

MR142

Pesticide Application Technologies

3 Credits

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MR142 Version: 19



Pesticide Application Technologies

Calendar Description

This course provides an in-depth study of pesticide spray application equipment commonly used on prairie grain farms. Pesticide legislation, safety, health and environmental considerations are covered to assist those interested in pursuing a provincial pesticide applicator's license. Application accuracy and efficiency are emphasized, as is safe and responsible use of these pesticides.

Rationale

This is a required course for Crop Technology students. An understanding of the design and operation of pesticide application equipment is essential to proper selection and use of such equipment. Pesticides represent a major portion of the variable costs of growing a crop. Careful application of pesticides is important to keep costs low. Informed selection of equipment and application methods is part of responsible management. Understanding the design of equipment and application procedures are required to correctly apply pesticides while protecting the environment and ensuring personal safety. This course is intended to complement selected sections of the Pesticide Applicator Homestudy Course used in Alberta to obtain a pesticide applicator's license.

Prerequisites

None

Co-Requisites

None

Course Learning Outcomes

Upon successful completion of this course, students will be able to

1. **be prepared to write the core portion of the Alberta provincial pesticide applicator's license.**

Objectives

- a. Convert product units using unit factoring or conversions.
 - b. Interpret key federal pesticide legislation acts.
 - c. Interpret key Alberta provincial pesticide legislation acts.
 - d. Identify the key components and purpose of a pesticide label.
 - e. Compare the properties of various pesticide formulations.
 - f. Describe safe methods for handling and applying pesticides for protection of personal health and the environment.
2. **describe the wide variety of application methods and machines for applying pesticides.**

Objectives

- a. Identify key components common to all sprayers.
 - b. Identify and differentiate common pump types.
 - c. Identify various styles and types of booms, valves, and other product distribution components.
 - d. Identify and differentiate common nozzle types.
 - e. Analyze nozzle output for rate predictability, pattern, and droplet size consistency.
3. **solve problems relating to sprayer output, concentration ratios, and sprayer calibrations.**

Objectives

- a. Use mathematical formula and unit factoring conversions to solve rate and calibration problems.
 - b. Find online resources (calculators, applications, etc.) to solve rate and calibration problems.
 - c. Calibrate a sprayer model using solution pressure and nozzle size (and type) outputs and compare to online resources (charts and applications).
4. **predict the efficacy and drift potential of the output from a given nozzle based on the “spray quality” of that output.**

Objectives

- a. Define a sprayer nozzle’s “Spray Quality”.
- b. Discuss and verify the relationship between spray quality and operating pressure.
- c. Explain the relationships between each of the following variables – spray angle, boom height, nozzle orientation, nozzle type, travel speed, and atmospheric conditions – on drift risk and product efficacy.
- d. Define target interception, canopy penetration, and product retention, as related to spray efficacy.
- e. Identify the relationships between droplet size and pesticide efficacy for various target orientation and condition.

- f. Assess the spray qualities achieved from various nozzle type and pressure combinations with the college model.

Resource Materials

Required Text:

Lakeland College Pesticide Applicator Certificate Course, Core Lesson. Revised November 21, 2016. Copyright 2015 by Lakeland College, Continuing Education and Alberta Environment, Pesticide Management Program.

Alberta Agriculture and Forestry. (2019). *Crop Protection* (blue book). Edmonton, AB:

Alberta Agriculture and Forestry.

Reference Text:

Students intending to challenge the provincial pesticide applicator license should purchase the complete Pesticide Applicator Certificate Course for their license classification from the Pesticide Certificate and Business Development Department at Lakeland College.

Required Materials:

Calculator.

Conduct of Course

This course consists of 40 hours of lecture and 12 hours of lab. The course work involves classroom lecture and discussion as well as labs that investigate pesticide application equipment. Course note outlines, lab data, assignments and extra reading are available on the Internet through Lakeland College's D2L server. Students are encouraged to check the D2L Internet site frequently for new information and announcements pertaining to the course. Unless specified otherwise, lab reports are due one week from the day of the lab and due dates for assignments are given with the assignment. Since completion of the labs and assignments are a requirement for credit for the course, due dates should be adhered to.

Evaluation Procedures

The weights for various components are as follows:

Labs/Lab Assignments	25%
Math Assignment	10%
Quizzes	15%
Exam 1 (Pesticide Applicators Core Lessons Exam)	25%
Exam 2 (Sprayer Components/Nozzles/Coverage and Droplet Sizes)	25%
Total	100%

The nature of each lab and assignment may change from time to time due to the availability of certain equipment or time available, but the total marks attributed to labs and assignments will always total 35%. To receive a mark for the course you must complete all labs and assignments.

Grade Equivalents and Course Pass Requirements

A minimum grade of D (50%) (1.00) is required to pass this course.

Letter	F	D	D+	C-	C	C+	B-	B	B+	A-	A	A+
Percent Range	0-49	50-52	53-56	57-59	60-64	65-69	70-74	75-79	80-84	85-89	90-94	95-100
Points	0.00	1.00	1.30	1.70	2.00	2.30	2.70	3.00	3.30	3.70	4.00	4.00

Students must maintain a cumulative grade of C (GPA - Grade Point Average of 2.00) in order to qualify to graduate.

Attendance

Classroom and laboratory attendance is considered vital to the learning process and as significant to the students' evaluation as examinations and reports.

- a. Students having a combination of excused and/or unexcused absence of 20 percent or higher for the scheduled course hours will be required to withdraw and will automatically receive a "RW" (required withdrawal) for the course, regardless of any other evaluation results. (RW is a failing grade.)
- b. An excused absence is one that is verified with your Instructor. Verification should be prior to the absence or the next class day following the absence. Verification of the absence may take the form of a note from your doctor/College nurse regarding illness, or a note from another Instructor regarding a field trip or other activity, or authorization by your Instructor. An unexcused absence is anything NOT verified by the instructor prior to the absence or the next class day following the absence.

NOTE: Any exceptions to the above attendance policy (e.g. timetable conflicts, work-related issues) must be approved in writing by the Department Chair prior to the beginning of the course.

It is the students' responsibility to know their own absentee record.

Normal hours are 8:30 a.m. to 6:30 p.m., with potential for evening courses, exams or extended field trips. Students are expected to be available for classes during these times.

Course Units/Topics

1. Pesticide Legislation
 - The Pesticide Applicator Certificates
 - Pest Control Products Act and product registration
 - Other related federal legislation
 - The Environmental Protection and Enhancement Act
 - Other related provincial legislation

2. Health and Environmental Issues Related to Pesticide Application
 - Pesticide names, groups and formulations
 - Toxicity
 - Fate of pesticides in the environment
 - Water contamination
 - Pesticide safety
 - Mixing and loading
 - Pesticide storage and cleanup

3. Calculation of Rates, Concentrations and Calibrations
 - Rate, water volume, and concentration problems
 - Sprayer calibration

4. Pesticide Application Equipment
 - Sprayer components
 - Nozzle types and selection
 - Drift and coverage
 - Droplet size and spray quality
 - New pesticide application technology



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