BACHELOR OF SCIENCE IN FOREST ENGINEERING

Forest Engineering (FE) is a joint degree between the Faculty of Forestry and Environmental Management and the Faculty of Engineering. Graduates qualify for registration as professional engineers (PEng) and, when they complete the RPF option, for registration as Registered Professional Foresters (RPF).

PLEASE NOTE: ADMISSION TO THE BACHELOR OF FOREST ENGINEERING DEGREE PROGRAM HAS BEEN SUSPENDED EFFECTIVE JUNE 1, 2010. FOR FURTHER INFORMATION PLEASE CONTACT THE DEAN OF FORESTRY AND ENVIRONMENTAL MANAGEMENT

Forest Engineering Program

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NOTE: For Faculty information please see the Bachelor of Science in Forestry program section.

General Information

The FE program was established at UNB in 1968 and remains the only program of its kind in Canada. Forest engineers design structures and production systems used in natural resource and industrial settings in ways that ensure environmental, economic and social sustainability. In practice, FEs are operations engineers, forest managers, production engineers, project engineers, business people and entrepreneurs. Their knowledge is broad and their approach to problem solving analytic. They integrate engineering principles, environmental ethics and a concern for human welfare. They are thoughtful in their planning and persistent in achieving
excellence in execution, and they communicate and interact with others in clear, confident and respectful ways.

A forest engineering education helps students acquire analysis and design capabilities in the following three areas:

- **Structures used in natural environments incorporating an informed understanding of ecology**
  - Structures include roads, trails, small bridges, ponds, embankments, small buildings and stand structures;

- **Production systems used in natural resource and manufacturing settings**
  - Production system designs describe the nature and sequence of activities to produce a good or service.
  - In forests, they include the system of machines and the activity of people to plant trees, harvest a stand, build a road etc.
  - In manufacturing settings, they include selecting machines, procedures and people needed to produce lumber, wood composites, furniture, or seedlings in a nursery;

- **Natural resource management plans that adhere to principles of sustainability**
  - Strategic natural resource management plans describe what activities to use, where, when and how over a large area and a long time span, ensuring economic, social, and environmental sustainability.
  - In this hierarchical planning system, operational plans to organize production over near-term planning horizons are required to achieve the strategic objectives.

The forest engineering program teaches students to be effective at important professional abilities including structured problem solving, critical thinking, written communication, oral communication, interacting with people, managing projects and global awareness. In terms of attitudes, the program and the faculty encourage FE students to:

- exhibit a willingness to seek out and accept challenge, then strive for success;
- be positive, respectful and ethical;
- be goal oriented;
- have an interdependent work ethic;
- be flexible and adaptable;
- push the limit of their ability; and
- be willing to take on responsibility.
Regulations

Students are strongly advised to read the General University Regulations, Section B of this Calendar, because that information will apply to points not covered in the following:

1. A minimum of 160 credit hours is required for the BScFE degree, of which 19 are elective courses.

2. Students entering the program who do not have appropriate high school level Chemistry and Physics may be required to take additional credit hours in these subjects. Credit hours for such preparatory courses are not included in the degree requirements.

3. Students must consult with their faculty advisor or the Assistant Dean in Forestry, and other faculty as appropriate, to receive advice on course selection, scheduling, etc.

4. The minimum number of credit hours of electives in the FE program is 19. At least 6 credit hours of electives must be in complementary studies, of which 3 must be from the following disciplines: Anthropology, Classics, Literature, History, Philosophy, Political Science and Sociology.

5. A minimum assessment year grade point average (g.p.a.) of 2.0 is required at the end of each year. Assessment is in May following the completion of the spring examination period and includes the preceding Intersession, Summer School and Spring Extensions.

6. A student who has been required to withdraw from the program for academic reasons once, and who reapplies for admission following the withdrawal period, may be re-admitted to the program. If re-admitted, the student will automatically be on academic probation. Failure to meet the normal academic requirements at the next time of assessment will result in final dismissal from the program. Further applications for re-admission will not be considered.

7. C grade minimum is required for all courses used for credit towards
the BScFE degree.

8. Degree requirements must be successfully completed in not more than 16 terms during a period of 8 consecutive calendar years from the date of first registration in the FE program. Transfer students will have the time prorated on the basis of advanced credit granted.

Curriculum

Acquiring and demonstrating competence in the FE outcomes is the goal of the curriculum. The curriculum consists of 141 credit hours of core courses (listed below) and 19 credit hours of electives at a minimum. Students can and may need to take more courses to fulfill the requirements of a minor or other specialization. Students are able to choose electives from a broad range of courses offered by forest engineering, engineering, forestry and other departments. See a more detailed description under the section heading ELECTIVES below.

In the first year, many courses are common to all engineering programs, including FE, at UNB. This allows easy transfer between programs. Thereafter, students take courses which increase their engineering sciences and engineering design competence in the 3 technical outcomes described above; basic math and science courses; courses that complement these, and elective courses.

Core (Required) Courses

The core courses required of all Forest Engineering students are shown below.

CE 1023 Statics for Engineers
CE 2023 Mechanics of Materials
CE 2703 Introduction to Fluid Mechanics
CE 3713 Hydraulics and Hydrology
CHE 2501 General Materials Science
CHE 2506 Materials Science Laboratory
CHEM 1982 General Applied Chemistry
CHEM 1987 General Applied Chemistry Lab
CS 1003 Introduction to Computer Programming
ENGG 1001 Engineering Practice Lecture Series
ENGG 1003 Engineering Technical Communications
ENGG 1015 Introduction to Eng. Design and Problem Solving
ENGG 4013 Law and Ethics
ENR 2004  Social and Cultural Systems  
ENR 1973  Fall Field Camp  
FE 1611  Engineered Systems in Natural Resources  
FE 2113  Introduction to Forest Wildlife Ecology  
FE 2703  Forest Operations Concepts  
FE 2803  Wood Technology  
FE 3033  Analysis of Structures  
FE 3143  Natural Resource Geotechnique I  
FE 3233  Introduction to Operations Research  
FE 3303  Thermal Engineering  
FE 3363  Machine Design I  
FE 3433  Operations Research for Production Planning  
FE 3603  Economic Decision-Making for Engineers  
FE 3773  Forest Operation Planning Project I  
FE 3853  Processing of Wood Products  
FE 4893  Systems Design Project  
FE 4995  Structural Design of Forest Engineering Systems  
FE 4043  Structural Design in Natural Environments  
FOR 1001  Introduction to Forestry  
FOR 2281  Introduction to GIS in Forestry  
FOR 3005  Silviculture and Stand Intervention Design  
GEOL 1001  The Earth: Its Origin, Evolution and Age  
GEOL 1026  Geology Lab for Engineers  
GGE 1001  Introduction to Geodesy and Geomatics  
MATH 1003  Introduction to Calculus I  
MATH 1013  Introduction to Calculus II  
MATH 1503  Introduction to Linear Algebra  
MATH 2513  Multivariable Calculus for Engineers  
PHYS 1081  Foundations of Physics for Engineers  
STAT 2593  Probability and Statistics for Engineers  

**Electives**

The FE program provides a general engineering education. Electives provide students an opportunity to specialize in any area of their choice. Three credit hours must be taken in Anthropology, Classics, Literature, History, Philosophy, Political Science and Sociology, and an additional 3 ch must qualify as complementary studies. Otherwise, students are free to choose electives that meet their personal and professional aspirations. Students must have their elective choices approved annually by their
faculty advisor. Forest Engineering technical elective courses are listed in the course descriptions section of the calendar.

Forest engineering offers a Wood Products Option and a Registered Professional Forester (RPF) Option

**Wood Products Option**

Those students wishing to obtain competence in subjects related to manufacture, marketing and use of engineered wood products may pursue the combination of elective courses which constitute the wood products option. The option consists of the following courses (15 ch):

- ADM 3375 Marketing of Products and Services
- ADM 3685 Total Quality Management
- FE 3873 Physical and Mechanical Properties of Wood
- FE 5863 Wood Structures
- FE 5873 Performance of Structural Wood Systems

**Registered Professional Foresters (RPF) Option**

Students wishing to fulfill the academic requirements for registration as a Registered Professional Forester must complete the RPF Option along with the FE core program. The option consists of the following courses (24 ch):

- FOR 2006 Forest Dynamics and Management
- FOR 2435 Physiological Processes in the Forest
- FOR 2416 Structure and Development of Woody Plants
- FOR 2505 Soils for Plant Growth
- FOR 2425 Autecology of Forest Vegetation
- FOR 3006 Forest Management
- FOR 3456 Forest Watershed and Fire Management
- FOR 4625 Integrated Management of Insects and Fungi
- FOR 3006 Forest Management

**Forest Engineering Minor in BSCE Programs**

Since Forest Engineering applies industrial engineering, mechanical engineering and civil engineering in forestry settings, opportunities exist for students enrolled in these engineering disciplines to acquire competency in any of the three major FE technical outcomes. The following three concentrations, which are modeled after the three major technical
outcomes of the forest engineering program respectively, are recommended. Students will be recognized for this competency in their transcripts with a Forest Engineering Minor if they successfully complete a minimum of 24 ch with a grade C or better from the following customized lists of courses.

**Forest Engineering Minor (Forest Operations Management)**

- FE 2113  Introduction to Forest Wildlife Ecology
- FE 3233  Operations Research
- FE 3433  Operations Research for Production Planning
- FE 2703  Forest Operations Concepts
- FE 3773  Forest Operations Planning Project I
- FOR 1001  Introduction to Forestry
- FOR 3005  Silviculture and Stand Intervention Design
- FE 3603  Economic Decision-making for Engineers
- FE 3143  Natural Resource Geotechnique I
- FE 5761  Transportation of Forest Products

**Forest Engineering Minor (Production Systems in Forests and Wood Processing)**

- FE 2703  Forest Operations Concepts
- FE 2803  Wood Technology
- FE 3233  Operations Research using Natural Resources Applications
- FE 3433  Operations Research for Production Planning
- FE 3853  Processing of Wood Products
- FE 5622  Human Factors Engineering
- FE 4893  Systems Design Project
- FOR 1001  Introduction to Forestry

**Forest Engineering Minor (Forest Transportation and Structures)**

- FE 2113  Introduction to Forest Wildlife Ecology
- FE 3033  Structural Analysis and Design
- FE 3143  Natural Resource Geotechnique I
- FE 4043  Structural Design in Natural Environments
- FE 4995  Structures Design Project
- FE 5143  Natural Resource Geotechnique II
- FOR 2281  GIS in Forestry
- FOR 4576  Advanced Studies in Forest Soils and Hydrology
GEOL 1001 The Earth: its Origin, Evolution and Age
GEOL 1026 Geology Lab for Engineers
GGE 1001 Introduction to Geodesy and Geomatics
GE 2922 Engineering Geology