COURSE OUTLINE: NRT243 - FOREST HEALTH

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Course Code: Title	NRT243: FOREST HEALTH
Program Number: Name	5230: FORESTRY TECHNICIAN
Department:	NATURAL RESOURCES PRG
Academic Year:	2022-2023
Course Description:	This course introduces the student to the disciplines of pathology and entomology through an examination of a variety of biotic and abiotic factors that impact on the health of forest environments. Particular emphasis is placed on the identification, biology and ecology of insects and fungi that are associated with tree species. Abiotic stresses related to temperature, precipitation, soil conditions, etc. are examined in terms of their effect on physiological processes and the recognition of manifested symptoms.
Total Credits:	4
Hours/Week:	4
Total Hours:	56
Prerequisites:	There are no pre-requisites for this course.
Corequisites:	There are no co-requisites for this course.
Substitutes:	NRT206
Vocational Learning Outcomes (VLO's) addressed in this course: **Please refer to program web page for a complete listing of program outcomes where applicable.**	**5230 - FORESTRY TECHNICIAN** VLO 6 Identify and analyze forest diseases, pests, invasive species and other disturbance events and implement mitigation strategies to maintain and improve forest ecosystems. VLO 8 Work independently and in a collaborative environment while applying effective teamwork, leadership and interpersonal skills. VLO 9 Communicate technical information to a variety of stakeholders in oral, written, visual and electronic forms.
Essential Employability Skills (EES) addressed in this course:	EES 1 Communicate clearly, concisely and correctly in the written, spoken, and visual form that fulfills the purpose and meets the needs of the audience. EES 2 Respond to written, spoken, or visual messages in a manner that ensures effective communication. EES 6 Locate, select, organize, and document information using appropriate technology and information systems. EES 7 Analyze, evaluate, and apply relevant information from a variety of sources. EES 8 Show respect for the diverse opinions, values, belief systems, and contributions of others. EES 9 Interact with others in groups or teams that contribute to effective working relationships and the achievement of goals.

	EES 10 Manage the use of time and other resources to complete projects. EES 11 Take responsibility for ones own actions, decisions, and consequences.
General Education Themes:	Science and Technology
Course Evaluation:	Passing Grade: 50%, D A minimum program GPA of 2.0 or higher where program specific standards exist is required for graduation.
Other Course Evaluation & Assessment Requirements:	Academic success is directly linked to attendance. Missing more than 1/3 of the course hours in a semester shall result in an `F` grade for the course.

Course Outcomes and Learning Objectives:

Course Outcome 1	**Learning Objectives for Course Outcome 1**
Collect, preserve, process, and present insect specimens in accordance with scientific standards.	1.1 Demonstrate knowledge of various tools and methods of collecting insect specimens including nets, traps and baits.
Course Outcome 2	**Learning Objectives for Course Outcome 2**
Identify and recognize a selected number of harmful and beneficial insects associated with commercial tree species to the family level using taxonomic keys and microscopic technique.	2.1 Demonstrate use of taxonomic keys. 2.2 Demonstrate use of the binocular microscope. 2.3 Identify selected specimens (Hymenoptera, Lepidoptera, Coleoptera, Hemiptera, Diptera) to appropriate taxonomic groupings.
Course Outcome 3	**Learning Objectives for Course Outcome 3**
Describe the biology and ecology of insects in general and selected harmful and beneficial species.	3.1 Identify and describe the function of external structures of insects. 3.2 Describe the significant anatomical features which distinguish insects from other arthropods. 3.3 Describe the significant anatomical features which distinguish Insect Orders. 3.4 Distinguish between various types of insect metamorphosis. 3.5 Demonstrate correct use of entomological terminology presented in the course. 3.6 For selected species, research and describe their life cycle, the type of damage caused and general importance to the harvesting industry. 3.7 Categorize and recognize different types of damage caused by insects. 3.8 Describe positive contributions that insects make to the health and sustainability of forest environments. 3.9 Prepare properly labelled scientific drawings from microscopic examinations of specimens.
Course Outcome 4	**Learning Objectives for Course Outcome 4**
Describe procedures used	4.1 Describe the objectives of forest health monitoring

	in the monitoring and control of pest species.	programs in general. 4.2 Describe monitoring procedures for select forest pest species. 4.3 Describe various methodologies for pest management including, cultural, chemical and biological treatments. 4.4 Describe integrated control strategies for select forest pest species. Conduct field surveys to assess insect damage potential.
	Course Outcome 5	**Learning Objectives for Course Outcome 5**
	List and describe abiotic stress factors.	5.1 List abiotic factors that affect trees. 5.2 Describe the damage and impacts of abiotic stresses. 5.3 Suggest management techniques to minimize abiotic stress.
	Course Outcome 6	**Learning Objectives for Course Outcome 6**
	Describe select biotic diseases of trees.	6.1 List the causal agents of tree diseases. 6.2 Describe 6 categories of biotic induced diseases. 6.3 Describe the life cycle, damage caused and significance of select tree diseases. 6.4 Suggest management strategies to minimize disease impacts. 6.5 Prepare drawings of the reproductive structures of fungi.
	Course Outcome 7	**Learning Objectives for Course Outcome 7**
	Use signs and symptoms to identify diseases.	7.1 Distinguish between signs and symptoms. 7.2 Collect and identify 20 designated fugal/disease specimens. 7.3 Identify select fruiting structures of fungi. 7.4 Categorize symptoms used in disease identification.

Evaluation Process and Grading System:

Evaluation Type	Evaluation Weight
Assignments	20%
Identification Labs	31%
In-class Activities	19%
Quizzes	10%
Tests	20%

Date: August 31, 2022

Addendum: Please refer to the course outline addendum on the Learning Management System for further information.