

Effective Fall 2021

2.5 Year MS & MSE Plan		Requirement*	Notes	Course #	Credits	Term		
Engineering	Chemical Engineering Core	21CR from the ChE courses at 500 level or higher	Required: All courses in Chemical Engineering courses (see next page)	ChE 527	3			
				ChE 528	3			
				ChE 538	3			
				ChE 542	3			
				ChE 595	1			
				ChE 505	3			
School for Environment and Sustainability	SS CORE	6CR in Systems Analysis for Sustainability	Required: EAS 557/CEE 586 And one course from List A1	EAS 557				
				9CR total	Sustainable Design & Technology <i>Minimum 3CR</i>	Required: See List A2 for acceptable courses		
					Sustainable Enterprise <i>Minimum 3CR</i>	See List A3 for acceptable courses		
					Additional 3CR minimum from list A1, 2, or 3	See attached list (A1-3) of acceptable courses in these specializations		
	EAS Core	EAS 509 (Natural Systems Core) EAS 510(Social Systems Core) or 3CR from the <u>*Social Systems Distribution list.</u> <u>*IAMS Requirement</u> Two courses; 3CR minimum						
	Analytics	One Statistics course	EAS 538 or equivalent required:					
	Capstone	Master's Project/Thesis/Practicum	At most 6 credit hours of EAS 701 (Master's Project) or EAS 702 (Master's Practicum) or At most 12 credits of EAS 700 (Master's Thesis)					
	TOTALS	Total "EAS" credits - 25						
TOTALS	Total "ChE" credits - 18							
	Total credits needed for both - 54							

*IAMS and Social Systems Distribution courses can double-count with Core requirements but we do not double-count the actual credits.

Chemical Engineering

ChE 527 (3)	Fluid Flow (W)
ChE 528 (3)	Chemical Reactor Engineering (F)
ChE 538 (3)	Statistical and Irreversible Thermodynamics (W)
ChE 542 (3)	Heat and Mass Transport (F)
ChE 595 (1)	Chemical Engineering Research Survey (F)

A. Sustainable Systems Core (1-3)

1) Systems Analysis for Sustainability (at least 6CR*)

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EAS 573 (3cr)	Environ Footprinting and Environ Input-Output Analysis (W)
EAS 610 (1.5cr)	Advanced LCA Methods & Software Tools (W)
EAS 597 (3cr)	Environmental Systems Analysis (F)
EAS 557/CEE 586 (3cr)	Industrial Ecology (W)
EAS 550/STRAT 566 (3cr)	Systems Thinking for Sustainable Development (W)
EAS 501.023 (3cr)	Tools for Policy and Environmental Analysis (F)
EAS 501.091 (3cr)	Climate Change Science and Solutions (F)

*At least two courses need to be from the courses listed above

EAS 570 (3cr)	Environ Economics: Quantitative Methods & Tools (F)
EAS 531 (4cr)	Principles of GIS (F&W)

2) Sustainable Design & Technology (3CR)

EAS 537 (3CR)	Urban Sustainability (F)
EAS 501.087 (3CR)	Technology and Community Sustainable Development (TBD)
EAS 501.091 (1.5CR)	Transport, Energy, & Environment (W)
EAS 579 (3CR)	The Hydrologic Cycle and Water Resource Management (W)
EAS 501.009 (1.5CR)	Principles of Infrastructure Sustainability (F)
EAS 501.209 (1.5CR)	Advanced Infrastructure Systems (F)
EAS 615 (3CR)	Renewable Electricity and the Grid (W)
EAS 574/PUBPOL 519 (3cr)	Sustainable Energy Systems (F)
EAS 605/BA 605 (3cr)	Green Development (W)
EAS 677.023 (2)	Deep Decarbonization (W)
EAS 687 (4cr)	Landscape Planning (F)
ARCH 575 (3cr)	Building Ecology (F)
CEE 480 (3cr)	Design of Environ Engineering Systems (F)
CEE 582 (3cr)	Environmental Microbiology (F)
MECHENG 589 (3cr)	Sustainable Design of Technology Systems (W)

3) Sustainable Enterprise (3CR)

EAS 501.035	Michigan Venture Club (W)
EAS 501.102 (3cr)	Renewable Energy at the State and Local Level (F)
EAS 525 (3cr)	Energy Justice (F)
EAS 535/BL 536 (2.25cr)	Ethics Corporate Management (TBD)
EAS 512/Strategy 564	Strategies for Sustainable Development I (F)
EAS 513/Strategy 565	Strategies for Sustainable Development II (F)
EAS 527/BE 527 (3cr)	Energy Markets and Energy Politics (F)
EAS 533 (3cr)	Negotiation Skills (F)
EAS 595/TO 560 (1.5)	Sustainable Operations and Supply Chain Management (W)
BE 555 (1.5)	Non-Market Strategy (F)
EAS 560/URP 544 (3cr)	Behavior and Environment (F)

EAS 576/CEE 588/ChE 590 (3cr)
ENGR 521 (3cr)
FIN 637 (2.25cr)
FIN 583 (1.5cr)

Sustainability Finance: Investment Model for Green Growth (F)
CleanTech Entrepreneurship (W)
Finance and Sustainable Enterprises (F)
Energy Project Finance (W)

B) Sustainable Systems Electives

B1) Additional SS courses (can count towards Non-Opus option)

EAS 572(2cr)
EAS 523(3cr)
EAS 552 (3cr)
EHS 672 (3cr)
EAS 686/HMP 686/PubPol 563 (3cr)
BA 612 (2.25cr)
ESENG 501 (3cr)
Econ 437 (3cr)
URP 553

Environmental Impact Assessment (F)
Environmental Risk Assessment (W)
Ecosystem Services (F)
Life Cycle Assessment: Human Health & Environ Impacts (F)
Environmental Policy (W)
Strategies for the Base of the Pyramid (F)
Seminars in Energy Science, Technology, and Policy (F)
Energy Economics & Policy (W)
Sustainable Urbanism and Architecture (F)

B2) Sustainable Systems Themes:

- Energy Systems
- Mobility Systems
- Water Systems
- Food Systems
- Built Environment
- Climate Change

Integrated Analytic Methods and Skills Requirement

Students are required, at some point during their time enrolled in the program, to take 2 courses composing at least 3 credits from a faculty-approved list of courses that focus on integrative analytic methods and skills.