

# **Forest Pathology**

## **(NRMT/Biology 3213)**

**Instructor:** Dr. Leonard J. Hutchison, Rm 1007A Braun Building

**Teaching Assistant:** Hanna Dorval

**Lecture Slot:** Wednesday and Friday 3:30 p.m.-4:30 p.m. (Rm 1050 Braun Building)

**Laboratory Slot:** Tuesday 2:30 p.m.-5:30 p.m. or Thursday 11:30 a.m.-2:30 p.m. (Rm 1050 Braun Building)

### **Mark Distribution:**

Mid Term Examination	15% (Wednesday evening, Nov. 1 <sup>st</sup> , 2017)
Forest Pathology Collection	30% (due Monday, November 20 <sup>th</sup> , 2017)
Culture Collection of Fungi	10% (due Monday, December 4 <sup>th</sup> , 2017)
Laboratory Book	10% (due Monday, December 4 <sup>th</sup> , 2017)
Final Examination	35% (TBA- see exam schedule)

**Textbook:** This course has no textbook. However, the book COMMON TREE DISEASES OF BRITISH COLUMBIA by Allen, Morrison and Wallis will be available in the lab to all students registered in this course (electronic PDF version available online).

**Laboratory Manual:** Forest Pathology Laboratory Manual (16<sup>th</sup> Ed.)(available from the instructor).

**Date for voluntary withdrawal:** Friday, November 3<sup>rd</sup>, 2017

**Course Content:** A survey of the key biotic and abiotic diseases of Canadian trees in both natural and plantation forests as well as in urban environments. Emphasis will be placed on diseases caused by fungi. Each disease discussed will include information on the biology of the causal agent, symptoms found on host trees, and the management, prevention and/or control of the disease. Laboratory exercises are designed to give students expertise in both field recognition of diseases and causal agents as well as lab experience in isolation, cultivation and identification of disease causing agents.

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**Forest Pathology**  
(Brief course outline)

Introduction to Forest Pathology

what is a disease?, causes of disease in trees, Koch's postulate, Forest disease management

Introduction to Fungi

what is a fungus?, hyphae and hyphal modifications, major taxonomic groups of fungi (Oomycota, Zygomycota, Basidiomycota, Ascomycota)

Foliage Diseases

deciduous leaves vs. conifer needles, nature of infection process by foliar pathogenic fungi, facultative necrotrophy vs. obligate biotrophy, some examples of foliar diseases of deciduous trees (*e.g.* powdery mildews, tar spot, leaf blisters or leaf curl, anthracnose), some examples of foliar diseases of coniferous trees (*e.g.* needle cast, cedar leaf blight, brown snow mould)

Canker Diseases

what are cankers? , classification of cankers, characteristics of canker-causing fungi, some examples of cankers of hardwoods (*e.g.* chestnut blight, Hypoxylon canker of aspen, beech bark disease, butternut canker, Nectria canker, coral spot disease, Eutypella canker, Cytospora canker of poplars & willows), some examples of cankers of conifers (*e.g.* Cytospora canker of spruce, Atropellis canker, Diplodia canker, Scleroderris canker, Lachnellula canker)

Vascular Wilts

what are vascular wilts?, mechanisms of disruption of water uptake, general symptoms of vascular wilt, examples of vascular wilts (*e.g.* conifer wilt and blue stain, Dutch elm disease, Verticillium wilt)

Wood and Litter Decay

significance of woody debris, fungi responsible for decay, colonization strategies of decay fungi, components of wood, types of wood decay, spalting, factors influencing decay, wood-decay fungi as parasites of living trees, CODIT, examples of heart rot fungi (*e.g.* *Phellinus tremulae*, *Laetiporus sulphureus*, *Ganoderma applanatum*)

## Root Diseases

microbial ecology of forest soils, root rots of seedlings (*e.g.* damping off, nursery seedling root rot, Rhizinia root rot), structural root rots of mature trees caused by wood decay fungi (*e.g.* Annosum root disease, stand opening disease, Armillaria root rot, brown root & butt rot of conifers)

## Symbiotic root associations

nitrogen-fixing nodules, actinorhizae, ectomycorrhizae, benefits of ectomycorrhizae to trees, fungi & trees involved in ectomycorrhizae, vesicular-arbuscular mycorrhizae (VAM)

## Rust Diseases

rust fungi (Uredinales), infection process, significance of spore states in life history, alternate hosts, origin of heteroecism, variations in life cycle of rust fungi, examples of important rust diseases (*e.g.* white pine blister rust, western gall rust, willow and poplar leaf rust, fir broom rust, conifer needle rusts, Gymnosporangium rusts)

## Biotic diseases of trees caused by other organisms

parasitic flowering plants (*e.g.* mistletoes & dwarf mistletoes, dodder), bacteria-what are they? examples of diseases caused by bacteria (*e.g.* fire blight, crown gall, wet wood), nematodes and their biology and ecology, pine wilt caused by the pine wood nematode,

## Diseases of trees caused by abiotic factors

mineral deficiencies, air pollution, acid rain, winter damage, climate, chemical injury