University of Michigan
Engineering Sustainable Systems
Sustainable Design & Manufacturing specialization

Dual-Master's Degree Program
Summary of Requirements for a Master of Science **(Sustainable Systems)** and a Master of Science in Engineering **(Mechanical Engineering)**

Effective Fall 2021

2.5 YEAR MS & MSE PLAN		Requirement		Notes	Course #	Credits	Term
Engineering	Mechanical Engineering Core	*12CR* in ME courses at the 500 or 600 level		Required Courses: ME 589 At least one course from Mechanical Engineering course list (next page)	ME 589		
		6CR in additional ME courses or research at 400 level or above		*ME option: • Coursework Only	ME 455		
		6CR in acceptable Mathematics or equivalent		Please see: ME Graduate Handbook			
School for Environment and Sustainability	SS Core	*6CR* in Systems Analysis for Sustainability		Required Course: EAS 557/CEE 586	EAS 557		
		9CR total	Sustainable Design & Technology *Minimum 3CR*	See List A2 for acceptable courses			
			Sustainable Enterprise *Minimum 3CR*	See List A3 for acceptable courses			
			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					
		IAMS Requirement Two courses; 3CR minimum Please see page 3 for approved					
	Analytics	One Statistics course		EAS 538 or equivalent required			
	Opus	Master's Project/Thesis/Practicum		At most *6CR* of EAS 700/701			
	TOTALS	**Total "EAS" credits - 25**					
	TOTALS	**Total "ME" 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.

SEAS SCHOOL FOR ENVIRONMENT AND SUSTAINABILITY UNIVERSITY OF MICHIGAN | COLLEGE OF ENGINEERING MECHANICAL ENGINEERING UNIVERSITY OF MICHIGAN

Last Revised 05/27/2021

Mechanical Engineering

MECHENG 555 (3)	Design Optimization (W)
MECHENG 577 (3)	Materials in Manufacturing and Design (W)
MECHENG 581 (3)	Global Product Development
MECHENG 587 (3)	Global Manufacturing (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

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 (F)
EAS 501.091 (1.5CR)	Transportation Energy (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)	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-Opus 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. The faculty-approved existing courses that satisfy this requirement are listed below: