

Industrial Engineering: Technical Electives Selection Guideline

Last Updated: 10/30/2024

1. Basic Requirement

- Industrial Engineering requires 12 units of technical elective (about 4 courses)
- All coursework must be upper division (300/400 level), with a minimum of 6 units 400-level coursework required
- Advanced Standing Required, Must meet course prerequisite(s)

2. Course Selection Guidance and Strategies

Before you read the following guideline, the most important thing to know your own interests and what kind of job or study after you graduated with your B.S.

- You can choose all four courses from a specific focus area
- You can choose four courses from different focus areas
- You can choose courses outside the department, but will need to meet prerequisites. Check with major advisor, or if needed, approval from faculty advisor.

Director of Industrial Engineering/Industrial Engineering Faculty Advisor

If you need help choosing your tech electives or need course approval for courses that are not listed on this list or approval for your internship approval, then you are very welcome to contact the faculty advisor for Industrial Engineering:

Professor Pavlo Krokhmal

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Table 1. Pre-approved technical electives course list

Focus Area	Course #	Course Title	Prerequisite: AdvStand in Engineering +	Typically offered
I. Engineering Management	SIE 367	Engineering Management II	No longer offered, previously earned credit accepted.	
	SIE 414	Law for Engineers and Scientists		Spring
	SIE 415	Technical Sales and Marketing		Fall & Spring
	SIE 457	Project Management		Fall & Spring
	SIE 482	Lean Manufacturing and Operations	SIE 305	Spring
	Choose 4 of the 5 courses above			
II. Reliability and Quality Engineering	SIE 406	Quality Engineering	SIE 305	Fall
	SIE 408	Reliability Engineering	SIE 305	Reoffered Fall 2024
	SIE 430	Engineering Statistics	SIE 305	Fall
	SIE 482	Lean Manufacturing and Operations	SIE 305	Spring
III. Operations Research	SIE 440	Survey of Optimization Methods	SIE 340	Spring
	SIE 449	Optimization for Machine Learning	SIE 270 & SIE 340	Spring
	SIE 422	Engineering Decision Making Under Uncertainty	SIE 305	Fall
	Add 2 more courses in other areas or add 1 more course and SIE 492 Directed Research			
IV. Manufacturing	SIE 465	Supply Chain Management	SIE 305 & 340	Spring
	SIE 482	Lean Manufacturing and Operations	SIE 305	Spring
	SIE 481	Design for Additive Manufacturing	BE 221 or SIE 383	Reoffered Fall 2024
	MSE 331R	Fundamentals of Materials for Engineers	CHEM 151	Fall & Spring
V. Human Factors Engineering	SIE 430	Engineering Statistics	SIE 305	Fall
	Add 3 more courses, or add 1 more course and SIE 492 Directed Research			
VI. Data Analytics	SIE 430	Engineering Statistics	SIE 305	Fall
	SIE 432	Sports Analytics	SIE 305	Summer
	SIE 433	Fundamentals of Data Science for Engineers	SIE 305	Spring
	SIE 440	Survey of Optimization Methods	SIE 340	Spring
	SIE 449	Optimization for Machine Learning	SIE 270 & SIE 340	Spring
	SIE 482	Lean Manufacturing and Operations	SIE 305	Spring
	Choose 4 of the 5 courses above			
VII. Healthcare Systems	SIE 477	Introduction to Biomedical Informatics	ECE 175 or equivalent	Fall
	ESOC 414 or LIS 471*	Computational Social Science (OR) Introduction to Information Technology		TBD
	ISTA 420*	Applied Cyberinfrastructure Concepts		TBD
	Courses marked as * can be replaced with SIE 492 – Directed Research			
VIII. Systems Engineering & Sensor Systems	SIE454A	The Systems Engineering Process	SIE 305	Fall & Spring
	SIE 455	Sensor System Engineering	SIE 305	Spring
	SIE 458	Model Based Systems Engineering	SIE 454A or instructor permission	Fall
	SIE 472	INSuRE: Information Security & Research	SIE471, or ECE 478, or ECE 509, or MIS 416	Spring
	Add one more course in other areas, or add SIE 492-Directed Research			

VIII. Cybersecurity	SIE 471	Systems Cyber Security Engineering		Fall
	SIE 472	INSuRE: Information Security & Research	SIE471, or ECE 478, or ECE 509, or MIS 416	Spring
	Add two more courses in other areas, or add SIE 492-Directed Research			

	SIE 473	Engineering of Trustworthy Secure Systems		Spring
	SIE 496	Special Topics in SIE	SIE 305	Summer
X. Software Engineering	CSC 355/345	Discrete Structures & Algorithms	MATH 243 & ECE 201	Fall/spring/sum
	SIE 472	INSuRE: Information Security & Research	SIE471, or ECE 478, or ECE 509, or MIS 416	Spring
	SFWE 301	SW Requirements Analysis & Test		Fall/spring
	SFWE 302	SW Design Process		Fall/spring
	SFWE 401	SW Assurance & Security		Fall/spring
	SFWE 402	SW DevOps	SFWE 301 & 302	Fall/spring
	Choose 4 of the 6 courses above			
Faculty Guided Research OR Internship	SIE 492	Directed Research (See Note 2)		Fall or Spring
	SIE 493	Internship	needs proposal and faculty approval	Fall Spring Summer
Math	MATH 300/400 level	You may apply 6 units of upper division MATH coursework not used in major		Fall Spring Summer

- **Note 1:** Course descriptions of these courses in the list can be found in the course catalog: https://uaccess.schedule.arizona.edu/psp/uazsaprd2/UA_CATALOG/HRMS/h/?tab=DEFAULT
- **Note 2:** SIE 492, please contact the faculty who you hope to work with and you will submit the approved "Independent Study Proposal Form" to your [academic advisor](#) before registration. Registration needs approval. <https://sie.engineering.arizona.edu/research/focus-areas>
- **Note 3:** SIE 496: Special Topics for Spring 2024
 - Section 1: Optimization for Machine Learning with Prof. Jalilzadeh: **I, III, VI**
 - Section 6: Robotic Systems, Prof. Curti: **VIII**

Academic Advising Questions: advisor@sie.arizona.edu