

# Academic Programs

## Degree Programs and Areas of Study

ESF is authorized by the New York State Department of Education to offer undergraduate and graduate degree programs as described in this catalog. The Higher Education General Information Survey (HEGIS) code is the number assigned to programs registered by the commissioner of the New York State Department of Education. The Classification of Instructional Programs (CIP) Code allows the U.S. Department of Education to track educational programs for financial aid eligibility. Enrollment in programs that are not registered or otherwise approved may jeopardize a student's eligibility for certain financial aid programs. Program descriptions and coursework requirements of the individual academic programs may be found on the page numbers listed with the program title.

### Associate in Applied Science (A.A.S.)

**Forest Technology** (HEGIS Code 5403, CIP Code 030599)  
The Ranger School, page 134 and [www.rangerschool.esf.edu](http://www.rangerschool.esf.edu)

**Land Surveying Technology** (HEGIS Code 5309, CIP Code 151102)  
The Ranger School, page 134 and [www.rangerschool.esf.edu](http://www.rangerschool.esf.edu)

### Bachelor of Landscape Architecture (B.L.A.)

**Landscape Architecture** (HEGIS Code 0204, CIP Code 040601)  
Department of Landscape Architecture, page 118 and [www.esf.edu/la](http://www.esf.edu/la)

### Bachelor of Science (B.S.)

**Aquatic and Fisheries Science** (HEGIS Code 0115, CIP Code 261304)  
Department of Environmental and Forest Biology, page 85 and [www.esf.edu/efb](http://www.esf.edu/efb)

**Bioprocess Engineering** (HEGIS Code 0905, CIP Code 140501)  
Department of Paper and Bioprocess Engineering, page 126 and [www.esf.edu/bpe](http://www.esf.edu/bpe)

**Biotechnology** (HEGIS Code 0499, CIP Code 261201)  
Department of Environmental and Forest Biology, page 85 and [www.esf.edu/efb](http://www.esf.edu/efb)

**Chemistry** (HEGIS Code 1905, CIP Code 400501) with options in biochemistry and organic chemistry of natural products, environmental chemistry, or natural and synthetic polymer chemistry.  
Department of Chemistry, page 73 and [www.esf.edu/chemistry](http://www.esf.edu/chemistry)

**Conservation Biology** (HEGIS Code 0420, CIP Code 261307)  
Department of Environmental and Forest Biology, page 85 and [www.esf.edu/efb](http://www.esf.edu/efb)

**Construction Management** (HEGIS Code 0599, CIP Code 469999) with elective concentration in sustainable construction and renewable materials.  
Department of Construction Management and Wood Products Engineering, page 78 and [www.esf.edu/cmwpe](http://www.esf.edu/cmwpe)

**Environmental Biology** (HEGIS Code 0420, CIP Code 261305 )  
Department of Environmental and Forest Biology, page 85 and [www.esf.edu/efb](http://www.esf.edu/efb)

**Environmental Science** (HEGIS Code 0420, CIP Code 030104)  
with options in renewable energy, environmental information

and mapping, watershed science, health and the environment, earth and atmospheric systems science, environmental analysis, or environmental engineering science.

Division of Environmental Science, page 66 and [www.esf.edu/environmentalscience](http://www.esf.edu/environmentalscience)

**Environmental Studies** (HEGIS Code 0201, CIP Code 030101) with options in biological science applications; environmental policy, planning and law; or environmental communication, culture and writing.

Department of Environmental Studies, page 103 and [www.esf.edu/es](http://www.esf.edu/es)

**Forest Ecosystem Science** (HEGIS Codes 0114, CIP Code 030502)

Department of Forest and Natural Resources Management, page 109 and [www.esf.edu/for](http://www.esf.edu/for)

**Forest Engineering** (HEGIS Code 0999, CIP Code 140101)

Department of Environmental Resources and Forest Engineering, page 99 and [www.esf.edu/erfeg](http://www.esf.edu/erfeg)

**Forest Health** (HEGIS Code 0114, CIP Code 030599)

Department of Environmental and Forest Biology, page 85 and [www.esf.edu/efb](http://www.esf.edu/efb)

**Forest Resources Management** (HEGIS Code 0115, CIP Code 030501)

Department of Forest and Natural Resources Management, page 109 and [www.esf.edu/for](http://www.esf.edu/for)

**Natural History and Interpretation** (HEGIS Code 0499, CIP Code 269999)

Department of Environmental and Forest Biology, page 85 and [www.esf.edu/efb](http://www.esf.edu/efb)

**Natural Resources Management** (HEGIS Code 0115, CIP Code 030201)

Department of Forest and Natural Resources Management, page 109 and [www.esf.edu/for](http://www.esf.edu/for)

**Paper Engineering** (HEGIS Code 0999, CIP Code 149999, with a minor in management.

Department of Paper and Bioprocess Engineering, page 126 and [www.esf.edu/pse](http://www.esf.edu/pse)

**Paper Science** (HEGIS Code 0999, CIP Code 149999) with a minor in management.

Department of Paper and Bioprocess Engineering, page 126 and [www.esf.edu/pse](http://www.esf.edu/pse)

**Wildlife Science** (HEGIS Code 0107, CIP Code 260709)

Department of Environmental and Forest Biology, page 85 and [www.esf.edu/efb](http://www.esf.edu/efb)

**Wood Products Engineering** (HEGIS Code 0999, CIP Code 030509) with elective concentrations in sustainable construction and renewable materials, marketing and production, or wood science.

Department of Construction Management and Wood Products Engineering, page 78 and [www.esf.edu/cmwpe](http://www.esf.edu/cmwpe)

### Bachelor of Landscape Architecture/ Master of Science

**B.L.A./M.S. Fast-Track** (HEGIS Code 0204, CIP Code 040601)  
Department of Landscape Architecture, page 118 and [www.esf.edu/la](http://www.esf.edu/la)

## Advanced (Graduate) Certificates

**Advanced Engineering Tools** (HEGIS Code 0999, CIP Code 149999)

Division of Engineering, Department of Environmental Resources and Forest Engineering, page 99 and [www.esf.edu/erfeg](http://www.esf.edu/erfeg)

**Bioprocessing** (HEGIS Code 0199, CIP Code 019999)

Division of Engineering, Department of Paper and Bioprocess Engineering, page 126 and [www.esf.edu/bpe](http://www.esf.edu/bpe)

**Environmental Decision Making** (HEGIS Code 0420)

Division of Environmental Science [restricted to students matriculated at Syracuse University]

## Master of Forestry (M.F.)

**Forest Management and Operations** (HEGIS Code 0115)

Department of Forest and Natural Resources Management, page 109 and [www.esf.edu/for](http://www.esf.edu/for)

## Master of Landscape Architecture (M.L.A.)

**Landscape Architecture** (HEGIS Code 0204, CIP Code 040601)

with areas of study in community design and planning, cultural landscape studies and conservation, or landscape and urban ecology. Department of Landscape Architecture, page 118 and [www.esf.edu/la](http://www.esf.edu/la)

## Master of Professional Studies (M.P.S.)

**Environmental and Forest Biology** (HEGIS Code 0499, CIP Code 261305) with areas of study in applied ecology, chemical ecology, conservation biology, ecology, entomology, environmental interpretation, environmental physiology, fish and wildlife biology and management, forest pathology and mycology, plant biotechnology, or plant science and biotechnology.

Department of Environmental and Forest Biology, page 85 and [www.esf.edu/efb](http://www.esf.edu/efb)

**Environmental and Forest Chemistry** (HEGIS Code 1905, CIP Code 400599) with areas of study in biochemistry, environmental chemistry, organic chemistry of natural products, or polymer chemistry.

Department of Chemistry, page 73 and [www.esf.edu/chemistry](http://www.esf.edu/chemistry)

**Environmental and Resource Engineering** (HEGIS Code 0999, CIP Code 141401) with an option in **construction management and wood products engineering** and areas of study in construction and construction management or wood science and technology.

Division of Engineering, Department of Construction Management and Wood Products Engineering, page 78 and [www.esf.edu/wpe](http://www.esf.edu/wpe)

**Environmental and Resource Engineering** (HEGIS Code 0999, CIP Code 141401) with an option in **forest engineering** and areas of study in environmental management or mapping sciences.

Division of Engineering, Department of Environmental Resources and Forest Engineering, page 99 and [www.esf.edu/erfeg](http://www.esf.edu/erfeg)

**Environmental and Resource Engineering** (HEGIS Code 0999, CIP Code 141401) with an option in **paper and bioprocess engineering** and areas of study in process and environmental systems engineering or pulp and paper technology.

Division of Engineering, Department of Paper and Bioprocess Engineering, page 126 and [www.esf.edu/pse](http://www.esf.edu/pse)

**Environmental Science** (HEGIS Code 0420, CIP Code 030104) with areas of study in environmental and community land planning, environmental communication and participatory processes, environmental policy and democratic processes, environmental systems and risk management, or water and wetland resource studies.

Division of Environmental Science, page 66 and [www.esf.edu/environmentalscience](http://www.esf.edu/environmentalscience)

**Environmental Studies** (HEGIS Code 0201, CIP Code 030101)

Department of Environmental Studies, page 103 and [www.esf.edu/es/esgp.htm](http://www.esf.edu/es/esgp.htm)

**Forest Resources Management** (HEGIS Code 0115, CIP Code 030506) with areas of study in environmental and natural resources policy, forest ecosystem science and applications, natural resources management, quantitative methods in forest science and management, recreation and resources management, or watershed management and forest hydrology. Department of Forest and Natural Resources Management, page 109 and [www.esf.edu/for](http://www.esf.edu/for)

## Master of Science (M.S.)

**Environmental and Forest Biology** (HEGIS Code 0499, CIP Code 261305) with areas of study in chemical ecology, conservation biology, ecology, entomology, environmental interpretation, environmental physiology, fish and wildlife biology and management, forest pathology and mycology, or plant science and biotechnology.

Department of Environmental and Forest Biology, page 85 and [www.esf.edu/efb](http://www.esf.edu/efb)

**Environmental and Forest Chemistry** (HEGIS Code 1905, CIP Code 400599) with areas of study in biochemistry, environmental chemistry, organic chemistry of natural products, or polymer chemistry.

Department of Chemistry, page 73 and [www.esf.edu/chemistry](http://www.esf.edu/chemistry)

**Environmental and Resource Engineering** (HEGIS Code 0999, CIP Code 141401) with an option in **construction management and wood products engineering** and areas of study in construction and construction management, engineered wood products and structures (timber structure design), tropical timbers, wood science and technology, wood anatomy and ultrastructure, or wood treatments.

Division of Engineering, Department of Construction Management and Wood Products Engineering, page 78 and [www.esf.edu/cmwp](http://www.esf.edu/cmwp)

**Environmental and Resource Engineering** (HEGIS Code 0999, CIP Code 141401) with an option in **forest engineering** and areas of study in ecological engineering, forest engineering, geospatial information science and engineering, or water resources engineering.

Division of Engineering, Department of Environmental Resources and Forest Engineering, page 99 and [www.esf.edu/erfeg](http://www.esf.edu/erfeg)

**Environmental and Resource Engineering** (HEGIS Code 0999, CIP Code 141401) with an option in **paper and bioprocess engineering** and areas of study in chemistry of pulping and bleaching, colloid chemistry and fiber flocculation, fiber and paper mechanics, renewable energy and bioprocess engineering, process and environmental systems engineering, or pulp and paper technology.

Division of Engineering, Department of Paper and Bioprocess Engineering, page 126 and [www.esf.edu/pse](http://www.esf.edu/pse)

**Environmental Science** (HEGIS Code 0420, CIP Code 030104) with areas of study in environmental and community land planning, environmental communication and participatory processes, environmental policy and democratic processes, environmental systems and risk management, or water and wetland resource studies.  
Division of Environmental Science, page 66 and [www.esf.edu/environmentalscience](http://www.esf.edu/environmentalscience)

**Environmental Studies** (HEGIS Code 0201, CIP Code 030101) Department of Environmental Studies, page 103 and [www.esf.edu/es](http://www.esf.edu/es)

**Forest Resources Management** (HEGIS Code 0115, CIP Code 030506) with areas of study in environmental and natural resources policy, forest ecosystem science and applications, natural resources management, quantitative methods in forest science and management, recreation and resources management, or watershed management and forest hydrology.  
Department of Forest and Natural Resources Management, page 109 and [www.esf.edu/for](http://www.esf.edu/for)

**Landscape Architecture** (HEGIS Code 0204, CIP Code 040601) with areas of study in community design and planning, cultural landscape studies and conservation, or landscape and urban ecology.  
Department of Landscape Architecture, page 118 and [www.esf.edu/la](http://www.esf.edu/la)

## Doctor of Philosophy (Ph.D.)

**Environmental and Natural Resources Policy** (HEGIS Codes 0115 and 0420, CIP Codes 030506 and 030104) Division of Environmental Science and the Department of Forest and Natural Resources Management, page 109 and [www.esf.edu/emp](http://www.esf.edu/emp)

**Environmental and Forest Biology** (HEGIS Code 0499, CIP Codes 261305) with areas of study in chemical ecology, conservation biology, ecology, entomology, environmental interpretation, environmental physiology, fish and wildlife biology and management, forest pathology and mycology, or plant science and biotechnology.  
Department of Environmental and Forest Biology, page 85 and [www.esf.edu/efb](http://www.esf.edu/efb)

**Environmental and Forest Chemistry** (HEGIS Code 1905, CIP Code 400599) with areas of study in biochemistry, environmental chemistry, organic chemistry of natural products, or polymer chemistry.  
Department of Chemistry, page 73 and [www.esf.edu/chemistry](http://www.esf.edu/chemistry)

**Environmental and Resource Engineering** (HEGIS Code 0999, CIP Code 141401) with an option in **construction management and wood products engineering** and areas of study in construction and construction management, engineered wood products and structures (timber structure design), tropical timbers, wood science and technology, wood anatomy and ultrastructure, or wood treatments.  
Division of Engineering, Department of Construction Management and Wood Products Engineering, page 78 and [www.esf.edu/cmpwe](http://www.esf.edu/cmpwe)

**Environmental and Resource Engineering** (HEGIS Code 0999, CIP Code 141401) with an option in **forest engineering** and areas of study in ecological engineering, forest engineering, geospatial information science and engineering, or water resources engineering.

Division of Engineering, Department of Environmental Resources and Forest Engineering, page 99 and [www.esf.edu/erfeg](http://www.esf.edu/erfeg)

**Environmental and Resource Engineering** (HEGIS Code 0999, CIP Code 141401) with an option in **paper and bioprocess engineering** and areas of study in chemistry of pulping and bleaching, colloid chemistry and fiber flocculation, fiber and paper mechanics, renewable energy and bioprocess engineering, process and environmental systems engineering, pulp and paper technology.  
Division of Engineering, Department of Paper and Bioprocess Engineering, page 126 and [www.esf.edu/pse](http://www.esf.edu/pse)

**Environmental Science** (HEGIS Code 0420, CIP Code 030104) with areas of study in environmental and community land planning, environmental communication and participatory processes, environmental systems and risk management, or water and wetland resource studies.  
Division of Environmental Science, page 66 and [www.esf.edu/environmentalscience](http://www.esf.edu/environmentalscience)

**Forest Resources Management** (HEGIS Code 0115, CIP Code 030506) with areas of study in forest ecosystem science and applications, natural resources management, quantitative methods in forest science and management, recreation and resources management, or watershed management and forest hydrology.  
Department of Forest and Natural Resources Management, page 109 and [www.esf.edu/for](http://www.esf.edu/for)

## Graduation Rate

The College of Environmental Science and Forestry provides graduation rate information based on a six-year period of study (12 semesters) to comply with state and federal reporting requirements and to properly allow for the extended five-year period of undergraduate study required by the Department of Landscape Architecture for the BLA degree. The six-year graduation rates for first-year freshman students entering ESF in the fall 2001, 2002, and 2003 semesters were 68, 72, and 64 percent respectively. The average six-year graduation rate for these three entering classes was 68 percent, one of the highest graduation rates in the State University of New York system.

Transfer students enter ESF at a variety of class levels and require different amounts of time to complete their degree programs. A review of registration and graduation records indicates that 67 percent of transfer students entering ESF in the fall 2003 semester had graduated by the spring 2009 semester. The average six-year graduation rate for transfer students entering in the fall 2001, 2002 and 2003 semesters was 66 percent.

Further information on student retention is available from the Director of Government Relations and Institutional Planning, 225 Bray Hall. Graduation rate data is also published annually on the federal government's College Navigator Web site.

## Undergraduate Education

### General Education

The State University of New York requires graduates of bachelor degree (B.S.) programs to successfully complete 27 credit hours of coursework distributed among nine knowledge and skill areas, collectively referred to as general education. The core of the

curricula for all ESF undergraduate degree programs satisfy the natural science, basic communications, mathematics, humanities, and other world civilizations general education knowledge and skill areas. For the remaining general education knowledge and skill areas requirements, students must complete one course chosen from the course selections in the knowledge and skill areas designated for their degree programs.

### Mathematics

APM	104	College Algebra and Precalculus	3
APM	105	Survey of Calculus and Its Applications I	4
APM	106	Survey of Calculus and Its Applications II	4
APM	391	Introduction to Probability and Statistics	3
MAT	111	Basic Algebra	3
MAT	112	Algebraic Operations and Functions	3
MAT	117	Foundational Mathematics via Problem Solving I	3
MAT	118	Foundational Mathematics via Problem Solving II	3
MAT	121	Probability and Statistics for the Liberal Arts I	3
MAT	122	Probability and Statistics for the Liberal Arts II	3
MAT	194	Precalculus	3
MAT	295	Calculus I	4
MAT	296	Calculus II	4

### Natural Sciences

EFB	120	The Global Environment & the Evolution of Human Society	3
EFB	101	General Biology I	3
EFB	102	General Biology Laboratory I	1
EFB	103	General Biology II	3
EFB	104	General Biology Laboratory II	1
EFB	320	General Ecology	4
EFB	321	Fundamentals of Ecology for Designers and Planners	3
FCH	150	General Chemistry I	3
FCH	151	General Chemistry I Laboratory	1

FCH	152	General Chemistry II	3
FCH	153	General Chemistry II Laboratory	1
FCH	210	Elements of Organic Chemistry	3
FCH	221	Organic Chemistry I	3
FCH	222	Organic Chemistry I Laboratory	1
FCH	223	Organic Chemistry II	3
FCH	224	Organic Chemistry II Laboratory	1
GOL	101	Dynamic Earth	4
PHY	211	General Physics I	3
PHY	221	General Physics I Laboratory	1
PHY	212	General Physics II	3
PHY	222	General Physics II Laboratory	1

### Social Sciences

EFB	120	The Global Environment & the Evolution of Human Society	3
EST	221	Introduction to American Government	3
EST	366	Attitudes, Values and the Environment	3
EST	390	Social Processes and the Environment	3
FOR	202	Introduction to Sociology	3
FOR	207	Introduction to Economics	3
GEO	103	America and the Global Environment	3
MAX	132	Global Community	3
PAF	101	An Introduction to the Analysis of Public Policy	3
PSC	123	Comparative Government and Politics	3
PSC	124	International Relations	3
PSC	125	Political Theory	3
PSY	205	Foundations of Human Behavior	3
SOC	248	Ethnic Inequalities and Intergroup Relations	3
SOC	281	Sociology of Families	3

## American History

For all students:

EST	201	American History: Reconstruction to Present	3
FOR	204	Natural Resources in American History	3
HST	101	American History to 1865	3
HST	102	American History Since 1865	3

For students scoring above 84 on the U.S. History Regents examination:

EST	361	History of the American Environmental Movement	3
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## Western Civilization

ETS	211	Early European Literary History	3
FIA	105	Arts and Ideas I	3
FIA	106	Arts and Ideas II	3
FOR	203	Western Civilization and the Environment	3
HST	111	Early Modern Europe, 1350-1815	3
HST	210	The Ancient World	3
HST	211	Medieval and Reformation Europe	3
LIT	203	Greek and Roman Epic in English Translation	3
LIT	211	Greek and Roman Drama in Translation	3
LSA	205	Art, Culture and Landscape I	3
LSA	206	Art, Culture and Landscape II	3
LSA	405	History of Landscape Architecture	3
PSC	125	Political Theory	3
REL/JSP	114	The Bible	3
REL	205	Ancient Greek Religion	3
REL	206	Greco-Roman Religion	3
REL/JSP	215	Hebrew Bible	3

## Other World Civilizations

AAS	241	African Religions: An Introduction	3
ANT	121	Peoples and Cultures of the World	3
ANT	185	Global Encounters: Comparing World Views and Values Cross-Culturally	3
ANT/SAS/WSP	324	Modern South Asian Cultures	3
ANT	326	Africa Through the Novel	3
EFB	217	Peoples, Plagues and Pests	
EST	200	Cultural Ecology	3
GEO	272	World Cultures	3
HST	320	Traditional China	3
HST	321	Modern China	3
REL	101	Religions of the World	3
REL/SAS	185	Hinduism	3
REL/SAS	186	Buddhism	3

## Humanities

AAS	231	African American Literature to 1900: An Introduction	3
AAS	235	African American Drama	3
CLL	290	Perspectives on the Environment	3
EST	245	Nature and Popular Culture	3
ETS	107	Living Writers	3
ETS	141	Readings and Interpretation I: From Language to Discourse	3
ETS	151	Interpretation of Poetry	3
ETS	153	Interpretation of Fiction	3
ETS	192	Gender and Literary Texts	3
LIN	201	The Nature and Study of Language	3
LIT	203	Greek and Roman Epic in English Translation	3
PHI	107	Theories of Knowledge and Reality	3
PHI	111	Plato's Republic	3
REL	217	New Testament	3

REL	231	Judaic Literature	3
REL	235	Judaism	3
REL	248	American Religious Thought	3
REL	252	Religious Ethics and Social Issues	3
REL	256	Christianity	3

### The Arts

APH	241	Art Photography, Introduction	3
EFB	215	Interpreting Science through Art	3
ETS	215	Sophomore Poetry Workshop	3
ETS	217	Sophomore Fiction Workshop	3
FIA	105	Arts and Ideas I	3
FIA	106	Arts and Ideas II	3
FIA	115	The Visual Arts in North America	3
FIA	125	Introduction to Music Theory	3
FIA	165	Understanding Music I	3
FIA	166	Understanding Music II	3
FIA	301	Masterpieces of Art	3
FIA	317	Nineteenth-Century American Art	3
LSA	182	Drawing Studio	3
LSA	205	Art, Culture and Landscape I	3
LSA	206	Art, Culture and Landscape II	3
PSE	201	The Art and Early History of Papermaking	3

### Basic Communication

CLL	190	Writing and The Environment	3
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### Dual Majors

Students who are pursuing undergraduate degrees may pursue dual majors. Program requirements must be satisfied concurrently (ie, a student cannot graduate from ESF and return later to complete coursework for a second major). The diploma will state

the completion of a single degree. The transcript will state the completion of two majors.

Admission to a dual major will be accomplished by petition to the primary degree department or academic unit that has been endorsed (approved) by the secondary degree department.

#### **Inter-department dual majors:**

Students must satisfy requirements of both majors.

#### **Permissible Intra-department dual majors:**

CMWPE: Construction Management and Wood Products Engineering allowed with each other;

PBE: Bioprocess Engineering allowed with either Paper Engineering or Paper Science;

FNRM: no dual majors between the three majors (FRM, NRM, and FES); forest technology and surveying technology degrees allowed for A.A.S. degrees;

EFB: Only Biotechnology with other EFB majors **except environmental biology.**

Students may petition for admission to a dual major A.A.S. degree after completing 18 credits and before 45 credits with an unambiguous GPA of 2.000 or greater (no grades of incomplete or missing grades).

Students pursuing the B.S. degree may petition admission to a dual major after completing 30 credits and before completing 90 credits in the primary major with an unambiguous GPA of 2.000 or greater (no grades of incomplete or missing grades).

### Undergraduate Minors

Admission to undergraduate minors for ESF students is via petition, with additional application requirements as noted in the descriptions of the minors below. Successful completion of a minor will be noted on the transcript of each student.

#### **Management Minors**

In collaboration with the Syracuse University School of Management, undergraduate minors in entrepreneurship, general management studies, and marketing are available for ESF students. To be eligible for any of these minors, students must have a cumulative grade point average of 2.750 or better and apply for the minor after completing at least one semester at ESF, but as soon after that as possible to ensure all courses can be completed. Normally, students are allowed to take only one management course per semester, with one semester of two management courses, so careful planning is required. It is preferable students begin the minor during their sophomore year.

**Entrepreneurship Minor:** The following 18 credits of courses are required: ACC 201 Introduction to Accounting for Non-Management Students (3); FIN 301 Finance for Non-Management Students (3); EEE 370 Introduction to Entrepreneurship and Emerging Enterprises (3). Three additional courses chosen from among the following: EEE 375 Entrepreneurial and Family Business Management (3); EEE 400 Special Topics (3); EEE 442 Emerging Enterprise Law (3); EEE 443 Consulting in Entrepreneurial Practice (3); EEE 451 Finance for Emerging Enterprises (3); FOR 360 Principles of Management (3); PSE 456 Management in the Paper Industry (3); or WPE 444 Materials Marketing (3).

**General Management Studies Minor:** The following 18 credits of courses are required: ACC 201 Financial Accounting for Non-Management Students (3); EEE 370 Introduction to Entrepreneurship and Emerging Enterprises (3); FIN 301 Finance for Non-Management Students (3); LPP 225 Introduction to the Legal System (3) or FOR 488 Natural Resources Agencies and Administration (3); MAR 255 Principles of Marketing (3); SHR 355 Strategic Human Resource Management (3). The following courses may be substituted for SHR 355, EEE 370, or MAR 255: FOR 360 Principles of Management (3); PSE 456 Management in the Paper Industry (3); WPE 444 Materials Marketing (3).

**Marketing Minor:** The following 18 credits of courses are required: ACC 201 Financial Accounting for Non-Management Students (3); EEE 370 Introduction to Entrepreneurship and Emerging Enterprises (3); FIN 301 Finance for Non-Management Students (3); MAR 255 Principles of Marketing (3). Two additional courses chosen from among the following: MAR 356 Marketing Research (3); MAR 400 Special Topics (3), MAR 455 Marketing Communications (3); MAR 456 Global Marketing Strategy (3); FOR 360 Principles of Management (3); PSE 456 Management in the Paper Industry (3); WPE 444 Materials Marketing (3).

### **Bioprocess Science Minor**

The bioprocess science minor gives students an understanding of the rapidly developing bioprocessing industry, which uses the chemical, physical and biological processes developed by living organisms or their cellular components in a type of advanced manufacturing of specialty commercial products. Bioprocess science will influence diverse fields as it becomes widely used, such as for producing energy from sustainable sources.

The bioprocess science minor is available to all ESF undergraduate students (**except students in the bioprocess engineering program**) who maintain a minimum cumulative grade point average of 2.8, and who desire to develop greater knowledge of bioprocess science and its related fields. Interested students must submit a petition and application form, with courses listed, to their academic advisor and the chair of their department, with final approval from the dean of Instruction and Graduate Studies. Students should declare the minor by the end of the sophomore year, but may petition to their home department for enrollment at any time after that. Successful completion of the minor will be noted on the student's transcript.

Eighteen credit hours (6 courses) are required to satisfy the minor. Specified courses: PSE 370 Principles of Mass and Energy Balance (3); BPE 310 Colloid and Interface Science (3); BPE 420 Bioseparations (3); and at least three directed elective courses available from both ESF and Syracuse University including biology, forestry, chemical engineering, chemistry, paper science and engineering, bioprocess engineering, and environmental and biological engineering. Students are required to complete at least one course from a list of biological and chemistry electives and at least one course from a list of engineering electives. The complete list of courses is available from faculty advisors.

### **Computer and Information Technology Minor**

The computer and information technology minor is available to all ESF undergraduates who want to develop greater skill in computer science and information technology applications. By

understanding of the basic principles behind software development, students can more effectively use these tools in their chosen fields. To be eligible for this minor, a student must have a cumulative grade point average of 2.800 or better by the end of the sophomore year. Interested students must submit a petition form, with courses listed, to their academic advisor and undergraduate coordinator, with final approval from the dean of Instruction and Graduate Studies.

Eighteen credit hours (6 courses) in computer science and information technology courses are required. Required courses: APM 153 Computing Methods for Engineers and Physical Scientists (3) or APM 360 Introduction to Computer Programming (3); ESF 200 Information Literacy (1); CIS 252 Introduction to Computer Science (4); CIS 351 Data Structures (4). Elective courses: at least two courses (6 credits) chosen from among courses available from both ESF and Syracuse University including Applied Mathematics (APM), Environmental Resource Engineering, Forestry, Wood Products Engineering, Computer and Information Science, Computer Engineering, and Computational Science. The complete list is available from faculty advisors.

### **Construction Management Minor**

The construction management minor is available to all ESF undergraduates (**except students in construction management or wood products engineering programs**) and prepares students for management careers in the construction industry. The basic objective of the minor is to provide a fundamental understanding of the various methods used to take a design into the field and build a quality structure in the most efficient and effective manner with minimal environmental impact. Eighteen credit hours (6 courses) are required to complete the minor. Four courses are specified, with an additional two courses selected from the list of six courses given below. A cumulative grade point average of 2.0 or higher is required for the construction management courses.

Admission to the minor requires sophomore status, a cumulative grade point average of 2.5 or higher, and permission of the Construction Management and Wood Products Engineering Department chair. Interested students must submit a petition form, with courses listed, to their academic advisor and the chair of Construction Management and Wood Products Engineering, with final approval from the dean of Instruction and Graduate Studies.

Eighteen credit hours (6 courses) are required. Specified courses: WPE 342 Light Construction (3); WPE 343 Construction Estimating (3); WPE 453 Construction Planning and Scheduling; WPE 454 Construction Project Management; and two additional courses chosen from the following: WPE 330 Building Codes and Zoning Practices (3); WPE 331 Construction Safety (3); WPE 335 Cost Engineering (3); WPE 350 Construction Methods and Equipment (3); WPE 444 Materials Marketing (3); WPE 455 Construction Contracts and Specifications (3).

### **Renewable Energy Minor**

The development of sustainable sources of energy has become a critical national and global issue due to concerns about the quality and quantity of the different potential resources, energy security, and potential impacts of each on the environment and human health. It is essential that our society and energy professionals gain an understanding of production and conversion of different forms of energy, their current and future

supplies, the markets and policy mechanisms that regulate their supply, and the associated impacts on the environment for each fuel. In the past both traditional and renewable energy sources have been studied one resource at a time and usually from the perspective of a single discipline. This minor will provide students an opportunity to examine different sources of traditional and renewable energy simultaneously in the context of our total energy use using a systems perspective. Students will be exposed to views from a variety of disciplines as they wrestle with a wide array of issues related to current and future energy supply and use.

The understanding and development of renewable energy requires expertise from a wide range of disciplines. This minor will be interdisciplinary in nature with instructors from different disciplines teaching the core courses. The Renewable Energy minor is available to all ESF undergraduate students (**except students who are in the renewable energy option in environmental science**) who have taken EFB 120 Global Environment & the Evolution of Human Society which is a prerequisite for ESC 325 Energy Systems, and have a GPA of 2.750 or better by the end of their sophomore year. Interested students must submit a petition and application form, with courses listed, to their faculty advisor and the undergraduate coordinator of their home department. The petition and application will then be sent to the dean of Instruction and Graduate Studies for final approval. The minor will require a minimum of 15 credits, 12 of which are required courses. The remaining 3 credits can be selected from a list of suggested courses.

Fifteen credit hours of courses are required. Specified courses: ESC 325 Energy Systems (3); ESC 335 Renewable Energy Systems (3); ESC 422 Energy Markets and Regulation (3); ESC 450 Renewable Energy Capstone Planning (1); ESC 460 Renewable Energy Capstone Seminar (2) and a minimum of three credits from the following list of suggested courses: BPE 441 Biomass Energy (3); EFB 516 Ecosystems (3); EFB 518 Systems Ecology (4); ERE 351 Basic Engineering Thermodynamics (2); ERE 519 Green Entrepreneurship (3); FCH 360 Physical Chemistry I (3); FCH 571 Wood Chemistry I: General Wood Chemistry (2); FOR 415 Forestry Consulting and Wood Procurement (3); PSE 361 Engineering Thermodynamics (3); PSE 370 Principles of Mass and Energy Balance (3).

### **Paper Science Minor**

The paper and related industries (including pulp, mineral, chemical and machinery suppliers) continually seek knowledgeable and skilled employees. Each year, companies hire numerous graduates of chemical, mechanical and environmental engineering programs as well as chemists and other environmental professionals in addition to paper science and engineering graduates. Salaries for new hires are among the highest for all fields of study at the bachelor's degree level. This minor gives students a thorough understanding of the paper industry that will allow them to apply their major field of study to this growth industry.

The paper science minor is available to all ESF undergraduate students (**except students in the paper science and paper engineering programs**) who maintain a minimum cumulative grade point average of 2.8 and who desire to develop greater knowledge of paper science and its related fields. Students will elect the minor by submitting a petition form with courses listed to their faculty advisor and the undergraduate coordinator of

their home department. The petition and application will then be sent to the dean of Instruction and Graduate Studies for final approval. A student should declare the minor by the end of the sophomore year, but may petition to his/her own department for enrollment at any time after that. Successful completion of the minor will be noted on the student's transcript.

Eighteen credit hours (6 courses) in paper science courses are required. Specified courses: PSE 300 Introduction to Papermaking (3); PSE 302 Pulp and Paper Laboratory Skills (1); PSE 370 Principles of Mass and Energy Balance (3); and directed electives courses (at least 11 credits): PSE 350 Pulping and Bleaching Processes (3); PSE 351 Pulping and Bleaching Laboratory (2); PSE 465 Paper Properties (4); PSE 466 Paper Coating and Converting (2); PSE 467 Papermaking Wet End Chemistry (3); PSE 468 Papermaking Processes (3).

### **Recreation Resource and Protected Area Management Minor**

This minor provides students with the opportunity to combine visitor management with protected area management. Understanding the need to balance the opportunity for visitor experiences with protecting and stewarding protected areas provides professional insight into planning and managing those areas for limited visitor access. Understanding the motivations, preferences, and behavior of recreational users is necessary to integrate the human dimensions into protected area management with consideration of the social and environmental factors related to such management. Protected area managers need to be able to manage both the resource itself as well as a wide variety of users, such as campers, hikers, bird watchers, boaters, nature photographers and others who enjoy nature-based experiences in extensive protected area environments owned by public agencies, private landowners, or NGOs.

Admission to the minor requires students to have completed a general ecology course (e.g., EFB 320 General Ecology, which is a prerequisite for EFB 416), a cumulative grade point average of 2.750 or better after one semester at ESF (or as a transfer student with same standing), and permission of the Forest & Natural Resources Management Chair and Undergraduate Education Coordinator (via petition).

Fifteen credit hours of courses are specified: EFB 416 Introduction to Environmental Interpretation (3); FOR 372 Fundamentals of Outdoor Recreation (3); FOR 475 Human Behavior and Recreation Visitor Management (3); FOR 476 Ecotourism and Nature Tourism (3); FOR 478 Wilderness and Wildlands Management (3).

### **Sustainable Construction Management Minor**

The sustainable construction management minor is available to all ESF undergraduates (**except students in construction management or wood products engineering programs**) and prepares students for management careers in sustainable construction. The basic objective of the minor is to provide a fundamental understanding of the sustainable concepts and methods used to take a design into the field and build a quality sustainable structure in the most efficient and effective manner with minimal environmental impact. Fifteen credit hours (5 courses) taken in residence are required to complete the minor. Three courses are specified, with an additional two courses selected from the categories listed below. A cumulative grade

point average of 2.0 or higher is required for the sustainable construction management courses in order to obtain the minor.

Admission to the minor requires sophomore status, a cumulative grade point average of 2.5 or higher, and permission of the Construction Management and Wood Products Engineering Department chair.

Interested students must submit a petition form, with courses listed, to their academic advisor and the chair of the Department of Construction Management and Wood Products Engineering, with final approval from the dean of Instruction and Graduate Studies.

Fifteen credit hours are required to satisfy the minor. Three courses (9 credits) of specified courses: WPE 343 Construction Estimating (3); WPE 453 Construction Planning and Scheduling (3); WPE 454 Construction Project Management (3) and two additional courses (6 credits) that cover the following thematic subject areas: green construction; environmental rating systems; environmental impact analysis and management; renewable energy and energy auditing; or sustainable development and design.

### **Urban Environmental Science Minor**

While many people often associate the environment with wild lands and linked rural areas, many of the most important environmental and quality-of-life issues of the coming decades will be related to the urban environment. ESF, under its Urban Initiative, offers a campuswide minor in urban environmental science. All students, but perhaps especially those with an intimate knowledge of the challenges facing city inhabitants, will find this program stimulating and provocative and will find professors interested in working with them to learn about and develop improved urban environments. Graduates of the program can make important professional contributions on issues ranging from urban forestry and urban wildlife, to urban air and water quality, population growth and urban sprawl, and environmental justice and equity. Successful completion of the minor will be noted on the student's transcript.

Twelve credit hours (4 courses) of urban concentration courses are required to satisfy the minor. Required courses: EST/EFB 220 Urban Ecology (3) and a Capstone Experience (3). A student enrolled in the minor, will present to the advisory committee in the sixth week of the semester prior to engagement in the learning endeavor, a plan for a "capstone" experience, which will be undertaken working in conjunction with a faculty member(s) who will oversee an off-campus internship (courses numbered 499), independent-study project (courses numbered 498), or completion of a final project undertaken in a special topic (courses numbered 496) or established 3-credit course. All students will present their completed projects to the advisory committee and their peers in the last week of classes, depending on the semester of completion (fall or spring). All students currently enrolled in the minor are expected to attend capstone presentations.

Elective courses: At least two courses (6 credits) of urban environmental science minor advisory committee-approved courses other than courses in, or required by, the student's major. The complete list of approved elective courses is available from department advisory committee representatives.

### **Honors Programs**

ESF offers two distinct honors programs. The **Lower-Division Honors Program** provides first- and second-year students with

value-added educational experiences that engage students in unique challenges. Academic components of the program strengthen exploration and communication skills through interdisciplinary assignments. Admission to the program is extremely selective. Primary consideration is given to a student's academic record with a minimum expectation of combined reading and mathematics SAT score of 1250 or higher, or an ACT equivalent composite score of 28 or higher, a high school grade point average of 92% or higher, and high school class rank in the top 20% (where rankings are available). Students are admitted as first-year students (fall admission), are expected to maintain a cumulative grade point average of at least 3.400, and complete the following coursework during the freshman year: Honors Seminar in Environmental Science and Forestry (ESF 109, 1 credit) and Writing, Humanities and the Environment — Honors (CLL 290, 3 credits).

Students who maintain good standing in honors will have early Registration privileges and access to honors sections of courses offered at Syracuse University and ESF. Honors students will be deemed "in good standing in honors" when they demonstrate steady progress in fulfilling honors requirements and a **cumulative GPA** of 3.400 or higher. Each semester, the honors program administrator will assess students' progress and provide each with a progress report. Students who are not in good standing in honors will be informed in writing. Students must be in good standing in honors to be eligible for early registration and have access to honors sections of courses.

The **Upper-Division Thesis Honors Program** provides opportunities for students to complete intensive research and creative projects under the guidance of research and design experts, emphasizing and encouraging holistic and multidisciplinary awareness to the problems and opportunities of the environment. ESF students enrolled in the Departments of Chemistry, Environmental and Forest Biology, Environmental Resources and Forest Engineering, Environmental Studies, Forest and Natural Resources Management, and Landscape Architecture are eligible to be invited to participate in the ESF Honors Program. Students must be at the beginning of their junior year, between the first and second semester of their junior year, or (in unusual circumstances) in the beginning of their senior year.

To be invited for admission, students must meet the minimum cumulative grade point requirement of at least a 3.500 at the end of 60 credits of lower-division preparation. This includes any courses taken while matriculated at ESF and any transfer courses accepted toward the ESF degree. Students who are invited to apply for admission must also submit a personal statement.

Students in the thesis program must complete degree requirements with a cumulative grade point average of at least 3.400 for all upper-division courses and complete the following coursework:

#### **Thesis Exploration Seminar (ESF 309, 1 credit)**

Two courses that contribute directly to the honors thesis/project. These courses must be either (a) in the student's major or a related area at the 400-, 500-, or 600-level and must not be a requirement for all students in that major (Students admitted to the ESF Honors Program are eligible to enroll by petition in appropriate courses numbered 600 to 699.); or (b) an enhanced or graduate-level version of a required upper-division course.

A total of at least four credits of Honors Thesis/Project (ESF 499, 1-5 credits) with a grade of B or better. Students must

supplement their work with an honors essay and presentation to an honors review committee.

The Honors Programs receive oversight from the Honors Faculty Council. The director of the Honors Programs identifies, admits, and counsels honors students in matters pertaining to program requirements.

## Coordinated Programs with SUNY Upstate Medical University

### Transfer Articulation Agreement

Students seeking admittance to the upper-division bachelor of science programs offered by the College of Health Professions at SUNY Upstate Medical University (UMU) in Syracuse may prepare for curricula in cardiovascular perfusion, cytotechnology, medical imaging sciences, medical technology, physical therapy, or respiratory care by taking lower-division coursework at SUNY-ESF. Prospective students must apply to both ESF and UMU. For further details, contact the dean of Instruction and Graduate Studies.

### Entry Level Doctor of Physical Therapy Program (DPT 3+3)

In collaboration with SUNY Upstate Medical University (UMU), ESF students may apply to an entry-level doctor of physical therapy program (DPT 3+3). ESF undergraduates who are completing bachelor of science degrees within the Department of Environmental and Forest Biology are eligible for admission.

Students apply for admission to ESF and UMU simultaneously, with the first three years of the program completed at ESF and the final three years completed at UMU. Admission to the DPT 3+3 program is based on academic achievement and personal qualifications that are considered essential for the successful practice of physical therapy.

Prior to matriculation at UMU, students must submit GRE scores, demonstrate familiarity in the demands of physical therapy via volunteer or work experience, and complete 53 credits of prerequisite coursework (completed with grades of C- or better) as follows:

Courses	Credits
Anatomy and Physiology I and II (or one semester each of Anatomy and Physiology)	8
General Biology I and II	8
General Chemistry I and II	8
General Physics I and II	8
English (including Composition)	6
Mathematics (College Trigonometry, Precalculus or Calculus)	3
Statistics	3
Psychology (including Child or Developmental Psychology)	9

Additional information about the DPT 3+3 Program is available from the Office of Undergraduate Admissions or the dean of Instruction and Graduate Studies.

## Pre-Professional Advising

### Pre-health advising

ESF students interested in medicine, dentistry, and veterinary medicine are encouraged to participate in the Health Professions Advisory Program (HPAP) offered through Syracuse University. Students should begin the program as early in their academic programs as possible, attend seminars and participate in the preparatory workshops to ensure their success in the professional school admissions process.

Most health professions schools require at least one year in each of the following subjects: English, general biology (botany and zoology), general physics, general chemistry and organic chemistry; calculus is recommended. ESF majors in environmental biology, biotechnology, or environmental science are well-suited to prepare students for health professions.

In addition to the general science background, colleges of veterinary medicine require coursework in bacteriology or microbiology, and at least one summer of practical experience in the management of poultry, pigs, cattle or horses. Regardless of the specific prerequisites of a school of medicine, dentistry or veterinary medicine, coursework available at ESF has proven to be valuable to applicants to those professional programs.

All students applying to medical school are required to provide letters of recommendation from a health advisory committee, evidence of public service, and evidence of previous experience (volunteer or paid) working in an area of health professions. The Health Professions Advisory Program assists students in making decisions about health careers and matches students with appropriate professional schools. The Health Professions Advisory Program is located in 323 Hall of Languages, College of Arts and Sciences, Syracuse University, Syracuse, N.Y. 13244 and may be contacted at 315-443-2321 or <http://hpap.syr.edu>.

### Pre-law advising

ESF offers preprofessional advising to students interested in pursuing law as a profession. Unlike some other professional programs, law schools do not require or recommend a specific program of study or specific coursework. Instead, the Law School Admissions Council advises students who are interested in the legal profession to pursue undergraduate education that demonstrates success in intellectually challenging curricula that enhance students' critical thinking skills. ESF's programs provide students with such an education.

ESF's prelaw advisor, Dr. Robert Malmsheimer, counsels students regarding selection of elective courses, the Law School Admission Test (LSAT), law school application procedures, and other matters of importance. Brochures and application forms for the LSAT and the Law School Data Assembly Service are available from the College's prelaw advisor. Each year, Syracuse University and the College's prelaw programs offer a variety of workshops and seminars to introduce students to law school and legal topics. Students considering law school are encouraged to meet with ESF's prelaw advisor as early in their academic careers as possible to take advantage of these services.

## Coordinated Programs with Syracuse University

### Joint Program in Science Teaching leading to Teacher Certification

ESF and the School of Education at Syracuse University offer qualified undergraduate students an opportunity to prepare for initial New York state teacher certification in biology or chemistry, and general science. This opportunity is available through the following ESF bachelor of science (B.S.) degree programs: chemistry (leading to initial certification in chemistry in grades 7-12) ; and environmental biology (leading to initial certification in biology in grades 7-12). Students who earned at least a 3.000 grade point average during their first semester at ESF and transfer students who maintained a 3.000 or greater cumulative grade point average at their previous college are eligible for admission to the program. Students who are interested in pursuing this opportunity should contact the assistant dean of Instruction and Graduate Studies at ESF for application materials.

### Academic Requirements

Students must complete all requirements for their academic program as listed in this catalog that include the following:

To meet the standards for general education, students must complete at least 30 semester hours (credits) in the general education core. Students who transfer into an English writing course that is substantially different in purpose from CLL 290 must complete WRT 428 to meet the education literacy requirement. Included in this standard is a foreign-language requirement: One year of college-level foreign language study, or its equivalent established through appropriate high school study (Level III ).

To meet the standards in content teaching, students complete at least 30 semester hours in the content core. For biology certification, content courses include cell biology, biochemistry, anatomy and physiology, comparative anatomy, genetics and evolution, biological diversity, human biology, botany, and zoology. Courses in nutrition are acceptable if the topics are cell nutrition, organic and inorganic chemistry, or physical chemistry. For chemistry certification, content courses include matter and atomic structure, energy, chemical bonds and molecular structure, chemical reactions, and quantitative relationships.

Students must also complete:

SED 340 Participation in the Professional Development School (0-1) — also known as "The Academy" — each semester. The non-credit online seminar, Child Health and Life Safety Seminar offered by the School of Education, which examines six areas of concern to teachers: identifying and reporting child abuse; violence prevention/ intervention; alcohol/tobacco/drug abuse prevention; child abduction prevention; fire and arson prevention; and highway safety/traffic regulations/safety patrols. Students are required to complete the following professional education (pedagogy) core courses at Syracuse University in preparation for the candidacy semester:

EDU 204 Principles of Learning in Inclusive Classrooms (4)  
EDU 304 Study of Teaching (4) Prerequisite: EDU 204 or equivalent  
RED 326 Literacy Across the Curriculum (4)  
EDU 310 The American School (3)

Candidacy Semester (Spring only): prerequisites include a minimum 2.8 cumulative average and a minimum 2.8 average in both required education and science courses; completion of EDU 204, EDU 304, RED 326, and a significant number of science credits; successful review of the professional portfolio by The Academy; and satisfactorily meeting the assessment standards of the School of Education. The following courses are co-requisites for the candidacy semester:

SED 409 Adapting Instruction for Diverse Student Needs (3)  
SCE 413 Methods and Curriculum in Teaching (3)  
EDU 508 Student Teaching/Secondary Candidacy (3)

Standard Student Teaching Semester (in the student's final fall semester prior to the degree conferral): prerequisites include a minimum 2.8 cumulative average and a minimum 2.8 average in both required education and science courses; successful completion of the candidacy semester and approval by The Academy; completion of a majority of the required credits on the science content area; and satisfactorily meeting the assessment standards of the School of Education. The following 12 credits are taken as co-requisites for the standard student teaching semester: EDU 508 Student Teaching/Science (9)  
SED 415 Teacher Development/Science (3)

### Initial Certification and Professional Certification

The School of Education evaluates and recommends eligible candidates as having met the requirements for the certificate. Students must pay fees for certification and exam processing. Candidates for initial certification must apply for certification within two years of the completion of the degree program and they must successfully complete (a) the Liberal Arts and Sciences Test (LAST); (b) the Written Assessment of Teaching Skills (ATS-W); and (c) the Content Specialty Test (CST).

Requirements for professional certification must be met within **five** years of the date of the initial certification. To achieve professional certification, applicants must earn a master's degree that meets one of the following criteria: (a) a graduate-level teacher education program that is registered with the Department of Education; (b) a master's-level or higher program in the content core of the initial certificate or in a related content area; or (c) a master's-level or higher program in any field, provided that it includes at least 12 semester hours of graduate study in the content core of the initial certificate or in a related content area. A one-year extension may be granted by the state if a student has completed at least 24 credits of the master's degree. Application for professional certification also requires three years of teaching experience. If the teaching experience is in New York State, the first year must be mentored by the school district. Teachers with professional certification must complete 175 hours of professional development every five years.

For additional information about certification requirements and the process, visit the New York State Education Department Web site at [www.highered.nysed.gov/tcert/certificate/index.html](http://www.highered.nysed.gov/tcert/certificate/index.html) or the Syracuse University School of Education Coordinator of Career Services and Certification at (315) 443-4759 .

### Service Learning Program

[www.esf.edu/students/csl](http://www.esf.edu/students/csl)

Public service is a vital component of ESF's mission, reflecting our commitment to making the world a better place. Through the College's service learning program, students can participate

in this mission of service, contributing to the larger community while gaining invaluable experience and earning course credit.

Students enrolled in any of ESF's service learning courses spend time working in the community on service projects related to their field of study. Through these courses, the traditional classroom is extended beyond the bounds of our campus, offering energizing, "real-world" learning experiences. The community benefits from student help and knowledge, even as students gain inspiration and a richer understanding of the value of their work.

Students are also welcome to participate outside of class in an ESF community service project. Numerous community service opportunities are available on campus and in the greater Syracuse community. For additional information on these activities, visit the service learning Web site.

Service learning activities help students develop a number of academic, personal and social attributes and may aid students in career development choices. For a list of courses that have incorporated service learning in the past, please refer to the service-learning Web site at [www.esf.edu/students/csl](http://www.esf.edu/students/csl).

## International Study Abroad

ESF students who have completed 30 or more credits toward their bachelor's degree with a cumulative grade point average of 3.000 or greater are eligible to apply for study in a foreign country through the *Study Abroad Program* at Syracuse University, or through overseas study programs offered at other institutions within the SUNY system. Although some international study programs require specific language skills or may be conducted in the language of the host country, others offer study in part or entirely in English. Students who seek additional information about the requirements for study abroad should contact ESF's Office of Instruction and Graduate Studies or search the SUNY Study Abroad Web site at [www.suny.edu/Student/Common/studyAbroad.cfm](http://www.suny.edu/Student/Common/studyAbroad.cfm).

## Graduate Education

Graduate degree programs at ESF enable students to:

- think critically and independently;
- comprehend the processes of science and effectively apply scientific principles and professional procedures;
- attain proficiency in the current knowledge in their respective fields;
- develop competence in the technical skills and tools required in their disciplines;
- demonstrate high standards of performance as scientists, educators and professionals; and
- exercise ethical conduct in their relationships with colleagues, other professionals and the public.

## Areas of Study

The general area of study for each master's or doctoral student is implied by the title of the program in which the degree is awarded. Areas of study may be established within degree programs by individual departments that further define the

student's area of specialization. The student's area of study is listed on the student's transcript if identified on the study plan.

Additionally, each department may offer minors identifying ancillary areas of study that may be appropriate for the degree program. A minor is equivalent to 12 or more graduate credits earned in the minor area. Courses in a minor area must be taken outside of the student's area of study. A minor is identified on the student's transcript. A minor professor must be appointed to the student's steering committee for each minor elected, in addition to the minimum complement of steering committee members. Each minor professor can replace an additional examiner.

## Degrees

Four master's degrees are offered at ESF, the master of science, master of forestry, master of landscape architecture, and master of professional studies as well as the doctor of philosophy degree. The following section describes the requirements for graduate degree programs offered by the College.

### Master of Science Degree

The master of science (M.S.) degree is an academic degree offered in the following programs: environmental and forest chemistry, environmental and forest biology, environmental studies, forest resources management, environmental and resource engineering, environmental science, and landscape architecture.

To complete this degree, in addition to completion of necessary coursework, students must investigate a problem that initiates, expands, or clarifies knowledge in the field and prepare a thesis based on this study. Students are required to define an appropriate problem for investigation; review relevant information; develop a study plan incorporating investigative techniques appropriate to the problem; implement the plan; and relate the results to theory or a body of knowledge in the field.

The minimum credit-hour requirement is the successful completion of 30 graduate credits distributed between coursework and thesis. The applicable distributions will be determined by individual departments to suit program objectives, with the understanding that a minimum of 18 credits is awarded for graduate-level coursework and a minimum of six credits is awarded for the thesis. All steering committee members should sign the student's study plan (Form 3B) before the end of the last year of the student's program. The student must successfully defend the thesis for degree completion. The thesis is prepared and bound according to college standards and submitted to ProQuest.

### Master of Forestry Degree

The master of forestry (M.F.) degree is intended to be a terminal degree and is offered in the Department of Forest and Natural Resources Management. It is designed primarily for students whose undergraduate degree was not in a professional program in forestry. This degree requires the successful completion of a minimum of 30 credits at the graduate level, of which at least 27 must be in coursework. The student's study plan (Form 3B) must be approved by the major professor and department chair. In addition, this program requires an integrative experience such as an internship or team project. If an examination is required, it is developed and managed by the Department of Forest and Natural Resources Management.

## **Master of Landscape Architecture Degree**

At the graduate level, the master of landscape architecture (M.L.A.) degree is the first professional degree in landscape architecture. This degree requires successful completion of a minimum of 66 credit hours of which at least 42 must be graduate coursework. The student's study plan (Form 3B) must be approved by the major professor and department chair. All steering committee members should sign the 3B form before the end of the last year of the student's program.

## **Master of Professional Studies Degree**

The master of professional studies (M.P.S.) degree is intended to be a terminal degree. The M.P.S. is offered in the following degree programs: environmental and forest biology, environmental studies, forest resources management, environmental and resource engineering, and environmental science.

This degree requires the successful completion of a minimum of 30 credits at the graduate level, of which at least 24 must be in coursework. The student's study plan (Form 3B) must be approved by the major professor and department chair. All steering committee members should sign the student's study plan (Form 3B) before the end of the last year of the student's program.

In addition, individual programs may require an integrative experience such as an internship, team project and/or comprehensive examination. If an examination is required, it is developed and managed by the department responsible for the program.

## **Doctor of Philosophy Degree**

The doctor of philosophy (Ph.D.) degree is an academic degree offered in the following degree programs: environmental and forest chemistry, environmental and forest biology, forest resources management, environmental and resource engineering, and environmental science. The doctor of philosophy degree requires a minimum of 60 graduate credits, of which 30 to 48 credits are for coursework and 12 to 30 credits are awarded for dissertation. Individual departments will determine the applicable credit hour requirements within these ranges to reflect individual program requirements and emphases. The graduate credits earned for a master's degree that are applicable to a student's doctoral study plan (Form 3B) are determined on an individual basis by the steering committee. All steering committee members should sign the 3B form before the end of the last year of the student's program. Students may not use master's thesis credits to fulfill doctoral program coursework requirements.

Students must pass the doctoral candidacy examination covering selected fields of study at least one year prior to dissertation defense and successfully defend the dissertation. The dissertation must be prepared according to college standards and submitted to ProQuest.

## **Tool Requirements**

Doctoral students must demonstrate competence in at least one research tool as a requirement for graduation. Such tools include statistics, computer science, or the ability to translate technical articles in a language, other than English, commonly used in science. Tool requirements and standards for each doctorate program will be determined by the corresponding program department.

## **Student Advising and Study Plan (Form 3B)**

### **Major Professor: Appointment and Responsibilities**

The student's major professor is appointed by the dean of Instruction and Graduate Studies upon the recommendation of the department chair. A major professor should be appointed upon the student's matriculation into a graduate program. For the graduate student accepted into a graduate program but lacking a major professor, a temporary advisor will be appointed by the department chair. However, every effort should be made to expedite appointment of a major professor.

The major professor shall be a member of the ESF faculty, except those with visiting appointments. The major professor, or at least one of the co-major professors, must hold a degree equal to or higher than the degree sought by the student. The major professor, or at least one of the co-major professors, must be a full time member of the department granting the degree sought by the student. An adjunct faculty member may also serve as a co-major professor. It is the duty of the major professor to fulfill a primary role as the student's mentor. Aided by other members of the steering committee, the major professor guides the student in the development and implementation of the student's study plan (Form 3B), including course selection, research planning, choice of the professional experience, and facilitation of the examination schedule. The major professor also guides the student in reviews of thesis or dissertation drafts, including a complete review of the thesis or dissertation before the final copy is presented for defense. It is the responsibility of the major professor to ensure that the document presented at defense is the final version, subject only to minor grammatical changes.

### **Steering Committee: Appointment and Duties**

The steering committee for master of science and doctoral students is composed of the major professor and at least two faculty members or other qualified persons. The steering committee for master of forestry, master of professional studies and master of landscape architecture students is composed of the major professor and at least one other faculty member or other qualified person. Other qualified people include faculty at other institutions or other recognized professionals.

The student's steering committee is appointed by the dean of Instruction and Graduate Studies upon the recommendation of the department chair. The steering committee should be appointed within the first semester. For all students, the steering committee must be established and must have met by the end of the third semester of graduate study.

The steering committee assists the student in the development of the student's study plan (Form 3B), including the development of the student's research or professional experience. All steering committee members should sign the 3B form before the end of the last year of the student's program. The steering committee guides the development of the thesis or dissertation, including a review of the thesis or dissertation before the final copy is presented for defense.

### **Student's Study Plan**

The student's study plan (Form 3B) includes an individualized sequence of courses and a plan for research or professional experience. The student and all steering committee members should sign the 3B form, submit it to the department chair for

approval and then forward it to the dean of Instruction and Graduate Studies by the end of the third semester for the M.S., M.L.A., or Ph.D. degree; it must be submitted by the end of the first semester for the M.F. or M.P.S. degree. For all graduate degrees, the program of study must be submitted by no later than the end of the last year of the student's program. The study plan can be changed during the course of a student's program. Changes must be approved by the major professor and department chair with notification to the dean of Instruction and Graduate Studies.

### **Part-Time Study**

Upon completion of 12 credit hours as a matriculated student, the part-time student will request assignment of a steering committee that consists of the major professor and one other person. The steering committee will meet and agree upon a program of study (Form 3B) and specify the delimitation date according to the needs of the part-time student.

### **Communication Skills**

All students entering graduate programs at ESF are expected to be proficient in communication skills, including technical writing and library skills. Students are required to have completed at least one course in technical writing and one course in library usage, either as an undergraduate or as a graduate student. Credit for such courses taken during the graduate program are not counted towards degree requirements. Alternatively, graduate students can meet the requirement by demonstrating the equivalent in experience in writing and library skills, as determined by the steering committee.

### **Seminars**

Participation in seminars, including the preparation and presentation of technical material, is vital to the student's graduate education. All graduate students at ESF are required to participate in graduate seminars as follows:

*Topic Seminar:* Each graduate student is expected to participate in topic seminars, including presentations, as determined by the individual department. This requirement can be fulfilled, with appropriate approval, by seminars offered at Syracuse University or SUNY Upstate Medical University.

*Capstone Seminar:* Students completing the master of science degree or the Ph.D. degree are required to present a capstone seminar on their thesis or dissertation research. Other master's students may be required to present a capstone seminar on a topic chosen in consultation with the major professor and steering committee. The purpose of the capstone seminar is to provide an opportunity for the graduate student to present technical information to a critical body of professionals and peers. This seminar will be presented prior to the thesis or dissertation defense and should be attended by the student's steering committee. Each seminar is open to the college community and will be announced collegewide to encourage attendance by students and faculty.

### **Examinations**

Students who wish to complete the doctoral candidacy examination, defense of thesis or dissertation should request formation of their examining committee guided by the schedule provided by the Office of Instruction and Graduate Studies.

To ensure the integrity of the examination process, oral examinations will generally take place during the academic year

and all members of the examination committee appointed by the dean of Instruction and Graduate Studies will be present at the oral examination. Students must complete the oral examination within six months from the appointment of the examination committee or the student will be required to request the assignment of a new examination committee. Exceptions may be granted by the dean of Instruction and Graduate Studies.

### **Doctoral Preliminary Examination**

The requirement for this examination is determined by individual departments. The purpose of this examination is to assess the entering student's basic knowledge in the chosen field of study. The results of this examination may be used to determine the student's suitability for the doctoral program and as a guide in selecting coursework and developing a program of study.

### **Doctoral Candidacy Examination**

The objectives of this examination are to determine the breadth and depth of knowledge in the chosen field of study and assess the student's understanding of the scientific process. The doctoral candidacy examination is taken when the majority of coursework is completed and no more than three years from the first date of matriculation has elapsed or the student may be dismissed from the doctoral program. This examination must be taken at least one year prior to the dissertation defense.

Upon the recommendation of the appropriate department chair, the dean of Instruction and Graduate Studies appoints the doctoral candidacy examination committee consisting of the student's major professor, the student's steering committee and an additional faculty member from an appropriate area. Additionally, the dean of Instruction and Graduate Studies appoints a committee chair who is not from the department of the student's degree program. The examination must have both written and oral components.

The role of the examination committee chair is to manage the examination, ensure its integrity, and represent the interests of the faculty and student. Any member of the faculty may be an observer. The student examinee may invite a silent student observer to attend the oral examination with notification of the chair of the student's exam committee.

**Written Examination:** The examining committee shall convene at a planning meeting with the student. During the first part of the planning meeting, the committee determines the schedule for the process and establishes the date for the oral component. The student is then excused from the meeting and the committee develops and discusses the exam content.

There are three alternative forms for the written component, as follows:

**Form 1:** The members of the committee submit questions or problems addressing the objectives of the exam. The questions are discussed and agreed upon at the planning meeting.

The major professor administers the written examination. Usually, one-half day is allocated to questions submitted by each examiner. Upon completion by the student, the examination questions are reviewed and graded by the committee members who prepared them. The committee then reviews the entire examination.

**Form 2:** The student prepares a written report on a topic or problem assigned by the examining committee. The topic or problem must meet the objectives of this examination and its

content cannot be directly related to the student's thesis research. The student has approximately one month to develop a thorough understanding of the assigned topic and prepare a written report. The report is reviewed by the committee members and committee chair.

**Form 3:** The student prepares and defends a written proposal of future research likely to be carried out during his or her Ph.D. project. This research prospectus must be presented to the examining committee two weeks prior to the candidacy exam and should include preliminary studies supporting the feasibility of the proposed research. The exam will test the candidate's understanding of concepts directly related to his or her immediate area of research, knowledge of prior related research that has been conducted by others, his or her ability to design and interpret experiments in this area, and capacity to think and write independently and to present work plans orally in a clear and rational manner. The report is reviewed by the committee members and committee chair. **This option is available only to doctoral students in the Department of Chemistry.**

**Oral Examination:** Following the written examination under Form 1, completion of the report under Form 2, or completion of proposal under Form 3, the committee meets with the student for an oral examination usually lasting two hours. However, the duration can be longer if required. The questions may address the report or other areas appropriate to the objectives of the examination, including subject matter in allied fields. At the conclusion of the examination period, the student examinee and observers are excused from the room and the examination committee determines whether the student has passed the examination. Unanimous agreement is required to pass the student. If less than unanimous agreement is reached, the student is considered to have failed the first doctoral candidacy examination. The student can request a second examination which must take place no more than one year from the date of the first examination. A student is considered to have passed the second examination if there is not more than one negative vote. A student who has failed the second examination is terminated from the graduate program.

### **Thesis or Dissertation Defense Examination**

At the conclusion of the study and research program, each master of science and doctoral candidate must successfully defend the thesis or dissertation. The objectives of the defense examination are (1) to probe the validity and significance of the data and information presented; (2) to assess the student as a critical thinker and data analyst; (3) to evaluate the student's scientific creativity, including the student's ability to relate research results to scientific theory within the chosen field; and (4) to present the results effectively in writing.

Upon the recommendation of the appropriate department chair, the dean of Instruction and Graduate Studies appoints the defense examination committee. It consists of members of the steering committee and at least one additional faculty member for the master's degree examination and two additional faculty members or other qualified persons for the doctoral degree examination. Additionally, the dean of Instruction and Graduate Studies appoints a committee chair who is not from the student's degree program.

This oral examination principally covers the material in the thesis or dissertation, as well as literature and information relating to it. At least 14 days prior to the date of the oral examination, the

student is required to submit a final document to all members of the examination committee. Within five days of the oral exam, the major professor confirms with the chair of the examining committee that the oral examination should proceed as scheduled. If the major professor determines that the written document does not meet the standards established for the thesis or dissertation exam, the exam may be postponed by the dean of Instruction and Graduate Studies at the recommendation of the chair of the student's exam committee.

The role of the examination committee chair is to manage the defense, ensure its integrity, and represent the interests of the faculty and student. Any member of the faculty may be an observer. The student examinee may invite a silent student observer to attend the examination. The defense examination usually lasts two hours, although this time period may be extended as required. At the completion of the examination, the candidate and observers are excused from the room and the examination committee determines whether the candidate has successfully defended the thesis or dissertation. The committee chair has the option to vote. Unanimous agreement is required to pass the student. If less than unanimous agreement is reached, the student is considered to have failed the first defense examination. A student who fails the first defense may request a second defense which must take place no more than one year from the date of the first examination. At the second defense, the student has passed the defense if there is not more than one negative vote. A student who has failed the second defense is terminated from the graduate program.

### **Standards for Theses, Dissertations and Professional Experience Reports**

Collegewide standards for theses and dissertations are developed and specified by the Moon Library faculty in consultation with the various departments and are available on-line at [www.esf.edu/graduate/thesisdiss.htm](http://www.esf.edu/graduate/thesisdiss.htm).

### **Concurrent Graduate Degrees with Syracuse University**

ESF and Syracuse University provide opportunities for graduate students to complete degrees concurrently at ESF and SU. Concurrent degrees are offered in the master of public administration program in the Maxwell School of Citizenship and Public Affairs, the master of arts or master of science programs in the S.I. Newhouse School of Public Communications, the master of science degree program in the School of Education, and the master of business administration program in the School of Management. Other concurrent degree programs may be developed with approval by the assistant dean of Instruction and Graduate Studies.

To be eligible for admission to concurrent degree programs, matriculated students must complete at least one full-time semester of graduate-level coursework or the equivalent, and earn a 3.500 grade point average or better at ESF. Students who are interested in any of these programs must complete an application process through the ESF Office of Instruction and Graduate Studies within their first year of study.

### **Concurrent Programs for Syracuse University Students**

The joint Juris Doctor (JD) and Forest and Natural Resources Management (FNRM) Master of Professional Studies (MPS) degree is designed for Syracuse University students who are

interested in legal careers involved with forest, natural, and environmental resources. As human demands on the environment increase, society needs attorneys who understand the economic, demographic, social, and political issues that drive resource use allocation. Students learn the complexities of managing both resources and people recognizing that resource and environmental decisions involve value-driven conflicts. The degree provides a comprehensive foundation in forest, natural, and environmental resources issues and an understanding of both biophysical and social science.

Students enrolled in the joint JD/FNRM degree program must earn a minimum of ninety-six (96) credits at both the College of Law and ESF. The JD normally requires eighty-seven (87) credits, but joint-degree students must take at least seventy-two (72) Law School credits. Students can transfer fifteen (15) credits from ESF to the College of Law. The MPS degree requires thirty (30) credits, a minimum of twenty-four (24) of which must be ESF courses and six (6) of which may be applied by transfer from coursework at the College of Law.

Students can apply to the joint JD/FNRM degree program at two points: 1) simultaneously, before entering the College of Law, or 2) after completing the fall semester of study at the College of Law. Applicants applying simultaneously must complete a College of Law application and an ESF graduate application. Applicants applying after enrolling at the College of Law must complete an "internal" College of Law application and ESF graduate application.

Graduate students at Syracuse University may also consider the certificate of graduate studies in environmental decision-making offered through the Department of Environmental Studies.

### **Cooperative Programs at Cornell University and SUNY Upstate Medical University**

ESF and the New York State College of Agriculture and Life Sciences at Cornell University provide exchange opportunities so that graduate students can take advantage of special courses, faculty, and research facilities found at the two institutions. Cornell University is in Ithaca, N.Y., about 50 miles southwest of Syracuse.

ESF and the SUNY Upstate Medical University provide opportunities for graduate students at each institution to enroll in graduate coursework or pursue coordinated M.D./Ph.D. degrees in environmental medicine. SUNY Upstate Medical University is located within walking distance of ESF.

Graduate students interested in these opportunities should contact the ESF Office of Instruction and Graduate Studies.

### **Intra-ESF Concurrent Degree Programs**

ESF graduate students have engaged in concurrent degree programs with Syracuse University for three decades. As of 2009, ESF graduate students may now undertake formal concurrent graduate degrees in two different departments or academic units within the college.

Concurrent degrees magnify the strengths of academic program offerings within ESF. Pairing an academic degree (PhD or MS) with a professional degree (MLA, MPS, MF), or pairing two professional degrees (MLA, MPS, MF) are attractive choices for ESF students. Please consult with individual departments for details regarding specific degree or program combinations. Concurrent degrees require a minimum of 80 percent of the

credit hour requirements of each of the paired degrees. Students may apply for admission to both degrees at matriculation, or they may apply to add the second degree following completion of at least 12 credit hours of coursework with a minimum GPA of 3.5. Graduate students interested in these opportunities should contact the ESF Office of Instruction and Graduate Studies.