

Systems Engineering: Minor Courses Selection Guideline

1. General Guideline

Systems Engineering requires an **engineering minor** or **thematic minor**.

Students must complete 18 **unique units** to satisfy this requirement. This means...

- If you complete a minor that shares coursework with your major (ex. ECE 175 applies to the major and the ECE minor), you must take an additional technical elective units to reach 18 total units not used anywhere else in the major.
 - The additional technical electives can be SIE electives, upper level math (if you are completing a math minor), or chosen from coursework in any of the approved engineering minors listed below.
 - 3 units of internship, SIE 493 or SIE 496, may also apply to minor units with pre-approval from your faculty advisor.

The 18 units of minor coursework must meet the following course levels:

Systems Engineering
No more than 9 units 200-level A minimum of 9 units 300/400-level

You can choose a minor from the following approved minors. Except for the Thematic Minor (See Note 3 at the end of the list) that you have to consult with faculty advisor, our department has approved all of these minors and you do not need to get an approval from your faculty advisor. If you like to choose a minor that is not listed in this list, please contact the faculty advisor at the end of this document for suggestions and approval.

Minor	Link to minor requirements
Aerospace Engineering	http://aprr.web.arizona.edu/data-minors/174/UGRD.AEEMINU.pdf
Biosystems Engineering	http://aprr.web.arizona.edu/data-minors/174/UGRD.BEMINU.pdf
Chemical Engineering	http://aprr.web.arizona.edu/data-minors/174/UGRD.CHEMINU.pdf
Civil Engineering	http://aprr.web.arizona.edu/data-minors/174/UGRD.CVEMINU.pdf
Computer Science	http://aprr.web.arizona.edu/data-minors/174/UGRD.COSCMINU.pdf
Electrical and Computer Engineering	http://aprr.web.arizona.edu/data-minors/174/UGRD.ECEMINU.pdf
Engineering Management (Systems majors only)	See "SIE Minor Requirements for SIE majors" below

Industrial Engineering	See "SIE Minor Requirements for SIE majors" below
Materials Science Engineering	http://aprr.web.arizona.edu/data-minors/174/UGRD.MSEMINU.pdf
Mechanical Engineering	http://aprr.web.arizona.edu/data-minors/174/UGRD.MEEMINU.pdf
Mining Engineering	http://aprr.web.arizona.edu/data-minors/174/UGRD.MNEMINU.pdf
Optical Sciences and Engineering	http://aprr.web.arizona.edu/data-minors/174/UGRD.OSEMINU.pdf
Software Engineering	See "Software Engineering Requirements for SIE majors" below
Systems Engineering (Engr Mgmt majors only)	See "SIE Minor Requirements for SIE majors" below
Thematic Minor ³	https://www.registrar.arizona.edu/academics/thematic-minors

Note 1: Some minors may require more than 18 units

Note 2: In case some web links are not working, please consult with Mildred Curran in our department.

Note 3: You may choose a **thematic minor** in consultation with your faculty advisor, Dr. Jian Liu. The thematic minor must consist of coursework from two or more engineering disciplines, meet the required course levels, and should be developed around a central and unified theme (e.g., Cybersecurity, Data Analytics, Biomedical, Construction Management, etc.).

2. How to Declare your Minor

Once you have decided on a minor, please follow instructions in the table below to officially declare it.

Minor	How to declare
All Engineering Minors	Complete the online form here: http://engineering.arizona.edu/academic-policies/declare-minor
Computer Science Minor	Complete info session and online form here: https://www.cs.arizona.edu/minor-cs
Thematic Minor	Complete this form: https://www.registrar.arizona.edu/sites/registrar.arizona.edu/files/forms/Thematic%20Minor%20Form%203-17.pdf Obtain faculty advisor signature and return to SIE Advisor for processing

3. SIE Minor Requirements for SIE majors

If you would like to complete one of the SIE minors (Engineering Management or Industrial Engineering), ***we do not allow double use of coursework between your major and minor.*** As a result of this departmental policy, the SIE minor requirements are slightly different for students pursuing a major in SIE. Please follow one of following options A1 or A2 to choose courses.

Option A1. If you are System Engineering Major, you can choose Industrial Engineering Minor:

Industrial Engineering minor, if you are a Systems Engineering major...			
Course #	Title	Prerequisite Adv Stand in Engineering +	Typically offered
Choose 6 courses from:			
SIE 377	Software for Engineers	ECE 175 or CSC 110	fall
SIE 383	Integrated Manufacturing Systems		spring
SIE 408	Reliability Engineering	SIE 305	fall
SIE 433 OR SIE 432	Fundamentals of Data Science for Engineers	SIE 305	fall (spring starting sp 2023)
	Sports Analytics	SIE 305	summer
SIE 440	Survey of Optimization Methods	SIE 340	spring
SIE 465	Supply Chain Management	SIE 305 & SIE 340	spring
SIE 492 OR SIE 493	Directed Research	Faculty Approval	fall, spring, summer
	Internship	Faculty Approval	fall, spring, summer

Option A2. If you are a Systems Engineering Major, you can choose Engineering Management Minor:

Engineering Management minor, if you are a Systems Engineering major...			
Course #	Title	Prerequisite AdvStand in Engineering +	Typically offered
Required:			
SIE 457	Project Management		fall/spring
Choose 5 courses from:			
SIE 367	Engineering Management II	SIE 265	spring
SIE 406	Quality Engineering	SIE 305	spring (fall starting fall 2022)
SIE 408	Reliability Engineering	SIE 305	fall
SIE 414	Law for Engineers and Scientists		spring
SIE 415	Technical Sales and Marketing		fall/spring
SIE 422	Engineering Decision Making Under Uncertainty	SIE 305	fall
SIE 432 OR SIE 433	Sports Analytics or Fundamentals of Data Science for Engineers	SIE 305	summer fall (spring starting sp 2023)
SIE 462	Production Systems Analysis	SIE 305 & 340	spring
SIE 464	Cost Estimation	SIE 305	spring
SIE 465	Supply Chain Management	SIE 305 & 340	spring
SIE 492 OR SIE 493	Directed Research Internship	Faculty Approval	fall/spring/summ

Option A3. If you are Systems Engineering Major, you can choose Software Engineering Minor:

Software Engineering minor, if you are an Systems Engineering major...			
Course #	Title	Prerequisite AdvStand in Engineering +	Typically offered
Required:			
SFWE 101	Intro to Software Engineering	MATH 122A/B or MATH 125	fall/spring
ECE 275	Computer Programming II	ECE 175	fall/spring
Choose 4 courses from:			
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	ECE 275	fall/spring
SFWE 402	SW DevOps	SFWE 301 & 302	fall/spring
SFWE 403	SW Project Management	SIE 464	fall/spring

4. Faculty Advisor

If you need help choosing your minor, making minor course selections or need thematic minor OR SIE 493 approval, please contact the faculty advisor for Systems Engineering:

Professor Jian Liu

Office: ENGR 221

Email: jianliu@arizona.edu

Phone: 520.621.6548