

2.5 YEAR MS & MSE PLAN		Requirement	Notes	Course #	Credits	Term	
Engineering	<b>Mechanical Engineering Core</b>	12CR in ME courses at the 500 or 600 level	Required Courses: ME 589 At least one course from List A (next page)	ME 589			
		6CR in additional ME courses or research	*ME option: • Coursework Only  Please see: <a href="http://me.engin.umich.edu/students/masters.shtml">http://me.engin.umich.edu/students/masters.shtml</a>	ME 455			
		6CR in acceptable Mathematics or equivalent	Please see: <a href="http://me.engin.umich.edu/students/acceptable_math.shtml">http://me.engin.umich.edu/students/acceptable_math.shtml</a>				
Natural Resources and Environment	<b>SS Core</b> <i>[SS-specific requirements]</i>	6CR in Systems Analysis for Sustainability	Required Course: NRE 557/CEE 586 And one course from List 1 (next page)	NRE 557			
		9CR total	Sustainable Design & Technology Minimum 3CR	See List 2 for acceptable courses (next page)			
			Sustainable Enterprise Minimum 3CR	See List 3 for acceptable courses (next page)			
	<b>NRE Core</b> <i>[School-wide requirement]</i>	NRE 509 NRE 510 NRE 580	10CR in total				
	<b>Analytics</b> <i>[School-wide requirement]</i>	3CR in Analytics	NRE 538 or equivalent required: <a href="http://www.snre.umich.edu/sites/snre.umich.edu/files/Statistic%20Courses%201108.pdf">http://www.snre.umich.edu/sites/snre.umich.edu/files/Statistic%20Courses%201108.pdf</a>				
	<b>Opus</b> <i>[School-wide requirement]</i>	Master's Project/Thesis/Practicum	At most 6CR of NRE 700/701				
	<b>Cognates</b> <i>[Rackham requirement]</i>		SNRE - 4CR of graduate level coursework outside of SNRE. Can be fulfilled with ME courses. ME - 2 non-ME courses				
<b>TOTALS</b>	<b>TOTAL CREDIT HOURS BY SCHOOL</b>		<b>"NRE" - Minimum 25CR</b>				
			<b>"ME" - Minimum 18CR</b>				
	<b>TOTAL CREDIT HOURS</b>	<b>Minimum 54 Credit Hours</b>					

\*Please see the Mechanical Engineering Student Services Office if you would prefer to complete their Research or Thesis option.

**A) 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)

**1) Systems Analysis for Sustainability (6 hrs)**

NRE 531 (4)	Principles of GIS (W)
NRE 550/STRATEGY 566 (3)	Systems Thinking For Sustainable Development (W)
NRE 557/CEE 586 (3)	Industrial Ecology (W)
NRE 570 (3)	Microeconomics with Natural Resource Applications (W)
*NRE 501.086 (W)	Topics and Tools in Environmental Economics (W)
NRE 501.092	Environmental Systems Analysis (F)

\*Please note that only 1 (one) econ course can be counted under the Systems Analysis requirement

**2) Sustainable Design and Technology (3-9hrs)**

NRE 501.039 (3)	Land Use and Global Change (F)
DESCI 502 (3)	Design Process Models (W)
DESCI 790 (1-4)	Design Science Colloquium (F or W)
EECS 498 (3)	Grid Integration of Alternative Energy Sources (TBD)
NRE 501.036 (3)	Sustainable Systems in Developing Countries (W)
NRE 574/PUBPOL 519 (3)	Sustainable Energy Systems (F)
NRE 576/UP 576 (3)	Ecological Design Approaches to Brownfield Redevel (F) every other year
NRE 605/BA 605 (3)	Green Development (W)
NRE 687 (4)	Landscape Analysis and Planning (F)
Arch 575 (3)	Building Ecology (F)
CEE 582 (3)	Design of Environmental Engineering Systems (F)
CEE 686/ChE 686 (2-3)	Environmental Microbiology (F)
ChE 496 (3)	Case Studies in Environmental Sustainability (W)
ME 589 (3)	Sustainable Design of Technology Systems (F)

**3) Sustainable Enterprise (3-9 hrs)**

NRE 501.032 (3)	Transportation Energy and Climate (W)
NRE 512/BA 512 (1.5)	Ethics Corporate Management (F and W)
NRE 513/ STRATEGY 564 & 565 (3)	Strategies for Sustainable Development (F)
NRE 527/BE 527 (3)	Energy Markets and Energy Politics (F)
NRE 532 (3)	Natural Resources and Environmental Conflict Management (F)
NRE 533 (3)	Negotiating Skills In Environmental Dispute Resolution (W)
BE 555	Non-Market Strategy: Shaping the Rules of the Game* (F)
NRE 560/UP 560/HB 710 (3)	Behavior and Environment: (F)
NRE 565 (3)	Principles for Sustainability (TBD)
NRE 605/BA 605 (3)	Green Development (W)
ENGR 521 (3)	CleanTech Entrepreneurship (F)
ES 520 (1.5)	CleanTech Venture Opportunities (F)
FIN 637 (2.25)	Finance and Sustainable Enterprises (F)
STRATEGY 735-739 (1.5)	Topics in Global Sustainable Enterprise (F)