Accelerated Master of Forestry Program

School of Forest Resources and Environmental Science

**A 4+1 program for Michigan Tech Forestry students
with training allowing students to specialize in the following areas:**

<u>Advanced Technologies</u>
<u>Natural Resources Policy</u>
<u>Natural Resources Business Economics</u>
<u>Engineering Technology</u>
<u>Comprehensive Studies for the Forestry Professional</u>

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Overview

The accelerated Master of Forestry is an option for Michigan Tech students to pursue. A general education option will allow for further developing skills used by professional Foresters for current Michigan Tech students with a Forestry or related degree. The standard MF degree curriculum is designed for students with undergraduate degrees from outside the School of Forest Resources and Environmental Science (SFRES) and who wish to reorient their career towards forestry; this option is accredited by the Society of American Foresters, and will continue.

The accelerated MF is for students who want to earn both a bachelor and a masters from Michigan Tech. It provides additional training and specialization beyond the Society of American Foresters accredited undergraduate major in areas relevant to the forestry profession. The maximum time to degree for students in an accelerated master's program is 5 years from the time the student is accepted into the graduate program. Graduate students at Michigan Tech are required to register each academic year (continuous enrollment) for at least one credit from the time they enter the graduate program until they receive their degree.

In order to be formally accepted into this accelerated master's program, students must apply to and be accepted into the Graduate School at Michigan Technological University. Applications will be reviewed by the School of Forest Resources and Environmental Science (SFRES) according to normal procedures. Admission requirements are the same as for other graduate programs in SFRES with the exception that students should have a GPA of 3.0 or higher to be admitted. This is a Michigan Tech Senate Policy regarding all accelerated programs. A student may still apply to the non-accelerated MF program if they have below a 3.0 GPA. Students can apply for admission to an accelerated master's program from one year before graduation until their bachelor's degree is awarded.

Students should have a cumulative GPA of 3.0 or above to be eligible to enter an accelerated master's program. Students who are accepted to the program will not be allowed to continue in the accelerated program if their cumulative undergraduate GPA falls below 3.0, a student may apply to enter the regular MF degree program.

Students will be considered undergraduates for the purposes of financial aid, tuition, and class standing until their undergraduate degree has been awarded. Once students are awarded their undergraduate degree, they will be considered graduate students for the purposes of financial aid and tuition.

Credit Requirements

A total of 30 credits are required for the master's degree, including six that may be applied to both the bachelor's and master's degree. A minimum of 152 credits must be completed for the combined bachelor's and master's degree programs. Ten of the remaining 24 credits may be completed while an undergraduate under senior rule, but these credits cannot be applied towards the bachelor's degree. Prior to completion of the master's degree, students must indicate on their master's degree schedule which undergraduate-level courses and credits (up to a maximum of six), should be applied to both their bachelor's and master's degrees. These classes will be 3000 or 4000 level classes required of the undergraduate forestry major. It is anticipated that the six credits applied to both degrees will be FW4080 (Forest Finance and Economics, 3 credits) and FW4150 (Forest Resource Management, 3 credits), though other classes from the undergraduate major would also be acceptable.

This program is offered as a coursework option with a final oral exam, requiring no thesis or report. Under this option, up to 12 credits of the 30 credit total may be at the 3000 or 4000 level. The 6 credits counted for both the bachelor's and master's degree count towards these 12 credits if they are at the 3000 or 4000 level.

Meeting SAF Accreditation Standards

Students will work with the Program Coordinator to determine what courses are need to meet the requirements for the Graduate School, SFRES, and SAF. Programmatic courses required for the SAF accredited Master Forestry degree must be on the student's transcript, either undergraduate or graduate, in order to satisfy requirements for the MF degree. This would include SFRES courses:
- Field Techniques, Field Methods or FERM
- Vegetation of North America or Woody Plants of North America
- Forest Ecology
- Soil Science or Applied Soil Science
- Biometrics and Vegetation Modeling, or Forest Biometrics and Modeling
- Advanced GIS or Remote Sensing
- Forest Economics and Finance or Economic Analysis of Forestry
- Natural Resources Policy
- Forest/Landscape Hydrology or Forest Biometrics and Modeling
- Forest Resource Management, Forest Management, or Integrated NR Assessment
- Timber Harvesting or Advanced Timber Harvesting

Beginning 2018/2019, all MF students must submit a Pre-Enrollment and Completion Check Form (https://www.mtu.edu/forest/graduate/professional/forestry/curriculum/) to the Program Director to ensure SAF accreditation standards are met.

Program Administration
A faculty member has been designated as the Coordinator of the Accelerated Master of Forestry program. Adjustments to the course of study are possible with approval from the Coordinator.

Accelerated MF Required Curriculum

Required classes	FW5810 – Research Methods in Natural Resources. Fall and Spring.	2 credits	
	FW5081 – Professionalism in Forestry. Spring.	1 credit	
	FW5377 - Advanced Forest & Environmental Resource Management II. Fall and Spring.	2 credits	
	MA5701 - Statistical Methods. (or alternate from list) Fall (or Spring).	3 credits	
	Credits applied to both BS and MF degree	6 credits	**Subtotal 14 credits**

Required Courses plus one of the Specialization areas (Grand Total 30-32 credits) outlined below.

Advanced Technologies

Directed electives	Three classes in remote sensing/ geographic information systems.	8-12 credits	
	One additional statistics class	3 credits	**Subtotal 13-19 credits**
	One class in the area of forest biology or management	2-4 credits	

Comprehensive Studies for the Forestry Professional

Directed electives	One class in economics or business related to natural resources or the environment.	3-4 credits	
	One class in wood products, chemistry, or engineering principles	2-4 credits	
	One class in natural resource policy or law.	3-4 credits	**Subtotal 14-20 credits**
	One class in forest biology or management	3-4 credits	
	One class in advanced GIS or spatial statistics	3-4 credits	

Engineering Technology

Directed electives	Four classes in wood products, chemistry, or engineering related to environmental products, procurement, or processing OR three classes in the above plus one approved statistics or math course.	12 credits	
	One class in forest biology or advanced GIS if only 9 credits in first category	2-4 credits	**Subtotal 14-18 credits**

Natural Resources Policy

Directed electives	Four classes in policy or law covering natural resources or environmental topics.	9-12 credits	
	One class in forest biology, management or advanced GIS.	2-4 credits	**Subtotal 14-18 credits**
	One class in Communications, rhetoric, writing, or social surveying.	2-4 credits	

Natural Resources Business Economics

Directed electives	Two classes in economic or business related topics covering natural resources or environmental topics.	5-7 credits	

Two classes in any economic or business related topic.	**5-7 credits**	
One class in the area of forest biology, management or advanced GIS.	**2-4 credits**	**Subtotal 14-18 credits**

Sample Electives

Below are examples of courses that would meet the above requirements. See the University Course Catalog each semester for course availability, and see the Program Coordinator for approval of alternative courses that would meet the category. Up to 12 credits of 3000-4000 level courses may be used for a graduate degree. Note that many classes may have additional prerequisites.

Economic or business related to natural resources or environmental topics

Fall	Spring
EC 4640 or 5640 - Natural Resource Economics (3 credits) Prereq: EC 2001 or EC 3002 or FW 4080	EC 4650 or 5650 - Environmental Economics (3 Credits) Prereq: EC 2001 or EC 3002
SS 5310 - Ecological Economics (3 credits, on demand)	EC 5620 - Energy Economics (3 credits)*
FW 4170 - Consulting Forestry (2 credits summer and fall)	FW 5021 – Forest Certification (1 credit) – summer

Natural resource policy or law topics

Fall	Spring
SS 3630 Environmental Policy and Politics (3 credits)	SS 3800 Energy Technology and Policy (3 credits)
FW3760 - Human Dimensions of Natural Resources (3 credits)	SS 5313 - Sustainability Policy (3 credits, on demand)*
SS 5004 Survey Methods	SS 5XXX Water Policy, History, and Governance
FW 5180 – Ethics of Conservation and Sustainability (2 credits)	SS 5320 - Special Topics in Environmental Policy (3-9 credits, on demand)*
SS5301 The Policy Process	SS 5302 Governance and Decision Making
SS 5300 - Environmental & Energy Policy (3 credits)*	SS 5350 - Environmental Policy Analysis (3 credits)* Prereq: SS 5300, EC 2001
SS 5318 Public Sector Management	SS 5635 – International Environmental Policy (3 credits, alternate years beginning 2011-2012)*
SS 5400 - Sociology and the Environment (3 credits)*	FW 5812 – Public Relations for Natural Resource Professionals (3 credits)
SS 5500 - Global Environmental History (3 credits)	SS 5550 – Global Environmental History (3 credits) alternate years beginning 2015-2016
SS 6100 - Advanced Seminar in Energy and Climate Policy (3 credits, alternate years beginning 2012-2013)*	SS 5150 – Natural Hazards and Human Impacts (3 credits, Summer only)
	FW 5021 – Forest Certification (1 credit) – summer

Wood products, chemistry, or engineering principle topics

Fall	Spring
BL 5120 – Environmental Remediation (3	BE 5200 Cellular and Molecular Biology II (3

credits) Pre-requisite BL 1020 or 1040, offered alternate years beginning 2011-2012	credits)
CEE 5233 – Advanced Structural Timber Design (3 credits) Pre-requisite CE 4233 offered alternate years beginning 2011-2012	CEE 5261 – Bridge design and construction (3 credits) Prerequisites: CE 4213 and 4223
ENVE 4505 Surface Water Quality Engineering - (3 credits) Prereq: 3501 or 3503	CEE 5350 Infrastructure Life Cycle Engineering (3 credits) offered alternate years beginning 2020-2021
CEE 5665 – Stream Restoration (3 cred9ts) Fall, Spring, Prereq: CE 3620	CM 5715 – Advanced Biochemical Processes (3 credits) Fall, Spring
CH 5130 – Professional Development: Chemical Safety (1 credit) Prereq: CH 3510 or 3540	FW 5517 – Soil Biogeochemistry (3 credits) alternate years starting 2011-2012
ENG 5540 – Sustainable Forest-Based Biofuel Pathways (3 credits) alternate years beginning 2013-2014	MEEM – Environmentally Responsible Design and Manufacturing (3 credits) fall, spring, alternate years beginning 2001-2002
ENVE 3501 - Environmental Engineering Principles (3 credits) or ENVE 3503 Environmental Engineering (3 credits)*	ENVE 4504 - Air Quality Engineering and Science (3 credits) prereq: ENVE 3501 or 3503
SU 5002 – Infrared Technology, Sensors, and Applications (1 credits, on demand)	CEE – Environmental Monitoring and Measurement Analysis (3 credits) Prereqs: MA 2160, CH 1112
FW 3097 – Forest Biomaterials (3 credits)	
CH 4610 – Introduction to Polymer Science (3 credits) prereq: CH 1122 or (ch1160 and CH1161)	
ENG 5510 – Sustainable Futures I (3 credits)	

Advanced GIS or Remote Sensing Topics

Fall	Spring
FW5550 - GIS for Resource Management (4 credits)	FW5560 - Digital Image Processing: A Remote Sensing Perspective (4 credits, Spring) Pre-requisite: FW5550
FW5554 - GPS Field Techniques (2 credits)	FW4545 - Map Design with GIS (3 credits, alternate Spring) Pre-requisite: FW3540 or FW5550
FW4540 - Remote Sensing of the Environment (3 credits - alternate Fall semesters), FW 5541 Lab (1 credit)	FW5555 Advanced GIS concepts and Analysis (3 credits)
FW5540 - Advanced Terrestrial Remote Sensing (4 credits, alternate Fall semesters)	FW5556 GIS Project management (3 credits) Prereq FW 5550
SU4140 Photogrammetry (3 credits). Prerequisite SU2260	FW 5557 – Applied Spatial Statistics (3 credits) Pre-requisite: FW 5550
FW 5553 – Python Programming for ArcMAP GIS (3 credits) Prereqs: FW5550 or 3540	FW 5084 – Data Presentation and Visualization with R (2 credits) alternate years beginning 2017-2018
FW 5580 – UAS (Drone) Remote Sensing and Photogrammetry (4 credits) Prereqs: MA 1032 and FW 5540 or 4540	

Forest biology or management topics.

Fall	Spring
FW 5368 - Forest Ecophysiology Offered alternate years beginning with the 2012-2013 academic year (2 credits)	FW 5130 - Forest Vegetation Dynamics Offered alternate years beginning with the 2012-2013 academic year (3 credits)
FW 5340 - Population Genetics and Applied Forest Genetics (3 credits)	FW 5135 - Plant Community Ecology Offered alternate years beginning with the 2013-2014 academic year (3 credits)
FW 5370 – Measuring Plants and the Environment (3 credits- alternate 2017-2018)	FW 5115 - Restoration Ecology Offered alternate years beginning with the 2013-2014 academic year (3 credits)
FW 5780 – Agroforestry (3 credits on demand)	FW 5100 – Advanced Terrestrial Ecology (3 credits)
FW 3097 – Forest Biomaterials (3 credits)	FW 5133 – Intensive Silviculture (3 credits) alternate years 2017-2018
FW 3098 – Adding Value to Forest Biomaterials (2 credits) alternate years beginning 2016-2017 Prereq: FW 1035	FW 5221- Advanced Wetlands and Global Peatlands (2 credits, alternate years beginning 2017-2018)
FW 3116 – Ethnobotany (3 credits)	FW 5371- Snow Hydrology (3 credits, alternate years 2018-2019)
FW 4250 – The wolves and moose of Isle Royale (2 credits) alternate years beginning 2018-2019	FW 5421 – Climate Change and Management in Great Lakes Forested Systems (3 credits)
BL 4030 – Molecular Biology (3 credits) Prereq: BL 1020 or 1040 and 2100 or CH 4710	FW 3075 – Introduction to Forest Biotechnology (3 credits)
BL 4034 – Community Ecology and Evolutionary Dynamics (3 credits) Prereq: BL 3400 and BL 3190	FW 4111 – Indigenous Natural Resource Management (3 credits)
	FW 4151 – Advanced Timber Harvesting (3 credits) Prereq: FW 3150
	FW 4300 – Wildland Fire (3 credits) Prereq: FW 3020 and 3010 or 3012
	FW 4400 – Urban Forestry (3 credits)

Communications, rhetoric, writing, or surveying topics.

Fall	Spring
SS 5003- Survey Methods (3 credits, fall and spring)	ED or FW 4850 – Environmental Education Methods (4 credits, on demand)
HU 3621 – Introduction to Journalism (3 credits, Prereq: UN 1015)	HU 4693 - Science Writing (3 credits, Prereq: UN 1015)
HU 3700 – Philosophy of Science (3 credits)	HU 4625 – Risk Communication (3 credits, spring, summer)
ED 3510 - Communicating Science I (2 credits, fall, spring, summer)	HU 5010 – Organizational Communication (3 credits, on demand)
HU 5011 – Technology, Culture, and Communication (3 credits, on demand)	FW 5812 – Public Relations for Natural Resource Professionals (3 credits)
HU 3890 – Documentary (3 credits)	

Sample Curriculum for the +1 year

*after completion of undergraduate degree (assumes undergraduate SAF accredited undergraduate degree and no credits taken under senior rule).
*6 credits counted towards both degrees (3000 level or higher).

Specialization in Comprehensive Studies for the Forestry Professional

Fall	Spring
MA5701 - Statistical Methods (3 credits)	FW 5081 – Professionalism in Forestry (1 credit)
FW5810 - Research methods in natural resources (2 credits)	CE 3332 - Fundamentals of Construction Engineering (3 credits) fall, spring, summer
FW 55540 – Remote Sensing of the Environment (3 credits)	FW 5377 - Advanced Forest & Environmental Resource Management II. (2 credits).
EC 5640 - Natural Resource Economics (3 credits)	FW 5130 - Forest Vegetation Dynamics (3 credits)
FW 5180 – Ethics of Conservation and Sustainability (2 credits)	FW 5421 – Climate Change and Mgmt in Great Lakes Forested Systems (3 credits)
Total 13 credits	**Total 12 credits**

Specialization in Natural Resource Policy

Fall	Spring
MA5701 - Statistical Methods (3 credits)	SS 5350 - Environmental Policy Analysis (3 credits)* Prereq: SS 5300, EC 2001
FW5810 - Research methods in natural resources (2 credits)	HU 4625 – Risk Communication (3 credits)
FW 5800 - Master's Graduate Seminar (1 credit)	FW 5377 - Advanced Forest & Environmental Resource Management II. (2 credits).
FW3760 - Human Dimensions of Natural Resources (3 credits)	FW 5556 GIS Project management (3 credits)
SS 5300 - Environmental & Energy Policy (3 credits)*	FW 5081 – Professionalism in Forestry (1 credit)
Total 12 credits	**Total 12 credits**

Specialization in Natural Resources Business Economics

Fall	Spring
MA5701 - Statistical Methods (3 credits)	EC 5650 - Environmental Economics (3 Credits) Prereq: EC 2001 or EC 3002
FW5810 - Research methods in natural resources (2 credits)	MGT 3100 - Leadership Development (3 credits)
FW 4170– Consulting Forestry (2 credits – one in previous summer and one in fall)	FW 5377 - Advanced Forest & Environmental Resource Management II. (2 credits).
EC 5640 - Natural Resource Economics (3	FW5556 GIS Project management (3 credits)

credits) Prereq: EC 2001 or EC 3002 or FW 4080	
SS 5310 - Ecological Economics (3 credits, on demand)	FW 5180 Professionalism in Forestry - (1 credit)
Total 13 credits	**Total 12 credits**

Specialization in Engineering Technology

Fall	Spring
MA 5701 - Statistical Methods (3 credits)	FW 5081- Professionalism in Forestry (1 credit)
FW 5810 - Research methods in natural resources (2 credits)	CEE 5350 Infrastructure Life Cycle Engineering (3 credits)
ENVE 3501 - Environmental Engineering Principles (3 credits)	FW 5377 - Advanced Forest & Environmental Resource Management II. (2 credits).
FW 3097 – Forest Biomaterials (3 credits)	FW5555 Advanced GIS concepts and Analysis (3 credits)
CH 5130 – Professional Development: Chemical Safety (1 credit)	CEE – Environmental Monitoring and Measurement Analysis (3 credits)
Total 12 credits	**Total 12 credits**

Specialization in Advanced Technologies

Fall	Spring
MA 5701 - Statistical Methods (3 credits)	FW 5510 – Applied Spatial Statistics (3 credits)
FW 5810 - Research methods in natural resources (2 credits)	FW 5560 - Digital Image Processing: A Remote Sensing Perspective (4 credits) Pre-requisite: FW5550 or 4550
FW 5554 - GPS Field Techniques (2 credits)	FW 5377 - Advanced Forest & Environmental Resource Management II. (2 credits).
FW 5580 – UAS (Drone) Remote Sensing and Photogrammetry (4 credits)	FW 5081 – Professionalism in Forestry (1 credit)
	FW4545 - Map Design with GIS (3 credits)
Total 11 credits	**Total 13 credits**