

SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY
SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

Course Title: FOREST PATHOLOGY


Code No.: FOR 114-3 Semester: IV

Program: FORESTRY

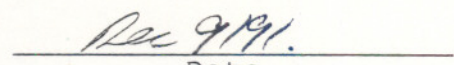
Author: G. STONE

Date: NOVEMBER, 1991 Previous Outline Dated: OCTOBER, 1991

APPROVED:



 Dean



 Date

Course Name

Course Number

TOTAL CREDIT HOURS: 48

I. PHILOSOPHY/GOALS:

The purpose of this course is to familiarize the student with forest tree diseases; their identification, life history, control and impact on the practice of forest management.

II. STUDENT PERFORMANCE OBJECTIVES:

OBJECTIVES

- 1) Compare forest and shade tree pathology.
- 2) Explain the role of tree diseases in natural ecosystems.
- 3) Explain the importance of tree diseases.
- 4) Distinguish between the concept of integrated forest management and forest disease management.
- 5) Distinguish between the concept of tree health and tree diseases.
- 6) Classify the ten (10) types of forest/shade tree diseases: biotic (infectious), abiotic (non-infectious), decline plant diseases, taxonomic, forest product, part of tree, parasitic vs saprophytic, necrotic vs hypertrophic vs atrophic, by host, non-pathogenic.
- 7) Identify and describe types of abiotic (non-infectious) stress factors that affect tree health.
- 8) Identify and describe types of biotic (infectious) stress factors as agents of tree diseases: nematodes, viruses, mycoplasma, bacteria, parasitic flowering plants and fungi.
- 9) Explain the characteristics that fungi have in common.
- 10) Collect and identify at least ten (10) fungi important to forest/shade trees of Ontario.
- 11) Construct a dichotomous key to separate fungi collected and identified.
- 12) Draw fully labelled life cycles of at least nine (9) fungus diseases important to Ontario using signs and symptoms: mycorrhizae, foliage, rust, canker, vascular wilt, wood decay, wood stain, root diseases and decline diseases.
- 13) Illustrate diagrammatically a decline disease of complex biotic (infectious) and abiotic (non-infectious) origin using a specific example.

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II. STUDENT PERFORMANCE OBJECTIVES: (cont'd)

- 14) State and explain the natural succession of infectious organisms on a tree, stump or log.
- 15) Compare the Forest Insect and Disease Survey of the Great Lakes Forestry Centre and the Forest Pathology Unit of the Ontario Forest Research Institute using the following aspects:
 - a) mandate
 - b) role of a forest technician
 - c) process involved from observation to prescription
- 16) Recognize the relationship between and the impact of forest/shade tree disease on the practice of:
 - a) **Silviculture**
 - i) List and describe five (5) silvicultural methods for the prevention of forest/shade tree diseases.
 - ii) Describe ways in which forest/shade tree diseases change species composition and resulting economic and aesthetic values with examples of each.
 - b) **Forest Law**
 - i) Describe the purpose of the following acts as they apply to forest/shade tree pathology.
 - Pest Control Products Act
 - Forest Tree Pest Control Act
 - Environmental Protection Act
 - c) **Urban Forestry**
 - i) Prepare an audiovisual presentation (proposal) about an area surveyed.
- 17) To identify forest/shade tree diseases in the field inspection for the slide and specimen tests.

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III. TOPICS TO BE COVERED:

UNIT NO.

TOPIC DESCRIPTION

INTRODUCTION

What is forest pathology, why study forest pathology, what is sustainable development, questions, course outline, introduction to the study guide.

1

CLASSIFICATION OF FOREST/SHADE TREE DISEASES

- A comparison, tree health vs tree diseases, role of tree diseases in a natural ecosystem. Biotic (infectious), abiotic (non-infectious), decline plant diseases, taxonomic, part of the tree, forest product, parasitic vs saprobic, necrotic vs hypertrophic vs atrophic by host, non-pathogenic.

2

ABIOTIC STRESS FACTORS

- Climatic, mineral nutrition and mechanical.

3

BIOTIC STRESS FACTORS

- Nematodes, viruses, bacteria, mycoplasma, parasitic seed plants and fungi.
- Impact on forest management.

4

INTRODUCTION TO FUNGI

- Fungi in the forest community, characteristics of fungi, taxonomic classification of fungi, disease cycles of pathogenic fungi.
- Disease prevention and control : a comparison, methods of disease control: a problem solving approach, silvicultural, biological and chemical.

5

FUNGI AS AGENTS OF TREE DISEASE

- Mycorrhizae as symbionts of tree disease, types, mode of action, association cycle, importance, recognition, examples and establishment.
- Foliage, rust, canker, vascular wilt, wood decay, wood stain, root diseases and decline diseases.

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III. TOPICS TO BE COVERED: (cont'd)

UNIT NO.

TOPIC DESCRIPTION

6

FINAL ASSIGNMENTS

- Succession of organisms.
- Role of Forest Technician.
- Impact on urban/forest management.
 - Audiovisual presentation.
- Field identification of forest/shade tree diseases.
- Fungus specimens

ABIOTIC STRESS FACTORS

- Climatic, mineral nutrition and mechanical.

BIOTIC STRESS FACTORS

- Nematodes, viruses, bacteria, mycoplasmas, parasitic seed plants and fungi.
- Impact on forest management.

INTRODUCTION TO FUNGI

- Fungi in the forest community, characteristics of fungi, taxonomic classification of fungi, disease cycles of pathogenic fungi.
- Disease prevention and control: a comparison of methods of disease control: a problem solving approach, silvicultural, biological and chemical.

FUNGI AS AGENTS OF TREE DISEASE

- Mycorrhizae as symbionts of tree disease, types, mode of action, association cycles, importance, recognition, examples and establishment.
- Polypore, rust, canker, vascular wilt, wood decay, wood stain, root diseases and decline diseases.

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IV. LEARNING ACTIVITIES:

FOREST PATHOLOGY ASSIGNMENTS

RESOURCES

DUE DATE
(TBA)

- 1) Classify forest shade tree diseases using nine different methods:
 - a) taxonomic
 - b) biotic (infectious)
 - c) abiotic (non-infectious)
 - d) decline
 - e) forest product
 - f) part of tree
 - g) parasitic/saprophytic
 - h) necrotic/atrophic/hypertrophic
 - i) by host
 - j) non-pathogenic

Manion, Chapter 1
Unit 1
Video - Signs & Symptoms

- 2) Identify and describe types of abiotic (non-infectious) stress factors that affect tree health. Present in the form of a chart having the following headings: Stress Factor, HW/SW, Symptoms, Sketch of Damage Treatment.

Manion, Chapter 2,3,4
Unit 2
Video - Abiotic Stress Factors

- 3) Identify and describe types of biotic or infectious forest/shade tree diseases - fungi, bacteria, nematode, virus, mycoplasma, seed plant.

Manion, Chapters 5,6,7 & 17
Unit 3

Present in the form of a chart, using the following headings: Size, Shape, Parasitic/Saprobic, Signs, Symptoms, Spread, Damage, Importance, Method of Reproduction, Control, Example.

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IV. LEARNING ACTIVITIES: (cont'd)

<u>FOREST PATHOLOGY ASSIGNMENTS</u>	<u>RESOURCES</u>	<u>DUE DATE</u> <u>(TBA)</u>
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- | | | |
|--|---|--|
| 4) Collect and identify at least ten fungi of Ontario. | Manion, Chapter 8
Lincoff.
Unit 4 | |
| 5) Construct a dichotomous key to separate a fungi collected and identified. | | |
| 6) Explain the characteristics that fungi have in common. | | |
| 7) Describe life cycles of nine (9) biotic (infectious) forest/shade tree diseases of Ontario using signs and symptoms only. | Manion
Unit 5 | |
| a) Mycorrhizal Fungi | | |
| b) Foliage Diseases | | |
| c) Rust Diseases | | |
| d) Canker Diseases | | |
| e) Vascular Wilt Diseases | | |
| f) Wood Decay | | |
| g) Wood Stain | | |
| h) Root Rots | | |
| i) Decline Disease | | |
| 8) State and explain natural succession of infectious (biotic) disease organisms on a tree, stump or log. | Class Notes
Library
Unit 6
Manion, Chapter 5,
16
Video, Signs &
Symptoms, Abiotic
Stress, Wood Decay | |

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RESOURCES

DUE DATE
(TBA)

- 9) Compare the Forest Insect and Disease Survey of the Great Lakes Forestry Centre and the Forest Pathology Unit of the Ontario Forest Research Institute using the following aspects:
- a) mandate
 - b) role of a forest technician
 - c) process involved from observation to prescription
- 10) List and describe at least five silvicultural methods for prevention of forest/shade tree diseases.
- 11) Describe ways in which forest/shade tree diseases change species composition, effects on economic and aesthetic values with examples of each.
- 12) Describe the purpose of the following acts, as they apply to Forest Pathology:
- a) Pest Control Products Act
 - b) Forest Tree Pest Act
 - c) Environment Protection Act
- 13) Research forest/shade tree pathology literature, and report on specific problem or issue, and prepare audiovisual materials for a forest/shade tree pathology presentation to a specific audience (see explanation in Notes)

Unit 6

Silviculture Study Guide
Library
Biology Study Guide
Manion
Unit 6

Silviculture Study Guide
Library
Biology Study Guide
Manion
Unit 6

Forestry Law Study Guide
Environmental Biology
Unit 6

Teacher
Manion
OFRI
Unit 6

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FOREST PATHOLOGY ASSIGNMENTS

RESOURCES

DUE DATE
(TBA)

14) Identify forest/shade tree diseases in the field in preparation for the slide and specimen test.

Unit 6
MNR Person

15) Fungus specimen slide test and specimen test.

Videotape

V. EVALUATION METHODS:

Evaluations:

Assignments	60% of total mark
Slide test	20% of total mark
Specimen test	20% of total mark
	100%

Grading:

A+ -	90% exceptional
A -	85% consistently outstanding
B -	75% above average
C -	60% basic understanding of course material

Each student must pass each item listed under evaluation. Marks will then be averaged to give the final mark. A student receiving an "I" in a slide or specimen test will be given an opportunity to rewrite. The opportunity to rewrite is a privilege and not a right.

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SPECIFIC AUDIENCE:

MNR, Band, Municipal Government, Conservation Group.

SCRIPT:

Verbal communication to accompany audio/visual presentation. Must be geared to level of audience.

PREPARATION AND PRESENTATION:

Can be done as an individual or teamed up with one other person (one who will complement your skills).

VII. ADDITIONAL RESOURCE MATERIAL:

VIDEOTAPES - available in Sault College library and on site for distance education.

REFERENCE COLLECTION: available in 1135 at Sault College and on site for distance education.

VIII. SPECIAL NOTES

Students with special needs (e.g. physical limitations, visual impairments, hearing impairments, learning disabilities) are encouraged to discuss required accommodations confidentially with the instructor.

Your instructor reserves the right to modify the course as he/she deems necessary to meet the needs of students.

AUDIOVISUAL PRESENTATION

OBJECTIVE:

Prepare audio/visual materials for a forest/shade tree pathology presentation to a specific audience.

AUDIOVISUAL MATERIALS:

Videotape, overhead projections, 35 mm slides, slide-tapes, charts, posters, drawings, illustrations.

FOREST/SHADE TREE PATHOLOGY:

Select an urban location: city, town, village park, campground or recreation area. Survey chosen area re: present condition of trees. Decide on one pathological problem that needs to be addressed.

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VI. REQUIRED STUDENT RESOURCES:

- Lincoff, 1990, "Guide to Mushrooms", Simon and Shuster
- Manion, P.D. 1991, "Tree Disease Concepts", 2nd Edition, Prentice-Hall
- Stone, G.L. 1991, "Forest Pathology Study Guide", Sault College
- Lincoff, G.H. Editor, 1981, "The Audubon Society Field Guide to North American Mushrooms", A.A. Knopf, Publisher.
- J.T. Basham, 1991 "Stem Decay in Living Trees in Ontario's Forests A User's Compendium and Guide", Forestry Canada, Ontario Region, Great Lakes Forest Research Center, Info Report - 0-X-403

VII. ADDITIONAL RESOURCE MATERIAL:

VIDEOTAPES - available in Sault College library and on site for distance education.

REFERENCE COLLECTION: available in J1305 at Sault College and on site for distance education.

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