# PLNT 0770
# WEED MANAGEMENT

Department of Plant Science

Faculty of Agriculture and Food Sciences

University of Manitoba

# Contents

# Course Details

**Course Title and Number:** Weed Management PLNT 0770

**Term:** Winter 2024

**Credit Hours:** 4 Credit Hours

**Pre-requisites:** PLNT 0410, DAGR 0420

**Class Times & days:** Lecture 10.30 am-11.20 am MWF

**Class location:** Agriculture 138

**Lab/tutorial times & days**: 2.30 -3.45 pm W, 11.30 am-12.45 pm R

**Lab/tutorial location**: Agriculture 343

# Instructor Contact Information

**Instructor's name:** Dilshan Benaragama

**Office Location:** 317 Plant Science Building

**Office Hours or Availability:** MWF 1.30 -3.00 pm or by appointment

**Office phone number:** 2044746940

**Email-** dilshan.benaragama@umanitoba.ca

Every attempt will be made to respond within 2-3 business days.

**Contact:** I would be available most of the time in my office during the term and please feel free to drop in and check at my office. However, it will be better to check in advance or having an appointment.

# Traditional Territory/Land Acknowledgment

*The University of Manitoba campuses are located on original lands of Anishinaabeg, Cree, Oji-Cree, Dakota and Dene peoples, and on the homeland of the Métis Nation. We respect the Treaties that were made on these territories, we acknowledge the harms and mistakes of the past, and we dedicate ourselves to move forward in partnership with Indigenous communities in a spirit of reconciliation and collaboration.*

# Equity And Inclusion Commitment

I value the diversity that students bring into the class in terms of gender, sexuality, disability, age, socio-economic status, ethnicity, race, and culture. When it comes to teaching, I believe it is an opportunity to serve diverse people around the world. I am open to discussing special requirements and needs throughout the course and make sure all the students have equal access and all are inclusive during the learning process.

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# Course Description

PLNT 0770 Weed Management Cr.Hrs. 4. Covers economic importance of weed management, weed identification, weed biology and ecology, principles of cultural, biological and chemical weed control, introduction to herbicides and factors influencing their use and selectivity. Prerequisite: PLNT 0410, DAGR 0420.

This course will give the student the ability to identify the weeds and biology of common weeds in the prairies. Identification and understanding weeds is an important first step in being able to manage weeds. The course will also provide students with the knowledge to use herbicides safely, effectively, and in conjunction with integrated weed management techniques to reduce the selection for and/or help with the management of herbicide-resistant weed biotypes as well as reduce the negative environmental effects. This will be useful for students that are returning to a farm or that are working as advisers, extension specialists, agronomists or in other agricultural positions. This course will be useful to all students who see themselves involved in any part of the agricultural production sector.

# Course Learning Outcomes

By the end of this course, students should be able to identify different weed species and their basic biology and ecology, understand how different crop management practice effect their abundance and their management. Further, students will be able to learn four major methods of managing weeds: cultural, biological, mechanical and chemical and how to combine these into effective and sustainable weed management systems.

# Course Materials

## Using Copyrighted Material

All students are required to respect copyright as per Canada's *Copyright Act.* The Copyright Office (https://umanitoba.ca/copyright/) provides copyright resources and support for all members of the University of Manitoba community. We will use copyrighted content in this course. I have ensured that the content I use is appropriately acknowledged and is copied in accordance with copyright laws and University guidelines. Copyrighted works, including those created by me, are made available for private study and research and must not be distributed in any format without permission. Do not upload copyrighted works to a learning management

system (such as UM Learn), or any website, unless an exception to the Copyright Act applies or written permission has been confirmed. For more information, see the University's Copyright Office website at https://umanitoba.ca/copyright/ or contact um_copyright@umanitoba.ca

## Acknowledgement

Most of the course content including lecture notes were originally developed by Dr. Rob Gulden, Professor, Department of Plant Science at University of Manitoba and Dr. Steve Shirtliffe, Professor, Department of Plant Sciences, University of Saskatchewan.

## Recording Class Lectures

No audio or video recording of lectures or presentations is allowed in any format, openly or surreptitiously, in whole or in part without express permission from Dr. Dilshan Benaragama.

## Textbook, Readings, Materials

**Textbook(s)**
1.Guide to Crop Protection (online)
http://www.gov.mb.ca/agriculture/crops/index.html

**Reference books**
Weeds of the Prairies, Alberta Agriculture and Rural Development
Weed Seedling Guide (province)
Ross and Lembi. Applied Weed Science. 1985
Wood, Powell, Anderson. Weed Science Principles. 1996
R.J. Aldrich. Weed Crop Ecology. 1984
R.J. Aldrich and R.J. Kremer. Principles of Weed Management 1997
http://www.umanitoba.ca/academic_support/libraries/
Robert Zimdahl, Fundamentals of Weed Science, 1999
T J Monaco, S C Weller, F M Ashton, Weed Science: Principles and Practices, 2002
L Hall, H Beckie, T Wolf, How Herbicides Work: Biology to Application, 1999
L Hall, How Herbicides Work: Mechanisms of Action, 1996
Liebman, Mohler, Staver, Ecological Management of Agricultural Weeds, 2001

## Library

The university of Manitoba Libraries provide the access to most material you required during the course. To get more specific information about using the library and accessing resources you can reach the particular library liaison at https://libguides.lib.umanitoba.ca/

## Course Technology

It is the general University of Manitoba policy that all technology resources are to be used in a responsible, efficient, ethical and legal manner. The student can use all technology in the classroom setting only for educational purposes approved by the instructor and/or the University of Manitoba Student Accessibility Services. Students should not participate in personal direct electronic messaging / posting activities (e-mail, texting, video or voice chat, wikis, blogs, social networking (e.g. Facebook) online and offline "gaming" during scheduled class time. If a student is on call (emergency) the student should switch his/her cell phone on vibrate mode and leave the classroom before using it. (©S Kondrashov. Used with permission). Class slides will be provided on UMLearn. Students need to ensure that they are familiar with the use of this software to access class notes, the course syllabus, assignments and other important information regarding this course.

## Class Communication

The University requires all students to activate an official University email account. You are required to obtain and use your U of M email account for all communication between yourself and the university. Please note that all communication between myself and you as a student must comply with the electronic communication with student policy. For full details of the Electronic Communication with Students and other policies please visit: https://umanitoba.ca/governance/sites/governance/files/2021-06/Electronic%20Communication%20with%20Students%20Policy%20-%202013_09_01%20RF.pdf

## Academic Integrity

Each student in this course is expected to abide by the University of Manitoba Academic Integrity principles. Always remember to reference the work of others that you have used. Also be advised that you are required to complete your assignments independently unless otherwise specified. If you are encouraged to work in a team, ensure that your project complies with the academic integrity regulations. You must do your own work during exams. Inappropriate collaborative behavior and violation of other academic Integrity principles will lead to serious disciplinary action. Plagiarism, duplicate submission, cheating on quizzes, tests, and exams, inappropriate collaboration, academic fraud, and personation are violations of the Student Discipline Bylaw and will lead to serious disciplinary action. Visit the Academic Calendar, Student Advocacy, and Academic Integrity web pages for more information and support.

## Expectations

Students are expected to contribute to a respectful work and learning environment (refer to Respectful Work and Learning Environment Policy) https://umanitoba.ca/governance/sites/governance/files/2021-06/Respectful%20Work%20and%20Learning%20Environment%20RWLE%20Policy%20-%202020_09_29.pdf. Disruptions including uninvited talking, gaming, use of technologies (including cell/smart phones) in class for purposes other than the course will not be tolerated. Students are expected to attend all lectures (see iclicker component below). Assignments are to be done individually unless otherwise indicated and all University of Manitoba policies on Academic Integrity must be adhered to. The instructor adds valuable and new information to augment the slides provided on UMLearn. Students are expected to take additional notes during class. All material presented in class and the lab including that NOT ON SLIDES is examinable

## Students Accessibility Services

If you are a student with a disability, please contact SAS for academic accommodation supports and services such as note-taking, interpreting, assistive technology and exam accommodations. Students who have, or think they may have, a disability (e.g. mental illness, learning, medical, hearing, injury-related, visual) are invited to contact SAS to arrange a confidential consultation.
Student Accessibility Services http://umanitoba.ca/student/saa/accessibility/
520 University Centre
204 474 7423
Student_accessibility@umanitoba.ca
Links to other available student services are provided in Schedule A which has been uploaded into this course on UMLearn.

# Course Schedule

This schedule is subject to change at the discretion of the instructor and/or based on the learning needs of the students but such changes are subject to Section 2.8 of the – ROASS Procedure.

**1.Introduction to the course and the content**

Course description and marking scheme, the importance of weed management and the course, definitions of weeds, origin and evolution of weeds.

**2. Biology and ecology of weeds**
Classification, life cycles, growth habits, reproduction, germination and dormancy of most common weeds in the prairies.

**3. Weed-crop competition**
Competition for water, nutrients, light, factors affecting yield loss (time of weed emergence, weed density), weed management decision tools, economic guides for crop protection.

**4. Weed management strategies**
Chemical weed control- history of herbicides, herbicide development and registration, herbicide classification, mode of actions, herbicide formulation, factors affecting herbicide performance, environmental fate of herbicides

**5. Herbicide resistance and their management**
Occurrence in western Canada and lessons from elsewhere
http://www.weedscience.org
Mechanism of resistance, predicting resistance, managing/avoiding resistance, herbicide resistant crops.

**6.Integrated Weed Management**
Cultural (shifting the competitive balance in favour of the crop) mechanical (tillage, clipping etc.) biological (broad spectrum, classical, and inundative approaches)

**7. Advances in weed management**
Molecular approaches to weed management, remote sensing in weed detection and weed mapping, precision weed control

# Laboratory Expectations

Attendance and weekly assignments are compulsory as a failing grade in the lab component will result in failing grade in the course. Students are expected to be respectful and clearly follow the instructions provided by the TA.

## Lab Content

1) Weed identification
2) Introduction to herbicides
3) Familiarization with the Guide to Crop Protection
4) Herbicide injury symptoms
5) Case study problem solving

# Course Evaluation

## Methods

| Due Date | Assessment Tool | Value of final grade |
|---|---|---|
| **In Class** | | |
| 10.30 am Wednesday, Feb 14, 2024 | Mid-term | 15% |
| Quizzes (throughout the term) | Iclicker | 15% |
| **In Lab** | Participation/quizzes/assignments | 20% |
| TBA | Final Lab Exam | 20% |
| TBA | Final Exam | 30% |
| **Total** | | **100%** |

** students must receive a passing grade in the laboratory portion of this course to receive a passing grade in the course.

Iclicker - Students are required to bring their iclicker to each class. Students will be tested with questions (3-5) after the each lecture topic. For each question asked students will receive one point for answering the question and one point for answering correctly. The iclicker grade will be determined as the sum of all questions asked during lectures and weighted according to the points earned for each question. Students that have received at least 80% of the iclicker points will receive 100% of the total allocated mark, those with 70-79% of the points will receive 80% of the total allocated mark, those with 60-69% of the points will receive 60% of the total allocated mark, those with 50-59% of the points will receive 40% of the total allocated mark, and those with less than 50% of the iclicker points will receive a grade of 0. If there are more Iclicker responses than actual students in class, I reserve the right to assign agrade of zero to all students for that session. Students must register their iclicker online at http://www.iclicker.com/registration/

## Grading

| Letter Grade | Percentage out of 100 | Grade Point Range | Final Grade Point |
|---|---|---|---|
| A+ | 95-100 | 4.25-4.5 | 4.5 |
| A | 86-94 | 3.75-4.24 | 4.0 |
| B+ | 80-85 | 3.25-3.74 | 3.5 |
| B | 72-29 | 2.75-3.24 | 3.0 |
| C+ | 65-71 | 2.25-2.74 | 2.5 |
| C | 60-64 | 2.0-2.24 | 2.0 |
| D | 50-59 | Less than 2.0 | 1.0 |
| F | Less than 50 | | 0 |

## Assignment Grading Times

Grades for all assignments and exams completed before the voluntary withdrawal date will be available before that date. Lab and Oral Assignment grades will be e-mailed to students shortly after all interviews and the lab section have been completed.

# UM support

All the policies/resources that are relevant to students learning and wellbeing can be found in https://umanitoba.ca/centre-advancement-teaching-learning/sites/centre-advancement-teaching-learning/files/2021-05/Text-for-Schedule-A-ROASS-July-27-2020.pdf