

Department of Systems and Industrial Engineering
Courses Advising for M.S. Degrees

The Department of Systems and Industrial Engineering (SIE) offers the following master of science degrees:

- Master of Science in Engineering Management (MS/EMG)
- Master of Science in Industrial Engineering (MS/INE)
- Master of Science in Systems Engineering (MS/SYE)

For each master's degree, there are three options:

1. Project Option (30 units): 27 units of approved coursework and 3 units of a master's project report;
2. Thesis Option (30 units): 24 units of approved coursework and 6 units of thesis;
3. Coursework Option (33 units): For MS/EMG: 33 units of coursework; for MS/INE and MS/SYE, 33 units of coursework which includes one 3-unit course at the 600 level in which you must receive an "A" or "B".

And required courses for each master's degree can be found:

Required Courses for MS/EMG (15 units):

- SIE 514: Law for Engineers & Scientists (*Spring*)
- SIE 515: Technical Sales & Marketing (*Fall, Spring*)
- SIE 522: Engineering Decision Making Under Uncertainty (*Fall*)
- SIE 557: Project Management (*Fall*)
- SIE 567: Financial Modeling for Innovation (*Fall*)

Required Courses for MS/INE (9 units):

- SIE 530: Engineering Statistics (*Fall*);
- SIE 540: Survey of Optimization Methods (*Spring*) or SIE 545: Fundamentals of Optimization (*Fall*);
- AND One Course from SIE 56X or 58X.

offered in Fall semester:

- SIE 563: Integrated Logistics and Distribution Systems
- SIE 567: Financial Modeling for Innovation
- SIE 583: Computer Integrated Manufacturing Systems

offered in Spring semester:

- SIE 561: Traffic Modeling & Simulation
- SIE 562: Production Systems Analysis
- SIE 564: Cost Estimation
- SIE 565: Supply Chain Management

Required Courses for MS/SYE (9 units):

- SIE 550: Theory of Linear Systems (*Spring*)
- SIE 554A: The Systems Engineering Process (*Fall*)
- SIE 520: Stochastic Modeling I (*Spring*) or SIE 530: Engineering Statistics (*Fall*)

The SIE Department offers graduate courses in multiple domains for specialized areas of study. To facilitate selection of courses beyond the required courses and align them with your interests, some suggested courses under different focus areas are listed, along with the semester they are usually offered in. More detailed course information is available here: <https://sie.engineering.arizona.edu/grad-programs/courses>.

Focus Areas (suggested courses):

I. Data Analytics and Informatics

- SIE 530: Engineering Statistics (*Fall*)
- SIE 536: Experiment Design and Regression (*Fall*)
- SIE 574: Information Analytics and Decision-Making in Engineering (*Fall*)
- SIE 575: Bayesian Machine Learning I (*Fall*)
- SIE 577: Introduction to Biomedical Informatics (*Fall*)
- SIE 578: Artificial Intelligence for Health and Medicine (*Spring*)

II. Healthcare Systems

- SIE 577: Introduction to Biomedical Informatics (*Fall*)
- SIE 578: Artificial Intelligence for Health and Medicine (*Spring*)

III. Management Science and Engineering

- SIE 506: Quality Engineering (*Spring*)
- SIE 522: Engineering Decision Making Under Uncertainty (*Fall*)
- SIE 557: Project Management (*Fall*)
- SIE 562: Production Systems Analysis (*Spring*)
- SIE 564: Cost Estimation (*Spring*)
- SIE 565: Supply Chain Management (*Spring*)
- SIE 567: Financial Modeling for Innovation (*Fall*)
- SIE 606: Advanced Quality Engineering (*Spring*)
- SIE 654: Advanced Concepts in Systems Engineering (*Spring*)

IV. Manufacturing and Production Systems

- SIE 562: Production Systems Analysis (*Spring*)
- SIE 565: Supply Chain Management (*Spring*)
- SIE 583: Computer Integrated Manufacturing Systems (*Fall*)

V. Modeling and Simulation

- SIE 531: Simulation Modeling and Analysis (*Fall, Spring*)
- SIE 558: Model-Based Systems Engineering (*Fall*)
- SIE 561: Traffic Modeling & Simulation (*Spring*)
- SIE 631: Distributed Multi-Paradigm Simulation Systems (*Fall*)
- SIE 654: Advanced Concepts in Systems Engineering (*Spring*)
- SIE 658: Advanced Model-Based Systems Engineering (*Spring*)

VI. Optimization

- SIE 520: Stochastic Modeling I (*Spring*)

SIE 540: Survey of Optimization Methods (*Spring*)
SIE 544: Linear Programming (*Fall*)
SIE 545: Fundamentals of Optimization (*Fall*)
SIE 546: Algorithms, Graphs, and Networks (*Spring*)
SIE 640: Large-Scale Optimization (*Fall*)
SIE 644: Integer and Combinatorial Optimization (*Spring*)
SIE 645: Nonlinear Optimization (*Spring*)
SIE 649: Topics of Optimization (*Fall*)

VII. Quality and Reliability Engineering

SIE 506: Quality Engineering (*Spring*)
SIE 508: Reliability Engineering (*Fall*)
SIE 530: Engineering Statistics (*Fall*)
SIE 536: Experiment Design and Regression (*Fall*)
SIE 606: Advanced Quality Engineering (*Spring*)
SIE 608: Advanced Reliability Engineering (*Fall*)

VIII. Space, Defense, and Security

SIE 552: Space Systems Engineering (*Spring*)
SIE 554A: The Systems Engineering Process (*Fall*)
SIE 555: Sensor Systems Engineering (*Spring*)
SIE 556: Fundamental of Guidance for Aerospace Systems (*Fall*)
SIE 558: Model-Based Systems Engineering (*Fall*)
SIE 570: Intelligent Control Systems & Applications (*Fall*)
SIE 571: Systems Cyber Security Engineering (*Fall*)
SIE 572: Information Security and Research (INSuRE) (*Spring*)
SIE 654: Advanced Concepts in Systems Engineering (*Spring*)

IX. Transportation/Logistics/Supply Chain Management (TLS)

SIE 546: Algorithms, Graphs, and Networks (*Spring*)
SIE 561: Traffic Modeling & Simulation (*Spring*)
SIE 563: Integrated Logistics and Distribution System (*Fall*)
SIE 565: Supply Chain Management (*Spring*)
SIE 678: Transportation Systems (*Spring*)

X. User Experience (Human Factors)

SIE 511: Human-Machine Interaction (*Fall*)
SIE 512: Human Factors Engineering Research Methods (*Spring*)
SIE 6xx: Human Performance Modeling (*Fall*)

The SIE department also offers Master's degree in Cybersecurity, and information is available here: <https://sie.engineering.arizona.edu/grad-programs/degrees>