

Industrial Engineering: Technical Electives Selection Guideline


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

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.. Following these information, you will have three possible strategies:

Strategy 1: “I am interested in courses in Industrial Engineering, and I would like to select my technical electives in a focus area in IE.”

 **Select a focus area based on your interests and then select courses in that area in the following pre-approval course table.**

If the number of courses in a focus area is less than 4 courses, you will add 1-2 courses in other areas or directed research in the following table. For example, if you are interested in manufacturing area, you will take these 3 courses in the following table and add 1 more courses in other areas in the table.

If the number of courses in a focus area is more than 4 courses, you will just need to select 4 courses.

You are always welcome to contact your faculty advisor for suggestions in choosing courses.

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	SIE 265	Spring
	SIE 414	Law for Engineers and Scientists		Spring
	SIE 415	Technical Sales and Marketing		Fall & Spring
	SIE 457	Project Management		Fall & Spring
	SIE 464	Cost Estimation	SIE 305	Spring
	Choose 4 of the 5 courses above			
II. Reliability and Quality Engineering	SIE 406	Quality Engineering	SIE 305	Fall (starting fall 2022)
	SIE 408	Reliability Engineering	SIE 305	Fall
	SIE 430	Engineering Statistics	SIE 305	Fall
	Add 1 more course in other areas or SIE 492 Directed Research			
III. Operations Research	SIE 440	Survey of Optimization Methods	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		Fall
	Add 1 more course in other areas or SIE 492 Directed Research			
V. Human Factors Engineering	SIE 413	Ergonomics for Inclusive Design	SIE 305 or 410A	Spring (starting 2022)
	SIE 430	Engineering Statistics	SIE 305	Fall
	Add 2 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 (starting sp 2023)
	SIE 440	Survey of Optimization Methods	SIE 340	Spring
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		Spring
	ISTA 420*	Applied Cyberinfrastructure Concepts		TBD
	Courses marked as * can be replaced with SIE 492 – Directed Research			
VIII. Systems Engineering & Sensor Systems	SIE 454A	The Systems Engineering Process	SIE 305	Fall
	SIE 455	Sensor System Engineering	SIE 305	Spring
	SIE 458	Model Based Systems Engineering	SIE 454A or instructor permission	Spring
	Add one more courses in other areas, or add SIE 492-Directed Research			

VIII. Cybersecurity	SIE 471	Systems Cyber Security Engineering		Fall
	SIE 472	Information Security and Research	SIE471, or ECE 478, or ECE 509, or MIS 416	Spring
	SIE 473	Engineering of Trustworthy Secure Systems		Spring
	SIE 496	Special Topics in SIE	SIE 305	Fall, Spring, Summer
X. Software Engineering	CSC 345	Analysis of Discrete Structure & Algorithms	CSC 210 & (CSC 245/MATH 243/MATH 323)	Fall/spring/sum
	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
Faculty Guided Research OR Internship	SIE 492	Directed Research (See Note 3)		Fall or Spring
	SIE 493	Internship	needs proposal and faculty approval	Fall Spring Summer
Math Minor	MATH 300/400 level	If you are completing a math minor, you may apply 6 units of upper division MATH coursework not used in major		Fall Spring Summer

- **Note 1:** This is the pre-approved course list but it should not prevent you from choosing other courses at U of Arizona that meets your interests. If you would like to take a class that is not on this list, please contact the faculty advisor for approval.
- **Note 2:** Course descriptions of these courses in the list can be found in the course catalog:
https://uaccess.schedule.arizona.edu/psp/uazsapr2/UA_CATALOG/HRMS/h/?tab=DEFAULT
- **Note 3:** SIE 492, please contact the faculty who you hope to work with and you will submit the “Independent Study Proposal Form” to Mildred Curran before registration. Registration needs approval.
<https://sie.engineering.arizona.edu/research/focus-areas>

Strategy 2: “I am interested in courses in Industrial Engineering, and I would like to select my technical electives in different focus areas in IE.”




Pick up 4 courses in the table above with samples of several focus areas. For example, you can choose 2 courses in manufacturing, 1 course in operations research, and 1 course in engineering management.

Based on your interests, you can choose any 4 courses as your technical elective from the Table 1 above. The department has approved all of these courses in this list as your technical elective, and you do not need to get an approval from your faculty advisor.

You are always welcome to contact your faculty advisor for suggestions in choosing courses.

Strategy 3: “I am interested in courses outside of Industrial Engineering, and I would like to select these courses as my technical electives.”

 Please check the university course list, prepare your course list meeting the basic requirement on the first page of this document, and then contact your faculty advisor Dr. Neng Fan for approval.

Faculty Advisor

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

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