INDUSTRIAL ENGINEERING: SYSTEMS ENGINEERING AND ANALYTICS, M.S.

This is a named option within the Industrial and Systems Engineering M.S. (http://guide.wisc.edu/graduate/industrial-systems-engineering/industrial-engineering-ms)

The program in Systems Engineering and Analytics (https://www.engr.wisc.edu/app/uploads/2017/02/SEA-Web-1.pdf) will train students to recognize, identify, analyze, and solve decision problems arising in the efficient operations of engineering systems. The program focuses on methods and models for data analytics and data-driven decision-making.

IS THIS PROGRAM RIGHT FOR YOU?

Analytics, and the ability to effectively utilize data, is quickly becoming an important component in engineering decision making. There is a strong need in the marketplace for people who use analytical tools to transform data into insights for making better decisions. The Systems Engineering and Analytics option within the UW–Madison graduate program in Industrial and Systems Engineering offers students the opportunity to pursue graduate study in this important and emerging area, under the auspices of the foremost experts in their field, in one of the world’s top-ranked departments of industrial and systems engineering. (We were ranked 8th in the latest US News and World Report rankings). The flexible curricula in Systems Engineering and Analytics enable students to tailor their degree program to suit their particular needs and career objectives.

After completing your degree, you will be able to analyze, process, and build conclusions based on the data you collect in the design, testing, and operations phases of engineering and design processes.

The program includes training in optimization models and methods, applied industrial analytics, simulation modeling and analysis, and courses wherein these analytical and computational tools are applied in an engineering systems setting. These learned skills are now highly sought after in manufacturing, transportation, finance, healthcare, and other industrial sectors.

WHAT YOU LEARN

- Acquire mathematical, scientific, and engineering principles in analytics.
- Utilize data-driven methodologies to formulate, analyze, and solve advanced engineering problems.
- Evaluate relevant analytical, computational, engineering tools to address advanced systems engineering problems.
- Solve real-world problems using computer-assisted, data-driven decision making technologies.

If questions, please contact COE Grad Admissions at iegradadmission@engr.wisc.edu. Subject Line: IE Grad Admissions and I Sy E Seniors please contact Pam Peterson, prpeterson@wisc.edu, with questions. Please see admission requirements under the Apply Now tab below.

ADMISSIONS

APPLICATION DEADLINES

- Fall 2018*: January 1 (*Non-UW IE students can only apply for fall semester.)
- Spring Admission: October 1 (ONLY UW–Madison IE seniors are eligible for spring admission.)

ADMISSIONS

Applicants must first meet all of the requirements of the Graduate School.

- Applicants must also meet department specific requirements as outlined below:
  - BS degree in industrial engineering or related area or equivalent
  - Introduction to Programming Course (for example, STAT 312)
  - COMP SCI 301
  - Non-native English speakers must have a Test of English as a Foreign Language (TOEFL) score of 580 (written), 243 (computer-based test), or 92 (Internet version).
  - The Graduate Record Examination (GRE) is *required for all masters programs in I Sy E. Information on taking the GRE exam can be found here (https://www.ets.org/gre). Please note: Applicants should plan to take their exam by December 1 to allow scores to be sent and processed.

*1 Sy E undergrads and applicants with prior institutional approval are waived from the GRE requirement.

HOW TO APPLY

1. Fill out an online application (https://apply.grad.wisc.edu/Account/Login?ReturnUrl=%2f) through the Graduate School website and pay the application fee (https://grad.wisc.edu/admissions/faq).
2. List three recommenders and their contact information as part of the online application. An email will be sent to the recommender, asking that they submit their letter online using the Graduate School’s recommendation form. Applicants can log back into their online application to re-send the email request if the recommender loses the email. Letters of recommendation must be submitted electronically.
3. Submit a Statement of Purpose (https://grad.wisc.edu/prospective/preparestatement) with your online application.
4. GRE Exam Information (https://www.ets.org/gre) (STARTING FALL 2018): The course-only option does require the GRE exam be taken by prospective students as part of the application but note there are no specific scoring guidelines for the exam as the GRE is only one part of consideration for admission into the program. Please note: Applicants should plan to take their exam by Dec. 1st to allow scores to be sent and processed.
5. TOEFL Exam Information: Ask ETS (https://www.ets.org) to submit your TOEFL scores to the UW–Madison Graduate School (Institution Number 1846). If you have your scores sent to UW–Madison, they will be available online to all departments to which you have applied. The institution code, therefore, is the only number needed. For more information please visit the Graduate School Requirements (https://grad.wisc.edu/admissions/requirements) page. Please note: Exam
information must be valid at start date of the semester that you are applying for (nonexpired).

6. **Electronically submit one copy of your official transcript with your application.** Unofficial copies of transcripts will be accepted for review but official copies are required for admitted students.

**FOR UW STUDENTS ONLY:**

1. UW IE Undergrads no longer need to submit a separate paper application—only the online application is required with a statement of purpose.

2. **Three letters of recommendation are NOT required for students completing their I Sy E bachelor’s degree at UW.** Please note that the application system will still require you to list three individuals as recommenders. You are welcome to list Jim Luedtke, Pam Peterson, and Maria Zarzalejo to bypass this requirement.

3. I Sy E undergrads and applicants with prior institutional approval are waived from the GRE requirement.

4. UW-Madison undergraduate students applying to this program do not need to submit a UW transcript.

#Submit only the documents requested.

Apply now

NOTE: PLEASE DO NOT SEND DOCUMENTS TO THE GRADUATE SCHOOL. ALL DOCUMENTS SHOULD BE UPLOADED WITH YOUR APPLICATION.

*Application deadlines are strictly enforced and ALL application materials including transcripts, letters and TOEFL scores MUST be included and submitted by the application deadline. Please review both the I Sy E department and Graduate School requirements for admission and if you feel you meet the necessary criteria for applying, please do so.

**QUESTIONS??**

Check out the Admissions FAQ [here](https://grad.wisc.edu/admissions/faq) or contact us at iegradadmission@engr.wisc.edu.

**GRADUATE SCHOOL ADMISSIONS**

Graduate admissions is a two-step process between academic degree programs and the Graduate School. Applicants must meet requirements of both the program(s) and the Graduate School. Once you have researched the graduate program(s) you are interested in, apply online [here](https://grad.wisc.edu/admissions).

**FUNDING**

**GRADUATE SCHOOL RESOURCES**

Resources to help you afford graduate study might include assistantships, fellowships, traineeships, and financial aid. Further funding information [here](https://grad.wisc.edu/funding) is available from the Graduate School. Be sure to check with your program for individual policies and processes related to funding.

**PROGRAM RESOURCES**

Financial assistance, such as TA, PA, or RA positions from the university or the department is not recommended given the accelerated structure and timeline of the program.

If you would like to pursue funding on your own, the following sites could be helpful:

- Graduate School Funding Resources [here](https://grad.wisc.edu/studentfunding/prospective)
- Graduate School Costs and Funding [here](https://grad.wisc.edu/studentfunding/currentstudents)
- Tuition & Fees [here](https://registrar.wisc.edu/tuition_&_fees.htm)

**REQUIREMENTS**

**MINIMUM GRADUATE SCHOOL REQUIREMENTS**

Review the Graduate School minimum academic progress and degree requirements [here](https://guide.wisc.edu/graduate/#policiesandrequirementstext), in addition to the program requirements listed below.

**NAMED OPTION REQUIREMENTS**

**MODE OF INSTRUCTION**

<table>
<thead>
<tr>
<th>Face to Face</th>
<th>Evening/Weekend</th>
<th>Online</th>
<th>Hybrid</th>
<th>Accelerated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Mode of Instruction Definitions**

- **Evening/Weekend**: These programs are offered in an evening and/or weekend format to accommodate working schedules. Enjoy the advantages of on-campus courses and personal connections, while keeping your day job. For more information about the meeting schedule of a specific program, contact the program.

- **Online**: These programs are offered primarily online. Many available online programs can be completed almost entirely online with all online programs offering at least 50 percent or more of the program work online. Some online programs have an on-campus component that is often designed to accommodate working schedules. Take advantage of the convenience of online learning while participating in a rich, interactive learning environment. For more information about the online nature of a specific program, contact the program.

- **Hybrid**: These programs have innovative curricula that combine on-campus and online formats. Most hybrid programs are completed on-campus with a partial or completely online semester. For more information about the hybrid schedule of a specific program, contact the program.

- **Accelerated**: These on-campus programs are offered in an accelerated format that allows you to complete your program in a condensed time-frame. Enjoy the advantages of on-campus courses with minimal disruption to your career. For more information about the accelerated nature of a specific program, contact the program.

**CURRICULAR REQUIREMENTS**

Minimum Credit Requirement

<table>
<thead>
<tr>
<th>Credit Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 credits</td>
</tr>
</tbody>
</table>
Minimum Residence Credit Requirement 15 credits

Minimum Graduate Coursework Requirement Half of degree coursework (15 credits out of 30 total credits) must be completed graduate-level coursework; courses with the Graduate Level Coursework attribute are identified and searchable in the university’s Course Guide (https://registrar.wisc.edu/course-guide/).

Overall Graduate GPA Requirement 3.00 GPA required.

Other Grade Requirements Grades of C and D received by a candidate in any graduate course will not be counted as credit toward the degree. These grades will be counted in the graduate GPA.

Assessments and Examinations None.

Language Requirements No language requirements.

REQUIRED COURSES
Below is a typical curriculum for those pursuing a M.S. in Industrial Engineering with a named option in Systems Engineering and Analytics. Please note the Systems Engineering and Analytics program is a customizable program and students should work out other course options with their faculty advisor.

**Fall Potential Courses:**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>I SYE 313</td>
<td>Engineering Economic Analysis</td>
<td>3</td>
</tr>
<tr>
<td>I SYE 412</td>
<td>Fundamentals of Industrial Data Analytics</td>
<td>3</td>
</tr>
<tr>
<td>I SY E/M E 510</td>
<td>Facilities Planning</td>
<td>3</td>
</tr>
<tr>
<td>I SY E/M E 512</td>
<td>Inspection, Quality Control and Reliability</td>
<td>3</td>
</tr>
<tr>
<td>I SY E/COMP SCI/E E C E 524</td>
<td>Introduction to Optimization</td>
<td>3</td>
</tr>
<tr>
<td>I SY E/COMP SCI/MATH/STAT 525</td>
<td>Linear Programming Methods</td>
<td>3</td>
</tr>
<tr>
<td>I SY E 601</td>
<td>Special Topics in Industrial Engineering</td>
<td>1-3</td>
</tr>
<tr>
<td>I SY E 624</td>
<td>Stochastic Modeling Techniques</td>
<td>3</td>
</tr>
<tr>
<td>I SY E 645</td>
<td>Engineering Models for Supply Chains</td>
<td>3</td>
</tr>
<tr>
<td>I SY E 699</td>
<td>Advanced Independent Study</td>
<td>1-5</td>
</tr>
</tbody>
</table>

**Spring Potential Courses:**

<table>
<thead>
<tr>
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<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
<tr>
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<td>Fundamentals of Industrial Data Analytics</td>
<td>3</td>
</tr>
<tr>
<td>I SY E/M E 512</td>
<td>Inspection, Quality Control and Reliability</td>
<td>3</td>
</tr>
<tr>
<td>I SY E 517</td>
<td>Decision Making in Health Care</td>
<td>3</td>
</tr>
<tr>
<td>I SY E 575</td>
<td>Introduction to Quality Engineering</td>
<td>3</td>
</tr>
<tr>
<td>I SY E 601</td>
<td>Special Topics in Industrial Engineering</td>
<td>1-3</td>
</tr>
</tbody>
</table>

**I SYE 612** Information Sensing and Analysis for Manufacturing Processes 3

**I SYE 615** Production Systems Control 3

**I SYE 620** Simulation Modeling and Analysis 3

**I SYE/M E 641** Design and Analysis of Manufacturing Systems 3

**I SYE/M E 643** Performance Analysis of Manufacturing Systems 3

**I SYE 699** Advanced Independent Study 1-5

**Summer Potential Courses:**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>I SY E 313</td>
<td>Engineering Economic Analysis</td>
<td>3</td>
</tr>
<tr>
<td>I SY E 516</td>
<td>Introduction to Decision Analysis</td>
<td>3</td>
</tr>
<tr>
<td>I SY E 575</td>
<td>Introduction to Quality Engineering</td>
<td>3</td>
</tr>
<tr>
<td>I SY E 601</td>
<td>Special Topics in Industrial Engineering</td>
<td>1-3</td>
</tr>
<tr>
<td>I SY E 699</td>
<td>Advanced Independent Study</td>
<td>1-5</td>
</tr>
</tbody>
</table>

POLICIES

GRADUATE SCHOOL POLICIES
The Graduate School’s Academic Policies and Procedures (https://grad.wisc.edu/acadpolicy) provide essential information regarding general university policies. Program authority to set degree policies beyond the minimum required by the Graduate School lies with the degree program faculty. Policies set by the academic degree program can be found below.

NAMED OPTION-SPECIFIC POLICIES

GRADUATE PROGRAM HANDBOOK
The Graduate Program Handbook (https://www.engr.wisc.edu/app/uploads/2016/02/ISYE_New_Grad_Handbook-4.pdf) is the repository for all of the program’s policies and requirements.

PRIOR COURSEWORK

Graduate Work from Other Institutions
With program approval, students are allowed to count no more than 9 credits of graduate course work from other institutions.

UW–Madison Undergraduate
UW-Madison students completing their bachelor’s degree in the Industrial and Systems Engineering department may count up to 6 credits of coursework numbered 300 or above toward the degree with prior program approval.

UW–Madison University Special
Allowed up to 15 credits numbered 300 or above toward graduate residence credit requirement and graduate degree credit requirement. If the courses were numbered 700 or above they may count toward the minimum graduate coursework (50%) requirement. Coursework earned five or more years prior to admission to a master’s degree is not allowed to satisfy requirements.

PROBATION
The Graduate School regularly reviews the record of any student who earned grades of BC, C, D, F, or Incomplete in a graduate course
(300 or above), or grade of U in research credits. This review could result in academic probation with a hold on future enrollment or in being suspended from the Graduate School.

ADVISOR / COMMITTEE
Per Graduate School policy, every graduate student MUST have a faculty advisor. A faculty advisor provides the graduate student with academic guidance regarding their course selection and research oversight in their thesis or project. Graduate students should always seek advice from their advisor and other faculty in their interest area prior to enrolling for courses.

When graduate students are admitted to the I Sy E department, their advisor is either (a) the faculty person providing financial support, (b) the faculty who recommended their admission, or (c) a faculty is assigned to them by the student services coordinator. Advisors are assigned according to a student’s chosen Focus Area.

A committee often accomplishes advising for the students in the early stages of their studies.

CREDITS PER TERM ALLOWED
Enrollment of 12 credits is highly recommended.

TIME CONSTRAINTS
Complete in one calendar year: fall, spring, and summer.

Master’s degree students who have been absent for five or more consecutive years lose all credits that they have earned before their absence. Individual programs may count the coursework students completed prior to their absence for meeting program requirements; that coursework may not count toward Graduate School credit requirements.

OTHER

PROFESSIONAL DEVELOPMENT

GRADUATE SCHOOL RESOURCES
Take advantage of the Graduate School’s professional development resources (https://grad.wisc.edu/pd) to build skills, thrive academically, and launch your career.

PROFESSORS

- Oguzhan Alagoz (https://directory.engr.wisc.edu/ie/Faculty/Alagoz_Oguzhan)
- Vicki Bier (https://directory.engr.wisc.edu/ie/Faculty/Bier_Vicki)
- Pascale Carayon (https://directory.engr.wisc.edu/ie/Faculty/Carayon_Pascale)
- Ananth Krishnamurthy (https://directory.engr.wisc.edu/ie/Faculty/Krishnamurthy_Ananth)
- John Lee (https://directory.engr.wisc.edu/ie/Faculty/Lee_John)
- Jingshan Li (https://directory.engr.wisc.edu/ie/Faculty/Li_Jingshan)
- Jeff Linderoth (https://directory.engr.wisc.edu/ie/Faculty/Linderoth_Jeffrey) (Department Chair)
- Robert Radwin (https://directory.engr.wisc.edu/ie/Faculty/Radwin_Robert)
- Leyuan Shi (https://directory.engr.wisc.edu/ie/Faculty/Shi_Leyuan)
- Raj Veeramani (https://directory.engr.wisc.edu/ie/Faculty/Veeramani_Raj)
- Shiyu Zhou (https://directory.engr.wisc.edu/ie/Faculty/Zhou_Shiyu)

ASSOCIATE PROFESSORS

- Laura Albert (https://directory.engr.wisc.edu/ie/Faculty/Albert-mclay_Laura)
- Jim Luedtke (https://directory.engr.wisc.edu/ie/Faculty/Luedtke_James)
- Doug Wiegmann (https://directory.engr.wisc.edu/ie/Faculty/Wiegmann_Douglas)

ASSISTANT PROFESSORS

- Alberto Del Pia (https://directory.engr.wisc.edu/ie/Faculty/Delpia_Alberto)
- Kaibo Liu (https://directory.engr.wisc.edu/ie/Faculty/Liu_Kaibo)
- Carla Michini (https://directory.engr.wisc.edu/ie/Faculty/Michini_Carla)
- Xin Wang (https://directory.engr.wisc.edu/ie/Faculty/Wang_Xin)
- Nicole Werner (https://directory.engr.wisc.edu/ie/Faculty/Werner_Nicole)
- Gabriel Zayas-Caban (https://directory.engr.wisc.edu/ie/Faculty/Zayas-caban_Gabriel)

AFFILIATE FACULTY

- Barbara Bowers (https://directory.engr.wisc.edu/ie/Faculty/Bowers_Barbara)
- Elizabeth S. Burnside (https://directory.engr.wisc.edu/ie/Faculty/Burnside_Elisabeth)
- Molly Carnes (https://directory.engr.wisc.edu/ie/Faculty/Carnes_Mary)
- Peter Chien (https://directory.engr.wisc.edu/ie/Faculty/Chien_Peter)
- Gregory DeCroix (https://directory.engr.wisc.edu/ie/Faculty/Decroix_Gregory)
- Michael Ferris (https://directory.engr.wisc.edu/ie/Faculty/Ferris_Michael)
- Caprice Greenberg (https://directory.engr.wisc.edu/ie/Faculty/Greenberg_Caprice)
- Po-ling Loh (https://directory.engr.wisc.edu/eece/Faculty/Loh_Po-ling)
- Eneida Mendonca (https://directory.engr.wisc.edu/ie/Faculty/Mendonca_Eneida)
- Bilge Mutlu (https://directory.engr.wisc.edu/ie/Faculty/Mutlu_Bilge)
- David Noyce (https://directory.engr.wisc.edu/ceee/Faculty/Noyce_David)
- Kevin Ponto (https://directory.engr.wisc.edu/ie/Faculty/Ponto_Kevin)
- Carla Pugh (https://directory.engr.wisc.edu/ie/Faculty/Pugh_Carla)
- Andrew Quanbeck (https://directory.engr.wisc.edu/ie/Faculty/Quanbeck_Anderew)
• Thomas Rutherford (https://directory.engr.wisc.edu/ie/Faculty/Rutherford_Thomas)
• Nasia Safdar (https://directory.engr.wisc.edu/ie/Faculty/Safdar_Nasia)
• Mary Elizabeth Sesto (https://directory.engr.wisc.edu/bme/Faculty/Sesto_Mary)
• Dhavan V. Shah (https://directory.engr.wisc.edu/ie/Faculty/Shah_Dhavan)
• Maureen A. Smith (https://directory.engr.wisc.edu/ie/Faculty/Smith_Maureen)
• Linsey Steege (https://directory.engr.wisc.edu/ie/Faculty/Steege_Linsey)
• Bruce R. Thomadsen (https://directory.engr.wisc.edu/bme/Faculty/Thomadsen_Bruce)
• David J. Vanness (https://directory.engr.wisc.edu/ie/Faculty/Vanness_David)
• Rebecca Willett (https://directory.engr.wisc.edu/ece/Faculty/Willett_Rebecca)
• Stephen J. Wright (https://directory.engr.wisc.edu/ie/Faculty/Wright_Stephen)
• Victor Zavala (https://directory.engr.wisc.edu/che/Faculty/Zavala_Victor)

EMERITUS PROFESSORS
• John G. Bollinger (https://directory.engr.wisc.edu/ie/Faculty/Bollinger_John)
• Patricia Brennan (https://directory.engr.wisc.edu/ie/Faculty/Brennan_Patricia)
• Dennis G. Fryback (https://directory.engr.wisc.edu/ie/Faculty/Fryback_Dennis)
• David Gustafson (https://directory.engr.wisc.edu/ie/Faculty/Gustafson_David)
• William G. Reddan (https://directory.engr.wisc.edu/ie/Faculty/Reddan_William)
• Stephen M. Robinson (https://directory.engr.wisc.edu/ie/Faculty/Robinson_Stephen)
• Jerry L. Sanders (https://directory.engr.wisc.edu/ie/Faculty/Sanders_Jerry)
• Michael J. Smith (https://directory.engr.wisc.edu/ie/Faculty/Smith_Michael)
• Harold J. Steudel (https://directory.engr.wisc.edu/ie/Faculty/Steudel_Harold)
• Rajan Suri (https://directory.engr.wisc.edu/ie/Faculty/Suri_Rajan)
• Arne Thesen (https://directory.engr.wisc.edu/ie/Faculty/Thesen_Arne)
• Gregg Vanderheiden (https://directory.engr.wisc.edu/ie/Faculty/Vanderheiden_Gregg)
• David R. Zimmerman (https://directory.engr.wisc.edu/ie/Faculty/Zimmerman_David)