

Effective Fall 2021

2 Year MS & MSE Plan		Requirement*	Notes	Course #	Credits	Term			
Engineering	Civil Engineering Core	15CR from the Civil and Environmental Engineering Department	Required: CEE 520 CEE 521 CEE 522	CEE 520					
				CEE 521					
				CEE 522					
		Minimum of 2 additional CEE courses in Environmental and Water Resource Engineering	See List A for sample of approved courses (next page)						
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 Minimum 3CR	Required: See List A2 for acceptable courses			
					Sustainable Enterprise Minimum 3CR	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 *Social Systems Distribution list.							
					*IAMS Requirement Two courses; 3CR minimum				
		Analytics	One Statistics course	EAS 538 or equivalent required:					
		Capstone*	Students are <u>not</u> expected to complete a Capstone, but could petition to do a thesis/practicum or project*	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 "CEE" credits - 18							
		54 credits total for both							

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

## Civil Engineering

Sample of Environmental and Water Resource courses (more available, see advisor):

CEE 524 (3)	Environmental Turbulence (W)
CEE 580 (3)	Physicochemical Processes in Environmental Engineering (W)
CEE 581 (3)	Aquatic Chemistry (W)
CEE 582 (3)	Environmental Microbiology (F)
CEE 586/EAS 557 (3)	Industrial Ecology (W)
CEE 624 (3)	Restoration Fundamentals and Practice in Aquatic Systems (F)

### A) Sustainable Systems Core (1-3)

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

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

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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 525 (3cr)	Energy Justice (F)
EAS 501.035	Michigan Venture Club (W)
EAS 501.102 (3cr)	Renewable Energy at the State and Local Level (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)	Sustainability Finance: Investment Model for Green Growth (F)
ENGR 521 (3cr)	CleanTech Entrepreneurship (W)
FIN 637 (2.25cr)	Finance and Sustainable Enterprises (F)
FIN 583 (1.5cr)	Energy Project Finance (W)

## B) Sustainable Systems Electives

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

EAS 572(2cr)	Environmental Impact Assessment (F)
EAS 523(3cr)	Environmental Risk Assessment (W)
EAS 552 (3cr)	Ecosystem Services (F)
EHS 672 (3cr)	Life Cycle Assessment: Human Health & Environ Impacts (F)
EAS 686/HMP 686/PubPol 563 (3cr)	Environmental Policy (W)
BA 612 (2.25cr)	Strategies for the Base of the Pyramid (F)
ESENG 501 (3cr)	Seminars in Energy Science, Technology, and Policy (F)
Econ 437 (3cr)	Energy Economics & Policy (W)
URP 553	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.