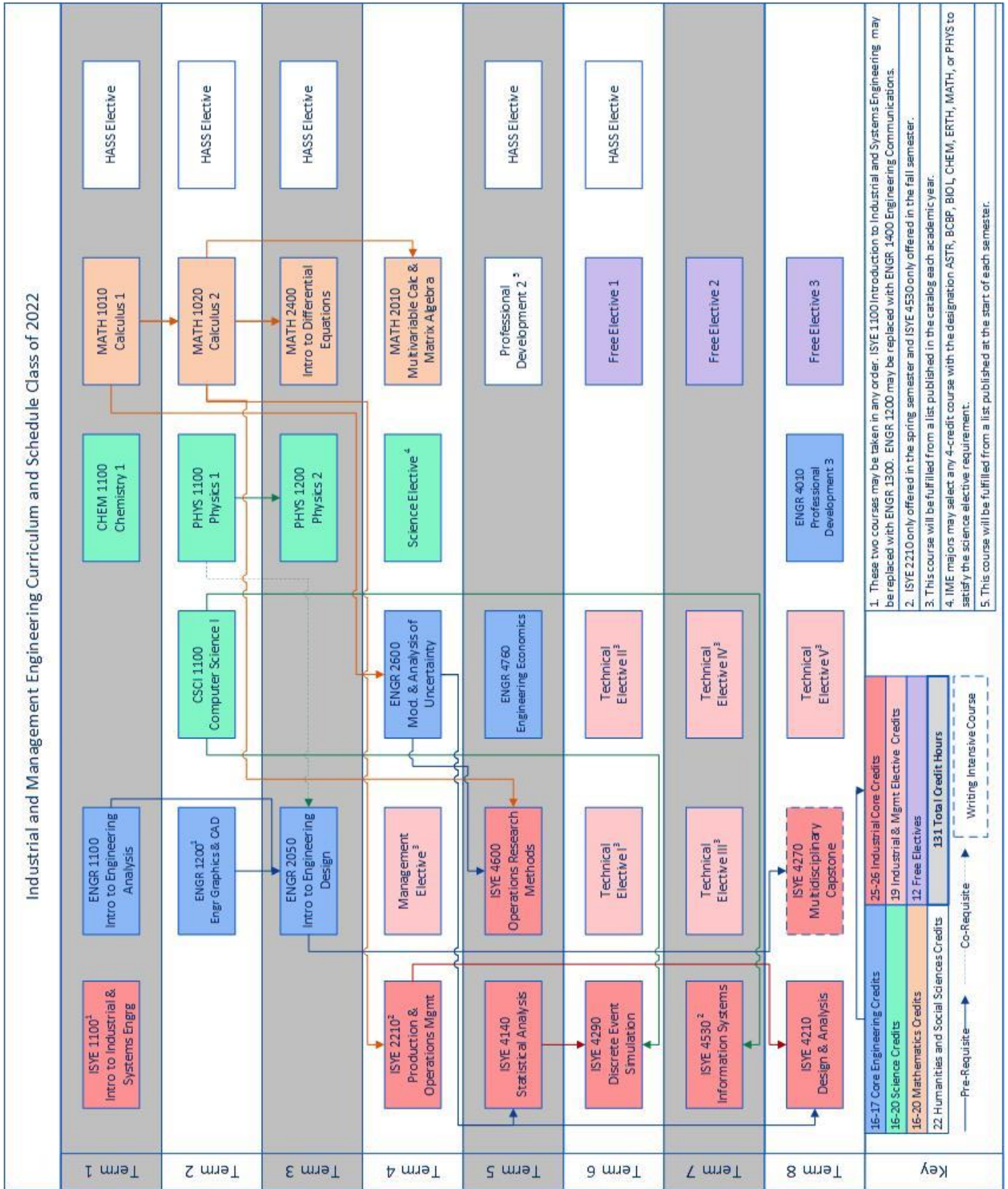
Industrial and Management Engineering Curriculum

Fall Semester				Spring Semester		
			FIRST YEAR			
CHEM-1100	Chemistry I	4		CSCI-1100	Computer Science I	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
	Hum. or Soc. Sci. Elective	4			Hum. or Soc. Sci. Elective	4
			SECOND YEAR			
ENGR 2050	Intro to Engineering Design	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
Arch			**THIRD YEAR**	**Fall or Spring**		
ENGR-4760	Engineering Economics	3		ISYE-4290	Discrete Event Simulation	4
ISYE-4140	Statistical Analysis	4			Technical Elective I [7]	3
ISYE-4600	Operations Research Methods	4			Technical Elective II [7]	3
	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		ENGR-4010	Professional Development III	1
	Technical Elective III [7]	3		ISYE-4210	Design & Analysis of Supply Chains	3
	Technical Elective IV [7]	3		ISYE-4270	Multidisciplinary Capstone Design	3
	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.

Industrial and Management Engineering Curriculum and Schedule Class of 2022

Term 1

- ISYE 1100[1] Intro to Industrial & Systems Engrg
- ENGR 1100 Intro to Engineering Analysis
- CHEM 1100 Chemistry 1
- MATH 1010 Calculus 1
- HASS Elective

Term 2

- ENGR 1200[1] Engr Graphics & CAD
- PHYS 1100 Physics 1
- CSCI 1100 Computer Science I
- MATH 1020 Calculus 2
- HASS Elective

Term 3

- ENGR 2050 Intro to Engineering Design
- PHYS 1200 Physics 2
- MATH 2400 Intro to Differential Equations
- HASS Elective

Term 4

- ISYE 2210[2] Production & Operations Mgmt
- Management Elective[3]
- ENGR 2600 Mod. & Analysis of Uncertainty
- MATH 2010 Multivariable Calc & Matrix Algebra

Term 5

- ISYE 4140 Statistical Analysis
- ISYE 4600 Operations Research Methods
- ENGR 4760 Engineering Economics
- Science Elective[4]
- Professional Development 2[5]
- HASS Elective

Term 6

- ISYE 4290 Discrete Event Simulation
- Technical Elective I[3]
- Technical Elective II[3]
- Free Elective 1
- HASS Elective

Term 7

- ISYE 4530[2] Information Systems
- Technical Elective III[3]
- Technical Elective IV[3]
- Free Elective 2

Term 8

- ISYE 4210 Design & Analysis
- ISYE 4270 Multidisciplinary Capstone
- Technical Elective V[3]
- ENGR 4010 Professional Development 3
- Free Elective 3

Key

- 16-17 Core Engineering Credits
- 16-20 Science Credits
- 16-20 Mathematics Credits
- 22 Humanities and Social Sciences Credits
- 25-26 Industrial Core Credits
- 19 Industrial & Mgmt Elective Credits
- 12 Free Electives
- **131 Total Credit Hours**

Pre-Requisite →
Co-Requisite →
Writing Intensive Course

1. These two courses may be taken in any order. ISYE 1100 Introduction to Industrial and Systems Engineering may be replaced with ENGR 1300. ENGR 1200 may be replaced with ENGR 1400 Engineering Communications.
2. ISYE 2210 only offered in the spring semester and ISYE 4530 only offered in the fall semester.
3. This course will be fulfilled from a list published in the catalog each academic year.
4. 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.
5. This course will be fulfilled from a list published at the start of each semester.

Selected ISYE Course Descriptions

Below are course descriptions for some of the courses in the undergraduate IME program. For a complete listing and description of all Rensselaer courses, see the online course catalogue http://catalog.rpi.edu/.

ISYE 1100 - Introduction to Industrial & Systems Engineering

An introduction to industrial and systems engineering (ISE). Major elements of the ISE disciplines are overviewed in the context of operations engineering problems. Topics include deterministic and stochastic applications of operations research methods, soft computing, applications of probability and statistics, engineering economics, discrete event simulation, and decision analysis. When Offered: Fall term annually. *1 credit hour*

ISYE 2210 Production and Operations Management

Overview of methods used in the design and operation of production and service systems and basic cost accounting. Topics include forecasting, capacity planning, line balancing, production scheduling, staff scheduling, inventory control, just in time, time study, project planning, and discrete item cost accounting. Goal of course is to educate students in basic operations management principles and models and in discrete goods cost accounting. Students cannot receive credit for this course and ENGR 2700.
Prerequisites: MATH 1020 or equivalent. Spring term annually. *3 credit hours*

ISYE 2940 - Readings in ISYE
1 to 4 credit hours

ISYE 296# - Topics in ISYE
4 credit hours

ISYE 4140 Statistical Analysis

Review of simple and multiple regression, selection procedures, regression diagnostics, residual analysis, stepwise regression, analysis of variance, design of experiments including factorial experiments, analysis of ordinal data and nonparametric inference, basic time series models. Extensive use of statistical software. Emphasis on statistical applications to industrial engineering. Prerequisites: ENGR 2600 or MATP 4600 and knowledge of calculus. Fall and Summer term annually. *4 credit hours*

ISYE 4200 Design and Analysis of Work Systems

Analysis and design of work and workplace. Topics covered include human-machine systems, ergonomics, work measurement systems, methods and standards, process design, direct time study, standard time data, predetermined time systems, work sampling, work load balancing, and workplace layout. Computer-based analysis of problems in work systems.
Prerequisite: ENGR 2600 or equivalent. *3 credit hours*

ISYE 4210 Design and Analysis of Supply Chains

An overview of the principles involved in the design and operation of supply chains with applications to manufacturing and service industries. Topics include dynamics of manufacturing systems and supply chains, lean manufacturing, lead time reduction in manufacturing and office operations, advanced pull systems, concurrent design of products and supply chains, rapid new product introduction, e-manufacturing and reverse supply chains, and integration of information technology in supply chain operations. The goal of the course is to enable students to synthesize models and tools and to understand how these could be applied to address emerging challenges in manufacturing and service systems and their supply chains.
Prerequisites: ISYE 2210 or ENGR 4700, and ENGR 2600 or equivalent. Spring term annually. *3 credit hours*

ISYE 4220 Optimization Algorithms and Applications
Design, analysis, and implementation of algorithms for combinatorial optimization problems. Introduction to theoretical analysis of algorithms and applications that can be formulated as combinatorial optimization problems. Specific topics include complexity analysis, network flow problems, traveling salesperson problems, matching problems, knapsack problems, and greedy algorithms. Implementation of combinatorial algorithms in a commercial software language. An introduction to this software language will be given at the beginning of the course.
Prerequisite: ISYE 4600 or equivalent. Fall term annually *3 credit hours*

ISYE 4230 Quality Control
The statistical approach to manufacturing quality control is emphasized. Consideration is given to the managerial implications and responsibilities in implementing the statistical approach. Topical coverage includes construction and interpretation of various control charts; special control charts (e.g., CUSUM, EWMA); graphical methods; specifications, tolerance limits, process capability indices; acceptance sampling; discussion of experimental design; and Taguchi methods of quality improvement.
Prerequisites: ISYE 4140 or ISYE 4760 (MATP). Spring term annually *3 credit hours*

ISYE 4240 Engineering Project Management
Planning, controlling, and evaluating engineering projects. Use of network analysis techniques, PERT/CPM, budget control, time/cost tradeoff, time estimation, resource allocation, and resource leveling. Extensions include probabilistic models, multiple resource models, project organization, risk analysis, technical forecasting, and network theory.
Students cannot obtain credit for both this course and ENGR 4750. *3 credit hours*

ISYE 4250 Facilities Design and Industrial Logistics
An in-depth study of the major design issues in location and physical configuration of production and service facilities. The course emphasizes the use of mathematical models, computer modeling, and quantitative analysis as aids to the design process. Topics include plant layout and location, material handling, material flow analysis, and distribution systems. Major course concepts are developed through case studies and projects.
Prerequisites: ISYE 2210 or equivalent, ISYE 4140 or equivalent, and an introductory operations research course. Spring term annually *3 credit hours*

ISYE 4260 Human Performance Modeling and Support
This course introduces methods, tools and technologies for describing human performance via various types of models, and supporting this performance via tools and advanced technologies. The course is hands-on, involving student projects that investigate human performance in challenging domains as well as direct engagement with technology.
Prerequisite: ENGR-2600. Fall term annually. **3 credit hours**.

ISYE 4270 Multidisciplinary Capstone Design
A capstone design experience that engages students from biomedical, computer systems, electrical, industrial, materials, and mechanical engineering on teams in an open-ended engineering design problem in preparation for professional practice. With the guidance of a multidisciplinary team of faculty members and instructional support staff, students apply knowledge and skills from prior coursework. This is a communication-intensive course.
Prerequisites: ENGR 2050, Senior Status. Cross-listed as ECSE-4900, MTLE 4920, and MANE 4260. Students cannot obtain credit for this course and ECSE-4900, MTLE 4920, MANE 4260. Spring and fall terms annually. **3 credit hours.**

ISYE 4280 Decision Focused Systems Engineering
The objective of this course is to introduce students to systems engineering, especially from a decision focused perspective. System concepts, methodologies, models and analysis are covered in relation to a system's design, development, test, evaluation, and operation. Decisions concerning a system's reliability, maintainability, usability, disposability, and affordability are systematically considered. A range of systems, including service systems, is also considered.
Pre- or co-requisite: ENGR 2600. *3 credit hours*

ISYE 4290 Discrete Event Simulation Modeling and Analysis
Introduction to discrete-event simulation modeling and analysis techniques including; graphical simulation modeling approaches, animation techniques, modeling large-scale and complex systems, pseudorandom number and random variate generation, stochastic processes, input modeling (data collection, analysis, and fitting distribution), output analysis (initial bias and termination bias, variance reduction techniques), sensitivity analysis, design of experiments, interactive simulation-based decision support systems.
Prerequisites: ISYE 4140 or equivalent and CSCI 1100 or CSCI-1010 or CSCI-1190. Spring term annually. *4 credit hours*

ISYE 4300 Complex Systems Modeling for Industrial and Systems Engineering
This course introduces simulation-based modeling methods for complex systems frequently met and used by industrial and systems engineers. Examples include production systems, queuing networks, communication systems, healthcare systems, supply chains, social networks, transportation systems, and financial markets. This course introduces techniques including discrete-event simulation and agent-based simulation for modeling and analyzing interdependent, interacting, and coupling variables, agents, components, and related subsystems.
Prerequisite: ISYE-4290. Spring term annually. **3 credit hours**

ISYE 4310 Ethics of Modeling for Industrial and Systems Engineering
This course introduces students to past, current, and future issues in the ethics of information technology, and encourages students to develop their own standpoint from which to address the diverse range of ethical challenges facing us in the information age. During the course, students will learn about a wide range of ethical theories, and then will apply these theories to address ethical dilemmas in creating models for decision support using an educational computer simulation.
Prerequisite ISYE-1100 or permission of instructor. Fall term annually. *3 credit hours*

ISYE 4320 - Theory of Production Scheduling
Problems of scheduling several tasks over time. Topics include measures of performance, single machine sequencing, flowshop scheduling, the job shop problem, and priority dispatching. Integer programming, dynamic programming, and heuristic approaches to various problems are also presented.
Prerequisites/Corequisites: Prerequisite: ISYE 4600. When Offered: Upon availability of instructor. Cross Listed: ISYE 6210. Students cannot get credit for both ISYE 4320 and ISYE 6210. **3 *credit hours***

ISYE 4330 - Design of Experiments
Methods of designing experiments so that statistical analysis of the resulting data will yield the maximum useful information. Testing of hypotheses; analysis of variance and covariance. Various designs, including the factorial and its modifications, incomplete blocks, Latin squares, and response surface designs are covered. Also discussed are optimality properties of design.
Prerequisites/Corequisites: ISYE 4140 or MATP 4600 and ISYE 4760 (MATP 4620) or permission of the instructor. Upon availability of instructor. Cross Listed: ISYE 6020. **3 credit hours**

ISYE 4530 Information Systems
This course surveys information-systems technology for the management of enterprise information as a resource. Topics include elements of system design life cycle, database concepts, and decision support. Managerial and technical dimensions of information systems are blended in a framework for IS systems. Additional topics include telecommunications, artificial intelligence (including expert systems), and structured design. The implementation, operation, and maintenance of information systems are also discussed. Projects are required.
Prerequisite: CSCI 1010 & CSCI 1100 . Fall term annually. *4 credit hours*

ISYE 4600 Operations Research Methods
An introduction to commonly used methods of deterministic and stochastic operations research. Topics include linear programming, simplex algorithms, duality, linear networks, integer programming, dynamic programming, goa1 programming, location models, exact and heuristic solution procedures for integer and sequencing problems, queuing theory, Markov chains, multicriteria decision making, and decision analysis. This is a communication-intensive course.
Prerequisites: ENGR 2600 and Math 1020. Fall and Summer term annually. *4 credit hours*

ISYE 4760 - Mathematical Statistics
A course in the theory of statistics which will provide students with a basic foundation for more specialized statistical methodology courses. Topics include sampling and sampling distributions; point estimation including method of moments, maximum likelihood estimation, uniform minimum variance estimation and properties of the associated estimators; confidence intervals; hypothesis testing including uniformly most powerful, likelihood ratio approaches, chi-square tests for goodness-of-fit and independence. The course will conclude with an introduction to linear statistical models.
Prerequisites/Corequisites: Prerequisite: MATP 4600 or equivalent calculus-based course. When offered: Upon availability of instructor. Cross Listed: Cross listed as MATP 4620. Students cannot obtain credit for both this course and MATP 4620. *4 credit hours*

ISYE 4810 - Computational Intelligence
With ever-increasing computer power readily available, new engineering methods based on "soft computing" are emerging at a rapid rate. This course provides students a working knowledge in computational intelligence covering the basics of fuzzy logic, neural networks, genetic algorithms, simulated annealing, wavelet analysis, fractal structures, and chaotic time series analysis. Applications in control, optimization, data mining, fractal image compression, and time series analysis are illustrated with engineering case studies. Fall term annually. *3 credit hours*

ISYE 4940 - Readings in ISYE
1 to 6 credit hours

ISYE 4960 - Topics in ISY
3 credit hours

Co-Op and Study Abroad Timing

The Co-Op and Study Abroad opportunities available at Rensselaer are excellent experiences for both professional and personal growth. Since both require significant time away from the Rensselaer campus, planning is required to minimize the impact on the graduation plans of the participant.

ISE has designed the undergraduate curriculum so that the sixth semester, the second semester of the junior year, is the best time for either program. While the typical plan of study presented above shows the student taking two technical electives in this semester, there are no required courses that must be taken in this semester that cannot be taken in the senior year.

For students studying abroad, this semester could be filled with a HASS course and free electives moved from the senior year if the host university does not have courses that might fit into the technical electives category. The technical electives listed for this semester can be moved to the senior year in place of the free electives.

When looking at these off campus experiences, some cautionary notes on course transfer apply. The courses easiest to find and transfer from a university that does not have engineering courses are:

1. Any course that RPI will accept as a free elective. These courses have to be more than 1 credit and must have some link back to a course or department at RPI. The course you want to transfer in cannot overlap extensively with a course you have already taken here at RPI.
2. Humanities, Arts and Social Science (HASS) courses which are above the 1000 level here at RPI. Courses that the host university claims as being a junior level or senior level course can be brought in subject to the transfer maximums for HASS courses stated in the catalogue. If you exceed this transfer credit limit, the course gets posted to Free Electives if there is still room to bring it in and have it count to the degree.
3. Listed Mathematics courses can be brought in often as direct substitutes for RPI courses but the credit hour problem arises here as well.

For universities with engineering programs, any exact named equivalent for Core engineering courses, (Strengths, Dynamics, Thermo-Fluid, and Circuits), can be taken and transferred in. For ISYE courses, students must get approval in advance before assuming that a course will transfer. For core courses, the credit hour question discussed above often arises.

In all cases, prior approval of transfer credits is strongly encouraged to avoid any problems. For prior approval, the course description from the university attended, and if possible a syllabus, makes the process work quickly and to the advantage of the student.

Registration Steps

Registration for the spring semester generally occurs in early November. Registration for the fall semester and summer terms occurs the preceding spring, usually in early April. Exact dates are included in the Academic Calendar.

Step 1 is to check your advising status on the Student Information System (SIS). Are you cleared to register by your advisor? If a freshman, did you have an academic advising meeting with your advisor this semester? For other class years, did you have such a meeting in the past 12 months? If not, schedule a meeting with your advisor and have your status updated. Have you cleared any holds on your account?

Step 2 is to review your Degree Works report and to compare your progress to your goals and to the plan of study you are following. You can access Degree Works report via the main menu of the Student Information System (SIS). If not on schedule, develop options to pursue and create a plan for review by your advisor. Update your plan of study as needed.

Step 3 can be done prior to 4 or following 4 depending on the timing in the semester. Step 3 is drafting a schedule of courses and sections based on the course offerings for the upcoming semester. Registration is by sections so develop some options to use when registering in the event you find sections closed or class times changed.

Step 4 is to schedule a visit with your advisor to discuss your plans. This visit is almost mandatory if you plan on completing a co-op assignment or to study abroad.

Step 5 is the physical act of registering for classes. A quick primer on class registration is below.
    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: 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. This e-mail message will also notify you of any existing holds which may prevent you from registering if you do not resolve them.

Adjusting Your Class Schedule

All adjustments to your class schedule are done using the Student Information System (SIS). Adjustments can include switching sections, dropping a class, or adding a class. The academic calendar contains cutoff dates for each of these actions. You do not need to wait until classes start to adjust your schedule of classes. The catalogue describes class schedule adjustment procedures that fall outside of the windows given on the Academic calendar such as late add and late drop. Consult the catalogue for the procedure.

Professional / Student Societies

[Institute of Industrial Engineers](#) – Faculty Advisor: Mohamed Aboul-Seoud, CII 5009
Systems world view. Productivity. Efficiency. These are words that describe the distinctive attributes of industrial engineering, and IIE is the world's largest professional society dedicated solely to the support of the industrial engineering profession and individuals involved with improving quality and productivity. Founded in 1948, IIE is an international, nonprofit association that provides leadership for the application, education, training, research, and development of industrial engineering. IEs figure out a better way to do things and work in a wide array of professional areas, including management, manufacturing, logistics, health systems, retail, service and ergonomics. They influence policy and implementation issues regarding topics such as sustainability, innovation and Six Sigma. And like the profession, IEs are rooted in the sciences of engineering, the analysis of systems, and the management of people.

[Alpha Pi Mu](#) – Faculty Advisor: Charles Malmborg, CII 5015
Alpha Pi Mu is the Industrial Engineering Honor Society whose mission is:
- To confer recognition upon the industrial engineering student who has shown exceptional academic interests and abilities in his field.
- To encourage wherever possible any movement which will advance the best interest of industrial engineering education.
- To further unify the student body of the Industrial Engineering Department in presenting its needs and ideals to the faculty.
- To create a closer student-faculty relationship by bringing together the needs and thoughts of both.
- To assist and cooperate with all organizations and persons working for the interest of industrial engineering.
- To benefit its members by the association and experience that can come from bringing together a group with similar interests, objectives, and abilities.
- To promote the professional welfare of all.

Undergraduate Research Program (URP)

Rensselaer has a very strong Undergraduate Research Program. This is a program that allows students to work in a professor's laboratory for credit or cash. Details on the program and application forms are available from the website of the Office of Undergraduate Education.

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. Check their website to investigate their field of research. If it sounds interesting, approach directly 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, you will need to 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. 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

URP funding comes from two sources:
- Your sponsoring faculty member
- The Office of Undergraduate Education

The faculty sponsor is responsible for the financial support of your research. In addition, the Office of Undergraduate Education pays URP participants a nominal sum each semester in the form of matching funds.

Co-Terminal M.S. or M.E. Program

The Co Terminal Graduate Degree Program enables Rensselaer undergraduates with strong academic records to study for a Master's degree within two semesters of completing their bachelor's degree(s) in the same or a different department or school. The application form and instructions are available from the website of the Office of Graduate Education.

ISE offers both thesis and non-thesis options at the Master's level. The application and admission requirements in the ISE department for this program are:

1. All applicants must take the Graduate Record Exam (GRE) and submit the scores to Rensselaer and include a paper copy of the scores with the completed application. Applicants with a GPA 3.5 or above are not required to take the GRE.

2. The minimum undergraduate GPA for admission is 3.2 and excellent GRE scores. Applicants with GPAs above 3.0 but below 3.2 may be considered for admission if the GRE scores exceed 156 verbal and 151 quantitative.

3. The application form must be signed by the undergraduate advisor who attests to the GPA stated on the application.

4. The applicant must schedule an appointment with the ISE Co-Terminal Advisor bringing the completed application including GRE score report. During this meeting, a graduate plan of study will be drafted listing the courses that must be completed and the semester the course will be completed for the Master's degree segment. The requirements will be based on the published requirements in the university catalogue. At a minimum, 30 credits beyond the Bachelor requirement must be completed. The draft plan must be typed by the student on the Graduate School Plan of Study form.

5. The applicant must submit the completed application package to the ISE Co-Terminal Advisor who will direct its review within the ISE department.

The final admission decision rests with the Graduate School. Notice of the decision on admission will be forwarded to the applicant soon after the ISE department is notified of the final decision.

Frequently Asked Questions

Accelerating Courses

1. **If I have advanced placement credit, what course should I take in place of the listed course?** For many topics, the first years are sequences of 2 or 3 courses that are taken in order. Advanced placement credit will be posted by the Rensselaer course name so the action by you might be to take the next topic course in the sequence. The Mathematics sequence is a prime example of this. A second option is to delay taking the next course in the sequence and to substitute in its place another future semester course provided all the prerequisites for the course are met.

2. **Can I take senior level courses as a sophomore when I meet the course prerequisites?** The general guidance provided in course level numbering is that 1000 level courses are freshman level, 2000 are sophomore, and 4000 are junior – senior level. The recommendation is to respect this guidance especially when looking at 4000 level courses.

Pass No Credit Usage

1. **Can pass - no credit be used for courses selected from a list?** No courses that are listed by name as degree requirements (including ones that are selected from a list of restricted electives) can be applied to the named degree requirement if taken pass – no credit.

2. **Who signs the pass – no credit election form?** Your advisor must sign the form. The purpose of this signature is to force a meeting between you and your advisor so that the consequences of your election are fully understood. No signature is required to remove the designation.

3. **Can pass – no credit be used for HASS courses?** Pass – no credit can be used for HASS courses with restrictions. The catalogue lists the current restrictions so refer to the latest issue of the catalogue to get the current policy. No course used for the depth sequence in a topic can be graded pass – no credit.

Registration

1. **What do I do if a class I want to register for is full?** For many courses, the class size listed on SIS is the room size so no additional students can be added to the room. For ISYE courses, meet with the instructor of the course and request to be admitted to the course. If there is physical space to accommodate you, your request is very often honored. 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.

2. **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. Meet with your advisor about the changes you want to make.

   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 getting the instructors signature (if required), the form must also be approved by the Advising and Learning Assistance Center.

Co-Terminal FAQ's

1. **When do I apply?** Co-terminal applications must be submitted before the end of the first semester of the applicants' senior year. Each department has their own application deadline separate from the Office of Graduate Education's deadlines of November 15th for spring

admission and May 1st for fall admission into the Co-Terminal Program. Applicants must have 90 credits of coursework in progress or earned towards their undergraduate degree. http://www.rpi.edu/dept/grad/docs/Co-Term%20App.pdf

2. **Where do I find a Plan of Study?** The Plan of Study is available on-line at the Office of Graduate Education website. http://gradoffice.rpi.edu/update.do?catcenterkey=20

3. **What if the courses I list on the Plan of Study change?** If the courses listed change, an updated plan must be filed with your Department, the Office of Graduate Education, and the Office of the Registrar.

4. **Do I have to file a FAFSA for my 5th year to get aid?** Yes - you must file a FAFSA, if you receive need based aid or choose to apply for a graduate level Federal Direct Aid loan. (Please contact the Office of Financial Aid for application deadlines).

5. **When/how does a student get assigned a graduate adviser?** Co-terminal students will continue to work with their undergraduate adviser until completion of their B.S. degree and will have a graduate advisor assigned in the 8th semester.

6. **How many credits will I be eligible to register for?** Since the primary degree you will be pursuing is your bachelor's degree, you will be eligible to register for up to 21 credits but the regular full time load for graduate work is usually no more than 15 credits. During undergraduate study, students who have room to combine both undergrad and grad courses are limited to a credit total of 15 credits for the semester.

7. **Can I become a part-time student in the Co-Terminal Program?** Co-terminal students must remain as full time students and cannot shift to part-time status.

8. **When do I receive my BS degree? I was supposed to graduate in May but I will be completing two more semesters to receive my Master's degree under the co-terminal program?** You should file a degree application with the Office of the Registrar for your B.S. degree at the beginning of the semester in which you will have met the degree requirements for the degree. See the academic calendar for deadline information. Upon graduating with your B.S. degree, your primary status/classification will change to graduate.

9. **Can I use a course for both my undergraduate and graduate degree?** No - credits applied toward satisfying requirements of the undergraduate degree cannot be used to satisfy the requirements for the Master's degree and vice versa.

10. **I finished my 9th semester but decided not to continue in the Master's program.** You must formally withdraw from the co-terminal program. This is done using the Graduate Student Request for Change of Status form. The Change of Status form is required at any point that you decide to leave the program. This includes if you decide to leave the program upon completion of your B.S. degree.

11. **Can I still designate courses as Pass/No Credit?** Co-terminal students are subject to graduate degree program guidelines. Any courses being applied to a graduate degree cannot be taken as Pass/No Credit. Students must earn a grade of C- or better in courses used towards a graduate degree and graduate with a GPA of 3.0 or higher.

12. **How does the degree application process work for Co-Terminal Students?** Students may participate in commencement when they complete their B.S. degree requirements, and again upon completion of their M.S. degree. To apply for graduation, students must fill out a degree application on the Student Information System (SIS) the semester they intend to graduate. Though Rensselaer students can officially graduate in August, December, or more commonly, May, Rensselaer's commencement ceremony is only held once a year in May. Check the academic calendar for application deadlines.

The Arch FAQs

1. **When will I be expected to take Arch?** Students in the Class of 2022 will be required to participate in the Arch program in summer 2020.
2. **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.
3. **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.
4. **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.
5. **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.
6. **What if I want to study abroad?** Study abroad has become an integral part of a well-rounded undergraduate experience. The Arch provides additional experiential learning opportunities for students to gain a greater understanding and appreciation of other cultures and customs. This includes short-term and faculty-led international programs, and other international experiences such as internships and service learning.
   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.
7. **Will there be air conditioned residence halls and classrooms for all students during the Arch?** There is an AC plan in place so that all students here for the summer will be in air conditioned residence halls (and air conditioned classrooms and laboratories).

International Students Arch FAQs

This is a brief overview of FAQs for International Students and The Arch. For more details or questions outside of the FAQs, please contact the ISSS Office directly.

1. **Can I participate in The Arch?** Yes, after opting in for The Arch you will need to fill out the ISSS Arch form.
2. **Can I choose either the fall or spring Semester to take as a break?** Yes, but you will need to choose which term semester you will take as a break during the mid semester of your sophomore year. For example sophomores who would like to be away in the fall would need to decide by early March. You would then decide after notifying ISSS what your plan for the fall break will be.
3. **For the fall semester as The Arch Semester Away, can I go back to my home country during this time?** Yes, you can. Please make sure the ISSS Arch form is completed, and that you have met with ISSS.
4. **When I return for the spring semester, after my fall Arch Semester Away will I need a new I-20?** No**,** if you have completed the proper paper work with ISSS, you will not need to get a new I-20 if you are returning for classes for the spring semester. If something else is occurring please contact ISSS.