

ENVIRONMENTAL SCIENCES, POLICY AND MANAGEMENT B.S.

Conservation and Resource Management Track

FALL 2018 curriculum

Course and schedule availability subject to change. Use your APAS report to find your exact requirements

Note: One course cannot satisfy multiple requirements in the major; however, a course can satisfy a major requirement and a liberal education and/or CFANS minor requirement.

A. Integrated ESPM Core (12 credits)

- ___ ESPM 1001 Orientation to ESPM: Freshmen Students (1 cr, F)
OR ESPM 1002 Orientation to ESPM: Transfer Students (1 cr, F)
- ___ ESPM 1011 Issues in the Environment (3 cr, F/S)^E
- ___ ESPM 2021 Environmental Sciences – Integrated Problem Solving (3 cr, S)
- ___ ESPM 3000 Seminar on Current Issues in ESPM (1 cr, F/S)
- ___ ESPM 4041W Problem Solving for Environmental Change (4 cr, F)
OR ESPM 4021W Problem Solving: Env Review (4 cr, S)

B. Communications (7 credits)

- ___ WRIT 1301 University Writing (4 cr, F/S)^F
OR WRIT 1401 Writing and Academic Inquiry (4 cr, F/S)^F
- ___ COMM 1101 Introduction to Public Speaking (3 cr, F/S)^{CIV}
OR AFEE 2421 Communication for Ag, Food & Env. (3 cr, F/S)

C. Mathematical Thinking (8 credits)

- ___ ESPM 3012 Statistical Methods for Env. Scientists & Mgrs. (4 cr, S)^M
OR STAT 3011 Introduction to Statistical Analysis (4 cr, F/S)^M
- ___ MATH 1142 Short Calculus (4 cr, F/S)^M
OR MATH 1271 Calculus 1 (4 cr, F/S)^M

D. Physical, Biological & Technical Sciences (22-24 credits)

- ___ BIOL 1009 General Biology (4 cr, F/S)^B *Reqd if taking BIOC 2011*
OR BIOL 1001 Introductory Biology (4 cr, F/S)^B
- ___ PMB 2022 General Botany (3 cr, F/S)
OR BIOL 2012 General Zoology (4 cr, F/S)
OR ESPM 3108 Ecology of Managed Systems (3 cr, F)^E
OR ESPM 3101 Conservation of Plant Biodiversity (3 cr, F)
OR ESPM 3612W Soil and Environmental Biology (3 cr, F)^{WI}
OR FNRM 1101 Dendrology (3 cr, F)
OR FNRM 3104 Forest Ecology (4 cr, F)
- ___ SOIL 2125 Basic Soil Science (4 cr, F/S)^{P,E}

CHOOSE ONE CHEMISTRY SEQUENCE

- ___ CHEM 1061 Chemical Principles I Lecture (3 cr, F/S)^P
AND CHEM 1065 Chemical Principles I Lab (1 cr, F,S)
- ___ AND CHEM 1062 Chemistry Principles II Lecture (3 cr, F/S)^P
AND CHEM 1066 Chemical Principles II Lab (1 cr, F,S)
OR
- ___ CHEM 1015 Introductory Chemistry: Lecture (3 cr, F/S)
AND CHEM 1017 Introductory Chemistry: Laboratory (1 cr, F/S)
- ___ AND BIOC 2011 Biochemistry for Ag. & Health Sciences (3 cr, F/S)
Prereq Biol 1009
OR SOIL 3416 Plant Nutrients in the Environment (3 cr, S)
OR
- ___ CHEM 1061 Chemical Principles I Lecture(3 cr, F/S)^P
AND CHEM 1065 Chemical Principles I Lab (1 cr, F,S)
- ___ AND BIOC 2011 Biochem. for Ag. & Health Sciences (3 cr, F/S)
OR SOIL 3416 Plant Nutrients in the Environment (3 cr, S)

GEOSPATIAL/RESOURCES ANALYSIS

- ___ FNRM 3131 GIS for Natural Resources (4 cr, F/S)^{TS}
- OR GEOG 3561 Prin. of Geographic Information Science (4 cr, F)

Select One of the Following

- ___ ESPM 3031 Applied Global Positioning Systems for GIS(3 cr, S)
- ___ ESPM 3211 Survey, Measurmnt, & Modeling for Envntl Anlys (3 cr, S)
- ___ ESPM 4021W Problem Solving: Environmental Review (4 cr, S)^{WI}
- ___ ESPM 4295W GIS in Environmental Science & Management (4 cr, F)
- ___ FNRM 3218 Measuring and Modeling of Forests (3 cr, S)
- ___ FNRM 3262 Remote Sensing of Natural Resources & Envnt.(3 cr, F)
- ___ FW 5051 Analysis of Populations (4 cr, S)
- ___ GIS 5571 ArcGIS I (3 cr, F)

E. Social Sciences (7 credits)

- ___ ESPM 3261 Economics & Natural Resources Mgmt (4 cr, S)^{SS}
OR APEC 1101 Principles of Microeconomics (4 cr, F/S)^{SS, GP}
OR ECON 1101 Principles of Microeconomics (4 cr, F/S)^{SS, GP}
- ___ ESPM 3271 Env. Policy, Law & Human Behavior (3 cr, F)^{CIV, SS}
OR ESPM 3241W Natural Resource & Environmental Policy (3 cr, S)^{CIV, SS, WI}

SELECT ONE OF THE FOLLOWING

- ___ ESPM 3202W Conflict Mgmt, Leadership, & Planning (3 cr, S)^{WI}
- ___ ESPM 3241W Natural Resource & Env Policy (3 cr, S)^{CIV, SS, WI}
- ___ ESPM 3271 Environ. Policy, Law, and Human Behavior (3 cr, F)^{CIV.}
- ___ ESPM 3602 Regulations & Corp Environ. Mgmt (3 cr, S)
- ___ ESPM 3604 Environmental Mngmnt Systems & Strategy (3 cr, F)
- ___ ESPM 4242 Methods for Environmental and Natural Resource Policy Analysis (3 cr, even F)

F. Internship and Field Experience (3-5 credits)

FIELD EXPERIENCE

SELECT ONE OF THE FOLLOWING:

- *ESPM 3031 Applied Global Positioning Systems for GIS (3 cr, S)
- ___ ESPM 3111 Hydrology and Water Quality Field Methods (3 cr, S)
- ___ FNRM 2101, 2102, 2104 Forest Plants, Forest Ecology & Forest Measurement Techniques (4 cr, Summer, Cloquet)
- ___ FNRM 3206 Park and Prot. Area Mgmt Field Studies (2 cr, Su)
- ___ PMB 4321 Minnesota Flora (3 cr, even F)
- ___ SOIL 4511 Field Study of Soils (2 cr, May)
- ___ ESPM 4096 Professional Experience Internship (1 cr, F/S)^{*}
OR CFAN 3096 Making the Most of Your Internship* (1 cr, F/S/Su)
** Requires approved internship for enrollment*

Continued on the next page.

G. CRM Track: Contract Courses (23 credits)

A course cannot be on your contract if it is already satisfying an ESPM requirement from the first page*, nor can courses count for multiple groups. You are required to complete a contract with your faculty adviser for 23 credits. The contract must include classes from the lists below reflecting the shown minimum credits per area, plus additional classes from any of the shown areas to reach 23 credits. At least 15 credits for your contract must be taken on the UMTC campus.

CONSERVATION AND MANAGEMENT (MINIMUM 10 CREDITS)

BBE 4535 Assessment & Diagnosis of Impaired Waters (3 cr, F)
BBE 4608 Environmental & Industrial Microbiology (3 cr, F)
EEB 3603 Science, Protection and Mgmt. of Aquatic Envs. (3 cr, F)
ENGL 3501 Public Discourse: Coming to Terms with the Environment (3 cr, S)^{LIT, E}
ENT 3925 Insects, Aquatic Habitats and Pollution (3 cr, F)
ENT 4251 Forest & Shade Tree Entomology (3 cr, F)
*ESPM 3108 Ecology of Managed Systems (3 cr, F)^E
ESPM 3221 Soil Conservation and Land-Use Mgmt. (3 cr, S)
ESPM 3575 Wetlands (3 cr, S)
ESPM 3602 Regulations and Corp Environ. Mgmt (3 cr, S)
ESPM 3603 Environmental Life Cycle Analysis (3 cr, F)
ESPM 3607 Natural Res. Consumption and Sustainability (3 cr, S)
*ESPM 3612W Soil and Environmental Biology (3 cr, F)^{WI}
ESPM 4061W Water Quality and Natural Resources (3 cr, F)^{E, WI}
ESPM 4216 Contaminant Hydrology (3 cr, F)
ESPM 4601 Soils and Pollution (3 cr, S)
ESPM 5071 Ecological Restoration (4 cr, F)
*FNRM 3104 Forest Ecology (4 cr, F)
FNRM 3114 Hydrology and Watershed Management (3 cr, F)
FNRM 3411 Managing Forest Ecosystems: Silviculture (3 cr, F)
FNRM 5153 Forest Hydrology & Watershed Biogeochemistry (3 cr, S)
FW 4102 Principles of Conservation Biology (3 cr, S)^E
FW 4103 Principles of Wildlife Management (3 cr, S)
FW 5604W Fisheries Ecology and Management (3 cr, S)^{WI}
HSCI 3244 Nature's History: Science, Humans, & the Env. (3 cr, F)^{HP, E}
SOIL 3416 Plant Nutrients in the Environment (3 cr, S)
SOIL 5555 Wetland Soils (3 cr, F)
SSM 4504W Sustainable Products Systems Management (3 cr, S)^{WI}
WRIT 3315 Writing on Issues of Land & the Environment (3 cr, S)^{AH, DSJ}

Grand Challenge Courses approved for CRM contracts

Optional. Can be used toward total of 23 credits in the contract, as appropriate to the content areas.
GCC 3001 Can We Feed the World Without Destroying It? (3 cr, F)^E
GCC 3004 The Fracking Boom: Promises and Challenges of the Hydrocarbon Renaissance (3 cr, F)^E
GCC 3006 Climate Change – Myths, Mysteries & Uncertainties (3 cr, S)^E
GCC 3009 Rivers and Cities: Meeting Future Demands on Urban Water Systems (3 cr, S)^E
GCC 3011 Pathways to Renewable Energy (3 cr, S)^{TS}
GCC 5008 Policy and Science of Global Environ'l Change (3 cr, S)^E

H. Liberal Ed: Diversified Core, Designated Themes and WI Requirements

Students are strongly encouraged to take classes that fulfill multiple liberal education requirements. Students must complete four of the five Themes.

Completed through required coursework:

F Freshman Composition Requirement
 M Mathematical Thinking
 B Biological Science
 P Physical Science
 SS Social Sciences
 E *Environment Theme*
 CIV *Civic Life and Ethics Theme*

Can be completed through indicated required or contract course work (or must be completed by taking other courses):

LIT Literature (ENGL 3501)
 AH Arts/Humanities (WRIT 3315)
 TS *Technology & Society Theme (FNRM 3131)*
 HP Historical Perspective (HSCI 3244)
 DSJ *Diversity and Social Justice in United States Theme (WRIT 3315)*
 GP *Global Perspectives Theme (3 cr) (APEC 1101)*

Writing Intensive Courses (WI)

Required: 4 WI courses, 2 of them 3xxx OR 4xxx; at least one is in your major. We recommend you take all your WI as contract courses.

ESPM 4041W or 4021W
 (Completed if ESPM 3241W taken instead of ESPM 3271)
___ Additional writing intensive course
___ Additional writing intensive course

I. Free Electives (22 Credits)

Students are encouraged to make choices that strengthen their expertise in an area and/or provide comparative understanding from another culture or discipline. To this end, students should strongly consider using free electives to complete a University minor, study abroad experience, or a student designed content area. Students construct these expertise areas with the help of their advisors, and such areas can be integrated as contract courses.

Experiential Learning and Interdisciplinary Requirements

Beginning Fall 2013, all students entering CFANS are required to complete at least one course approved for the Experiential Learning designation (EL) and one course approved for the Interdisciplinary designation (ID). Several of the ESPM Integrated Core courses (ESPM 4012W & 4041W) are approved for these designations, so these requirements do not require completing additional courses.

Please Note: Students are strongly encouraged to have an international experience before graduation.

Courses completed during an international experience (study, work, volunteer, research) can meet program requirements, liberal education requirements, and/or electives. Discussion with an advisor prior to commencing an international experience is required to plan how courses tie into ESPM program and the CRM track.