

**Forest Soils (FO 3030)**  
Course Outline - Winter 1997

**Forest Soils:** - Forest soil properties, processes, and fertility; forest soils in relation to resource management; forest hydrology.

**Prerequisite:** Geomorphology and Soils (FO 2100)

**Instructor:** George Nercessian Ph.D. (Office: C 203)

**Lectures:**            M W 11:00    E 305  
                              F    4:00    E 305

**Laboratories:**    M     3:00    J 104

**Course Requirements and Marking:**

	<b>Percent</b>
Laboratory Reports and Problems	10
Term Paper [see p. 3 of this outline]	10
Quizzes	10
Midterm Examination	30
Final Examination	40

To receive a passing mark, students must pass the mid-term and final examinations.

If the final examination is failed, but the weighed mark equals or exceeds 50%, the final mark in the course will be 37%. In all other cases, the final mark will be the weighted mark.

**Required Materials:**

**Forest Soils Lecture Notes; Forest Soils Laboratory Manual; Forest Soils Computer Diskette.**

**Textbooks (Recommended):**

Pritchett, W.L. and Fisher, R.F. 1987. Properties and management of forest soils. 2nd ed. John Wiley & Sons, new York. 494 pp. - Available form the bookstore; a copy is on reserve under FO 3030 in the GPRC Library.

Brady, N.C.; Weil, R.R. 1996. The nature and properties of soils. 11th Ed. Prentice Hall, Upper Saddle River, New Jersey. xi +740pp.

Canada Soil Survey Committee 1987. The Canadian system of soil classification. Agriculture Canada. Publication 1646. Supply and services Canada, Ottawa. 164 pp.

Hewlett, J.D. 1982. Principles of Forest Hydrology. The Univ. of Georgia Press. Athens. 183 pp.

LECTURE TOPICS	APPROXIMATE LECTURE HOURS	RECOMMENDED READING
1. Soil Phosphorus and Potassium	3hrs.	<i>B and W, Ch. 14</i>
2. Micronutrient Elements	2hrs.	<i>B and W, Ch. 15</i>
3. Soil Classification (Guest Lecturer)	3hrs.	<i>B and W, Ch. 3</i> <i>The Canadian System of Soil Class.</i>
4. Soil interpretation, soil engineering	2hrs.	<i>P and F, Ch. 1</i>
5. Engineering classification. Water flow to tree roots.	3hrs.	<i>P and F, Ch. 7,8</i>
7. Tensiometry and Lysimetry. Soil frost action. Forest soil temperature.	3hrs.	<i>P and F, Ch. 9</i>
8. Site prep. Effects on temp. Soil air. forest floor classif.	3hrs.	<i>P and F, Ch. 4</i>
9. Forest floor properties and accumulation. Forest soil development.	3hrs.	<i>P and F, Ch. 2,3,6</i>
10. Nitrogen cycling. Mycorrhizae of trees: Effects and management.	2hrs.	<i>P and F, Ch. 5, 10, 11</i>
11. Site productivity prediction. Nutritional Diagnosis and calibration; visual symptoms	2hrs.	<i>P and F, Ch. Ch. 12</i>
12. Diagnosis: soil and foliage sampling, analysis and data interpretation.	3 hrs.	<i>P and F, Ch. 18</i>
13. Stand response to fertiliser. Operational forest fertilisation. Effects on soil.	2 hrs.	<i>P and F, Ch. 15, 19</i>
14. Slope stability. Effects of logging and roads. Surface erosion and erosion control.	3 hrs.	<i>P and F, Ch. 20</i>
15. Harvesting effects on soil properties and processes.	2hrs.	<i>P and F, Ch. 22</i>
16. Rehab. Of roads and landings. Soil physico-chemical and biological effects of fire.	3 hrs.	<i>P and F, Ch. 16, 21</i>

## Term Paper Requirements

Any forest soils topic or tree nutrition topic is acceptable. The topic should be sufficiently narrow to enable treatment at a level suitable for this course.

**Length:** From 8 - 20 pp. (Double spaced, typewritten, *Times New Roman 12 pt*). A good 8 page paper will receive as much credit as a good 25-page paper.

**Format and Style:** Use *Canadian Journal of Botany* or *Forest Research* as a guide for format, including reference citation format. The writing style should be scientific or professional. Reference to a good style manual is recommended. Include abstract, briefly summarising information and conclusions contained in the paper.

**Documentation:** Statements which a reader might question must be supported by a sound rationale or by evidence. The rationale or evidence must be either presented or identified by a literature citation.

**Grammar, spelling, punctuation:** Be consistent, and when in doubt, consult a grammar text or dictionary or style manual. Neatly correct any typographical errors.

**Marking:** 60% content and documentation; 10% format, organisation; 15% grammar, spelling, punctuation, and correction of typographical errors.

**Due February 17: Term paper topic and list of at least 4 references on the topic.**

**Finding References:** References listed in the course manual. Contact your instructor for interlibrary loans from the Library. Search the available materials at the GPRC Library. Consult the instructor regarding reference searches.

**Due April 4: Term Paper**

## Forest Hydrology

LECTURE TOPICS	APPROXIMATE LECTURE HOURS	RECOMMENDED READING
1. Introduction to Forest Hydrology	1 hr.	Ch. 1, Hewlett
2. The water and energy cycles	2 hrs.	Ch. 2
3. Drainage basin morphology	1 hr.	Ch. 3
4. Atmospheric moisture and precipitation.	1 hr.	Ch. 4
5. Subsurface water	2 hrs	Ch. 5
6. Evaporation and Evapotranspiration	2 hrs.	Ch. 6
7. Surface water, the hydrograph and the Runoff process	2 hrs.	Ch. 7
8. Erosion and sedimentation in relation to forests	1 hr.	Ch. 8