

Engineering Management: Minor Courses Selection Guideline

1. General Guideline

Engineering Management 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 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, 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:

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

You can choose a minor from the approved minors in the following list. 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 Minor Requirements for SIE majors" below
Systems Engineering (Engr Mgmt majors only)	See "SIE Minor Requirements for SIE majors" below
Thematic Minor (See Note 3)	https://www.registrar.arizona.edu/academics/thematic-minors

Note 1: Some minors may require more than 18 units. Additional technical elective must be taken if there is major/minor overlap.

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, Professor Bob Lepore. 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 Advising for processing

3. SIE Minor Requirements for SIE majors

If you would like to complete one of the SIE minors (Systems Engineering 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, based on your major to choose courses.

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 Engineering Management:

Professor Mike Kwinn

Office: ENGR 103

Email: kwinnm@arizona.edu

Phone: 520.626.4276

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

Industrial Engineering minor, if you are an Engineering Management major...			
Course #	Title	Prerequisite AdvStand in Engineering +	Typically offered
Required:			
SIE 410A	Human Factors & Ergonomics in Design	SIE 305	fall/spring
Choose 5 courses from:			
SIE 321	Probabilistic Models in Operations Research	SIE 305	spring
SIE 330R	Engineering Experiment Design	SIE 305	spring
SIE 370	Embedded Computer Systems	PHYS 241	fall/spring
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 432	Sports Analytics	SIE 305	summer
SIE 433	Fundamentals of Data Science for Engineers	SIE 305	spring (spring starting sp 2023)

SIE 440	Survey of Optimization Methods	SIE 340	spring
SIE 465	Supply Chain Management	SIE 305 & SIE 340	spring
SIE 481	Design for Additive Manufacturing	SIE 383 or BE 221	fall
SIE 482	Lean Operations and Manufacturing Systems	SIE 305	spring
SIE 492 OR	<u>Directed Research</u>	Faculty Approval	fall/spring/sum
SIE 493	Internship		

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

Systems Engineering minor, if you are an Engineering Management major...			
Course #	Title	Prerequisite AdvStand in Engineering +	Typically offered
Required:			
SIE 250	Intro to Systems & Industrial Engineering	MATH 129	fall/spring
SIE 277	Object-Oriented Modeling and Design	ECE 175 or CSC 110	fall/spring
Choose 4 courses from:			
SIE 370	Embedded Computer Systems	PHYS 241	fall/spring
SIE 377	Software for Engineers	ECE 175 or CSC 110	fall
SIE 408	Reliability Engineering	SIE 305	fall
SIE 410A	Human Factors & Ergonomics in Design	SIE 305	fall/spring
SIE 422	Engineering Decision-Making Under Uncertainty	SIE 305	fall
SIE 432	Sports Analytics	SIE 305	summer
SIE 433	Fundamentals of Data Science for Engineers	SIE 305	spring (spring starting sp 2023)
SIE 454A	The Systems Engineering Process		fall
SIE 455	Sensor Systems Engineering	SIE 305	spring
		(co-req or prereq)	
SIE 458	Model Based Systems Engineering	SIE 454A	spring
		(co-req or prereq)	
SIE 471	Systems Cyber Security Engineering	ECE 175 or CSC 110	fall
SIE 492 OR SIE 493	<u>Directed Research</u> Internship	Faculty approval	fall/spring/sum

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

Software Engineering minor, if you are an Engineering Management 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 355 or CSC 345	Discrete Structure & Basic Algorithms	CSC 210 & CSC 245, MATH 243/MATH 323	fall
SFWE 301	SW Requirements Analysis & Test	ECE 275	fall
SFWE 302	SW Design Process	SFWE 301	spring
SFWE 401	SW Assurance & Security	ECE 275	spring
SFWE 402	SW DevOps	SFWE 301 & 302	TBD
SFWE 403	SW Project Management	SIE 464	TBD

