

The University Senate of Michigan Technological University

PROPOSAL 29-18
(Voting Units: Academic)

“Proposal for Minor in Forest Biomaterials”

School of Forest Resources and Environmental Science

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1. Introduction

Bio-based materials are the future. Knowledge of how they are produced, transported, manufactured, recycled and returned to ecosystems is fundamental to the forest bioeconomy. The vision of the bioeconomy is centered on the application of research, development, innovation and industrial biotechnology to produce and utilize renewable materials and energy. There are exciting new growth opportunities in both traditional and emerging bio-based sectors, but this growth must be bounded by global challenges related to resource and environmental constraints.

2. Rationale

With over 20 million acres of forest (ranked 5th for timberland in the nation), the state of Michigan also has a large industrial base (auto, plastics, office furniture, biomedical) capable of transitioning to bio-based materials for many of their products. What is needed are technically trained people *who are aware of this opportunity* and up for the challenge to make it a reality. As Michigan Tech is a technically oriented institution with strong ties to industry through engineering, forestry and business, it is an ideal university to prepare students for this exciting future. This multidisciplinary minor will serve to expose students from across the university to the emerging forest bioeconomy in all its facets. It is flexible enough to include technical requirements needed by some academic units, while giving all students insight into how the bioeconomy is emerging, how their discipline fits within the bioeconomy framework, and the opportunities in interdisciplinary areas of study and work.

3. Details of Catalog Copy

3.1 Title of Minor

Forest Biomaterials

3.2 Catalog Description

Following completion of this minor, offered by the School of Forest Resources and Environmental Science, students will have a greater understanding of forest biomaterials and their context within the bioeconomy. Students will also understand how their own discipline relates to forest biomaterials and the bioeconomy, and will experience opportunities for interdisciplinary study and employment.

3.3 List of Courses

The minor requires a total of 18 credits.

Required Course (3 credits)
FW 3097 Forest Biomaterials (3)
Core Elective (Biomaterials) (Choose at least one course)
EC 4640 Natural Resources Economics (3)
CEE 4233 Structural Timber Design (3)
ENG 4510 Sustainable Futures I (3)
FW 3116 Ethnobotany (3)
Electives (Choose 3-12 credits, depending on the chosen core elective(s)) <i>Grouped by area of interest for convenience</i>
<i>Group 1 - Bioeconomy and Policy</i>
EC 4620/GE 4620 Energy Economics (3)
EC 4640 Natural Resource Economics (3)
EC 4650 Environmental Economics (3)
MGT 3000 Organizational Behavior (3)
OSM 3000 Operations and Supply Chain Management (3)
OSM 3150 Introduction to Supply Chain Management (3)
SS 3621 Intro to Public Policy & Mgm't (3)
FW 3110 Natural Resource Policy (3)
FW 3760 Human Dimensions of Natural Resources (3)
FW 4080 Forest Economics & Finance (3)
SS 3313 Sustainability Science, Policy, and Assessment (3)
SS 3630 Environmental Policy and Politics (3)
<i>Group 2 - Biobased Chemicals, Materials and Energy</i>
CM 3979 Alternative Energy Technologies and Processes (1)
CM 4080 Undergraduate Research in Biofuels Engineering (1-3)
CM 4310 Chemical Process Safety/Env (3)
CH/CM 4610 Introduction to Polymer Science (3)
CH 3540 Biophysical Chemistry (3)
CH 3541 Biophysical Chemistry Laboratory (2)
MY 4777 Distributed Additive Manufacturing Open-Source 3-D printing (3)
MY 4155 Composite Materials (3)

MY 4600 Introduction to Polymer Engineering (3)
<i>GROUP 3 - Wood Structures and Engineered Wood Products</i>
FW 3096 Adding Value to Biomaterials (2)
CEE 3202 Structural Analysis (3)
CEE 4233 Structural Timber Design (3)
MEEM 2150 Mechanics of Materials (3)
MET 2120 Statics and Strength of Materials (4)
MEEM 4405 Introduction to the Finite Element Method (3)
MEEM 4150 Intermediate Mechanics of Materials (3)
CMG 3250 Structural Analysis and Design (3)
CMG 4800 Sustainable Construction (3)
<i>GROUP 4 - Sustainable Systems Analysis</i>
ENG 2505 Low Fidelity Systems Modeling (3)
ENG 3505 Modeling Laboratory for Sustainable Systems (1)
ENG 4505 Systems Analysis, Modeling, and Design (3)
ENG 4510 Sustainable Futures I (3)
CEE 4506 Application of Sustainability Principles to Engineering Practice (3)
CEE 4993 Engineering with Developing Communities (2)
SS 4390 Seminar in Sustainability Issues (3-9)
SS 3313 Sustainability Science, Policy, and Assessment (3)
CMG 4800 Sustainable Construction (3)
SS 3300 Environmental Problems
<i>GROUP 5 – Timber and Non-Timber Products</i>
FA 2190 Art and Nature (3)
FW 3116 Ethnobotany (3)
FW 3510 Outdoor Recreation and Tourism (3)
FW 3765 Maple Syrup Management and Culture (1)
FW 3760 Human Dimensions of Natural Resources (3)
FW 4150 Forest Resource Management (3)
FW 3150 Timber Harvesting (2)
FW 3098 Wood Processing and Manufacture (2)

4. Prerequisites not listed in the Minor:

5. New course descriptions: 1 new course - FW 3097 – Forest Biomaterials (proposed fall 2018 as part of the curriculum proposal, aka binder, process)

6. Estimated costs: No additional costs are expected.

7. Planned implementation date : Spring 2019