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Syllabus

ANSC 7520 Special Topics in Animal Improvement:
Application of precision livestock farming technologies
(Fall 2023)



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COURSE DETAILS

Course Title & Number:	ANSC 7520 Special Topics in Animal Improvement: Application of precision livestock farming technologies
Number of Credit Hours:	3
Class Times & Days of Week:	Thursday from 9 am to 12 pm
Location for classes/labs/tutorials:	The delivery mode will be in-person or remote depending on the circumstances
Pre-Requisites:	Consent of instructor

Instructor Contact Information

Instructor(s) Name &	Dr. Argenis Rodas-González (Coordinator and instructor) Dr. Gabriel Dallago (co-instructor) Dr. Gabriel Thomas (co-instructor)
Preferred Form of Address:	Anything polite
Office Location:	Animal Science/Entomology Building RM 229
Office Hours or Availability:	Make an appointment, send an email or call me.
Office Phone No.	(204)747-9523
Email:	Argenis.RodasGonzalez@umanitoba.ca
Contact:	If you want to contact me, an email with the subject heading Food 7240 and your name is best, but you can see me after a class session. I expect to respond to telephone and email queries within 24-48 hours (circumstances permitting) during the week. I will not normally be checking my email or UM-Learn on weekends and holidays.

Course Description

Livestock farmers today require reliable and affordable technologies to manage their daily tasks effectively. Precision Livestock Farming (PLF) is the application of process engineering principles and techniques to monitor, model, and manage animal production. Its goal is to achieve sustainable farming practices through the optimization of management practices and the use of resources. This approach helps farmers reduce operational costs, including expenses for feed, medication, and energy. The in-depth study of PLF is crucial for advancing animal management, making it an essential research area to understand.

Course Goals

Upon completion of this course, students should be able to:

1. Describe PLF and its role in animal production
2. Identify critical points to develop a PLF program
3. Select technologies and data management systems compatible with livestock production
4. Build a machine learning model by using databases (image, text, video, etc.), run the training (train model, apply model, capture feedback) and evaluate the model (obtain results).

Textbook, Readings, Materials

- Journals: Meat Science, Journal of Food Science, Journal of Animal Science, Canadian Journal of Animal Science, Frontiers in Veterinary Science, Computers and Electronics in Agriculture, etc.
- Machine Learning Using R. Second Edition. Karthik Ramasubramanian, Abhishek Singh
- An Introduction to Statistical Learning with Applications in R. Second Edition. Springer
- R Deep Learning Essentials. Second Edition. Mark Hodnett and Joshua F. Wiley
- Deep Learning for Vision Systems. Mohamed Elgendy. Manning

Using Copyrighted Material

Please respect copyright. 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 <http://umanitoba.ca/copyright/> or contact um_copyright@umanitoba.ca.

Course Technology

Courses will be offered in-person.

Material for this course is uploaded to UM Learn. Please see this link for support: http://intranet.umanitoba.ca/academic_support/catl/resources/359.html Expectations: I Expect You To

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 Disability Services. The 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. (adapted from ©S Kondrashov. Used with permission)

Expectations: I Expect You To

Attend.
Participate.
Demonstrate willingness to learn.
Be courteous.
Show academic integrity and honesty.
Work effectively as a team to design and execute class activities.
See [Respectful Work and Learning Environment Policy](#).

Academic Integrity

Plagiarism or any other form of cheating in examinations, term tests or academic work is subject to serious academic penalties. Cheating in examinations or tests may take the form of copying from another student or bringing unauthorized materials into the exam room. Exam cheating can also include exam impersonation. A student found guilty of contributing to cheating in examinations or term assignments is also subject to serious academic penalties. Students should acquaint themselves with the University's policy on plagiarism; cheating, exam impersonation and duplicate submission (http://umanitoba.ca/student/resource/student_advocacy/media/Advoc-Cheat-Booklet-rev04-web.pdf).

Students Accessibility Services (SAS)

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

Expectations: You Can Expect Me To

- To treat you fairly and with respect.
- To be available for consultation regularly.
- To treat all of your questions and comments with respect and take your concerns seriously.
- To remain in the classroom for 5 minutes after class to answer any immediate questions.
- To provide clarification or explanation at the time in class for any doubt. Otherwise, send me an email.
- To offer advice about class materials, assignments or exams.
- To grade and return the assignments and exams within 2 weeks of the due date; late assignments will be graded as my time permits.
- To ask questions and gives everyone a chance to participate in class.

CLASS SCHEDULE AND COURSE EVALUATION

This schedule is subject to change at the discretion of the instructor and/or based on the learning needs of the students. However, the classes will be once a week for 3 hours, which students and instructor have to agree on class times & days of the week.

Class Schedule		
Month	Day	Topics
September	7	Introduction
	14	Explain the concept of precision livestock farming (PLF)
	21	Fundamentals of machine learning
	28	The workflow of machine learning
October	5	Tree-based methods. Data management: short R tutorial of the topics of the lectures.
	12	Support vector machines. Data management: short R tutorial of the topics of the lectures.
	19	Deep learning Convolutional neural networks
	26	Computer vision tasks
November	2	Keras and TensorFlow Lab Data management: short R tutorial of the topics of the lectures.
	9	Application of PLF management
	16	Application of PLF to predict animal health
	23	Application of PLF in nutrition and growth
	30	Hands-on assignment presentation
December	7	Hands-on assignment presentation
	14	Oral presentation

Course Evaluation

Written assignments as part of weekly class/discussion: 40%

Hands-on assignments (student will analyze and process a given data): 30%

Oral presentation of a research proposal no related to the thesis: 30%

Deadline for assignments

Class/discussion: weekly

Hands-on assignment (data management): short R tutorial (October) and final presentation of the results (Nov 30 and Dec 7).

Oral presentation: December 14, 2023

Grading

Standardized grades used are those followed by the Food Science Department:

Final grade	Letter Grade	Grade Point Value	
90 - 100%	A+	4.5	Exceptional
80 - 89%	A	4.0	Excellent
75 - 79%	B+	3.5	Very Good
67 - 74%	B	3.0	Good
61 - 66%	C+	2.5	Satisfactory
56 - 60%	C	2.0	Adequate
50 - 55%	D	1.0	Marginal
Under 50%	F	0.0	Failure
	P	Null	Pass

Note: Grades will not be curved.

Voluntary Withdrawal

Voluntary withdrawal date: Nov 21, 2023

ASSIGNMENT DESCRIPTIONS

Written summary of research topics: 40%

Written assignments (short essay 750-1000 words in length) and class discussions/short presentations

Hands-on assignments: 30%

Practical application of data analysis. It will provide a short R tutorial and will be assigned a data to work and present final results.

Oral presentation of a research proposal: 30%

The student will present the assigned research proposal in 20 minutes. The student will then be required to accept questions and establish a positive discussion.

All the assignments needs to be posted in UM Learn

Referencing Style

For written assignments, the essay should be typed, single-spaced with a font size of 12. Margins should be 2.54 cm (1") on all sides. The format of the paper should follow the Chicago style. Assignments will be evaluated based on your ability to discuss the topic in a coherent fashion and support the ideas presented. Points will be deducted for poor grammar and spelling.

Assignment Extension and Late Submission Policy

Attendance is essential to student success in this course.

Assignment extensions or absences on required days will be given only with the professor's permission and will be granted in cases of genuine need (sickness, death or funeral of a close relative). You will need to talk to me in person as soon as possible if you require an extension.

Late submissions will be marked, but do not expect a prompt return of the work. Late submission will incur a deduction of 5% for each weekday that the assignment is submitted after the deadline unless an assignment extension has been permitted by me in advance of the deadline.

UNIVERSITY SUPPORT OFFICES & POLICIES

Students should acquaint themselves with the university support offices and policies. In the following [Schedule “A”](#) is indicated the university support offices.

Schedule “A”

Section (a) sample re: A list of academic supports available to Students, such as the Academic Learning Centre, Libraries, and other supports as may be appropriate:

Writing and Learning Support

The Academic Learning Centre (ALC) offers services that may be helpful to you throughout your academic program. Through the ALC, you can meet with a learning specialist to discuss concerns such as time management, learning strategies, and test-taking strategies. The ALC also offers peer supported study groups called Supplemental Instruction (SI) for certain courses that students have typically found difficult. In these study groups, students have opportunities to ask questions, compare notes, discuss content, solve practice problems, and develop new study strategies in a group-learning format.

You can also meet one-to-one with a writing tutor who can give you feedback at any stage of the writing process, whether you are just beginning to work on a written assignment or already have a draft. If you are interested in meeting with a writing tutor, reserve your appointment two to three days in advance of the time you would like to meet. Also, plan to meet with a writing tutor a few days before your paper is due so that you have time to work with the tutor’s feedback.

These Academic Learning Centre services are free for U of M students. For more information, please visit the Academic Learning Centre website at: <http://umanitoba.ca/student/academiclearning/>

You can also contact the Academic Learning Centre by calling 204-480-1481 or by visiting 205 Tier Building.

University of Manitoba Libraries (UML)

As the primary contact for all research needs, your liaison librarian can play a vital role when completing academic papers and assignments. Liaisons can answer questions about managing citations, or locating appropriate resources, and will address any other concerns you may have, regarding the research process. Liaisons can be contacted by email or phone, and are also available to meet with you in-person. A complete list of liaison librarians can be found by subject: <http://bit.ly/WcEbA1> or name: <http://bit.ly/1tJ0bB4>. In addition, general library assistance is provided in person at 19 University Libraries, located on both the Fort Garry and Bannatyne campuses, as well as in many Winnipeg hospitals. For a listing of all libraries, please consult the following: <http://bit.ly/1sXe6RA>. When working remotely, students can also receive help online, via the Ask-a-Librarian chat found on the Libraries’ homepage: www.umanitoba.ca/libraries.

Section (b) sample: re: A statement regarding mental health that includes referral information:

For 24/7 mental health support, contact the Mobile Crisis Service at 204-940-1781.

Student Counselling Centre

Contact SCC if you are concerned about any aspect of your mental health, including anxiety, stress, or depression, or for help with relationships or other life concerns. SCC offers crisis services as well as individual, couple, and group counselling. *Student Counselling Centre:*

<http://umanitoba.ca/student/counselling/index.html>

474 University Centre or S207 Medical Services

(204) 474-8592

Student Support Case Management

Contact the Student Support Case Management team if you are concerned about yourself or another student and don't know where to turn. SSCM helps connect students with on and off campus resources, provides safety planning, and offers other supports, including consultation, educational workshops, and referral to the STATIS threat assessment team.

Student Support Intake Assistant <http://umanitoba.ca/student/case-manager/index.html>

520 University Centre

(204) 474-7423

University Health Service

Contact UHS for any medical concerns, including mental health problems. UHS offers a full range of medical services to students, including psychiatric consultation.

University Health Service <http://umanitoba.ca/student/health/>

104 University Centre, Fort Garry Campus

(204) 474-8411 (Business hours or after hours/urgent calls)

Health and Wellness

Contact our Health and Wellness Educator if you are interested in information on a broad range of health topics, including physical and mental health concerns, alcohol and substance use harms, and sexual assault.

Health and Wellness Educator <http://umanitoba.ca/student/health-wellness/welcome.html>

Katie.Kutryk@umanitoba.ca

469 University Centre

(204) 295-9032

Live Well @ UofM

For comprehensive information about the full range of health and wellness resources available on campus, visit the Live Well @ UofM site:

<http://umanitoba.ca/student/livewell/index.html>

Section (c) sample: re: A notice with respect to copyright:

All students are required to respect copyright as per Canada's *Copyright Act*. Staff and students play a key role in the University's copyright compliance as we balance user rights for educational

purposes with the rights of content creators from around the world. The Copyright Office provides copyright resources and support for all members of the University of Manitoba community. Visit <http://umanitoba.ca/copyright> for more information.

Section (d) sample: re: A statement directing the student to University and Unit policies, procedures, and supplemental information available on-line:

Your rights and responsibilities

As a student of the University of Manitoba you have rights and responsibilities. It is important for you to know what you can expect from the University as a student and to understand what the University expects from you. Become familiar with the policies and procedures of the University and the regulations that are specific to your faculty, college or school.

The [Academic Calendar](http://umanitoba.ca/student/records/academiccalendar.html) <http://umanitoba.ca/student/records/academiccalendar.html> is one important source of information. View the sections *University Policies and Procedures* and *General Academic Regulations*.

While all of the information contained in these two sections is important, the following information is highlighted.

- If you have questions about your grades, talk to your instructor. There is a process for term work and final **grade appeals**. Note that you have the right to access your final examination scripts. See the Registrar's Office website for more information including appeal deadline dates and the appeal form <http://umanitoba.ca/registrar/>
- You are expected to view the General Academic Regulation section within the Academic Calendar and specifically read the **Academic Integrity** regulation. Consult the course syllabus or ask your instructor for additional information about demonstrating academic integrity in your academic work. Visit the Academic Integrity Site for tools and support <http://umanitoba.ca/academicintegrity/> View the **Student Academic Misconduct** procedure for more information.
- The University is committed to a respectful work and learning environment. You have the right to be treated with respect and you are expected to conduct yourself in an appropriate respectful manner. Policies governing behavior include the:

Respectful Work and Learning Environment

http://umanitoba.ca/admin/governance/governing_documents/community/230.html

Student Discipline

http://umanitoba.ca/admin/governance/governing_documents/students/student_discipline.html and,

Violent or Threatening Behaviour

http://umanitoba.ca/admin/governance/governing_documents/community/669.html

- If you experience **Sexual Assault** or know a member of the University community who has, it is important to know there is a policy that provides information about the supports available to those who disclose and outlines a process for reporting. The **Sexual Assault** policy may be found at:
http://umanitoba.ca/admin/governance/governing_documents/community/230.html
More information and resources can be found by reviewing the Sexual Assault site
<http://umanitoba.ca/student/sexual-assault/>
- For information about rights and responsibilities regarding **Intellectual Property** view the policy http://umanitoba.ca/admin/governance/media/Intellectual_Property_Policy_-_2013_10_01.pdf

For information on regulations that are specific to your academic program, read the section in the Academic Calendar and on the respective faculty/college/school web site

<http://umanitoba.ca/faculties/>

Contact an **Academic Advisor** within our faculty/college or school for questions about your academic program and regulations <http://umanitoba.ca/academic-advisors/>

Student Advocacy

Contact Student Advocacy if you want to know more about your rights and responsibilities as a student, have questions about policies and procedures, and/or want support in dealing with academic or discipline concerns.

<http://umanitoba.ca/student/advocacy/>

520 University Centre

204 474 7423

student_advocacy@umanitoba.ca

Covid contingency

At the University of Manitoba wearing a mask is strongly encouraged, particularly in indoor settings where distancing may be challenging. This aligns UM with current public health practices across the province, underscoring our commitment to collective well-being.

Visit the UM Covid page for the most current info: <https://umanitoba.ca/covid-19>.