



University of Manitoba
Faculty of Agricultural and Food Sciences
Department of Animal Science

ANSC3520 ANIMAL REPRODUCTION

Course Outline

Fall 2026

COURSE DETAILS

Course Title & Number:	ANSC 3520 Animal Reproduction
Number of Credit Hours:	3 credit hours
Class Times & Days of Week: Lab Times & Days of Week:	Tues & Thurs, 11:30 a.m. - 12:45 p.m. Mondays 2:30 - 5:15 p.m.
Location for classes: Location for labs tutorials:	219 Animal Science 219 Animal Science
Pre-Requisites:	ANSC 2510 Anatomy and Physiology 1: Control Systems. Students are expected to complete this course before enrolling in ANSC 3520. The course explores the structure, functions, and interactions of the coordinating and regulatory systems in the animal body, encompassing the nervous, muscular, cardiovascular, respiratory, renal, and endocrine systems. Appreciating these systems is essential in understanding the basic concepts of reproduction and their practical applications. Co requisites: CHEM2770, or MBIO 2270, or CHEM 2360, or MBIO 2360

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.

INSTRUCTOR CONTACT INFORMATION

Instructor(s) Name & Preferred Address	George Nhamo Gozho, Ph.D.
Office Location & Availability	226 Animal Science Office Hours: There is no set time or hours. Feel free to drop by to see if I'm available. You can call the office to confirm before you come.
Office Telephone Number	204-474-9443
Email:	George.Gozho@umanitoba.ca
Preferred Method of Communication	I prefer in-person communication to all other forms of communication. From Monday to Friday, give 48 hours for an email response. If you must e-mail, allow a reasonable time between sending your e-mail and when you will likely get a response. I will reply to e-mails received after 5:30 p.m. on Friday of the following week.
Student Support	Control-click on any of the following items to download the relevant documents: Responsibilities of Academic Staff with Regard to Students (ROASS) Final Examination and Final Grades Policy Student Advocacy Office Policy

COURSE DESCRIPTION

The comparative anatomy and physiology of reproduction of farmed animals will be emphasized. The focus will be on the natural synchronization of reproductive processes and the potential to regulate and improve reproductive efficiency.

GENERAL INFORMATION

Students must have a solid foundation in anatomy, physiology, endocrinology, embryology, histology, cytology, microbiology, and nutrition to comprehend the principles of animal reproduction.

Course instruction will include two 75-minute lectures per week and three hours of laboratory practicum per week. Since a specimen may not always be available during laboratory demonstrations, some sessions will take the form of tutorials/ lectures using PowerPoint presentations and video clips.

We will visit the dairy and swine units at Glenlea Research Farm. The visits and some video recordings will be used to demonstrate artificial breeding in cattle and swine. Additionally, students will be expected to be actively engaged in all learning activities. The materials covered in these tutorials complement the lectures and are designed to allow students to observe or participate in relevant practical exercises. Additionally, the material covered in the labs may still be included in the tests.

This schedule is only a guide and is subject to change as circumstances may dictate.

COURSE GOALS

The course objective is to provide senior undergraduate students with adequate fundamental knowledge of reproductive physiology in farm animals. Comparing functional anatomy, basic physiology, and endocrinology related to reproduction are the fundamental principles for us to understand male and female reproduction among livestock and other domestic animals.

LEARNING OBJECTIVES

After this course, the student should be able to:

- a) Outline the functions and sources of hormones for reproduction
- b) Describe the interactions and or relationships of the hypothalamus, pituitary, and gonads and how they regulate reproductive functions
- c) Describe the basic mechanisms of action of hormones in reproduction
- d) Describe the development of the reproductive system from conception to sexual maturity and relate the various parts of the system to function
- e) Illustrate how an understanding of reproductive physiology in terms of endocrine function and behavior during sexual receptivity can be used to improve reproductive efficiency
- f) Formulate strategies to improve reproductive performance in farm animals
- g) Describe the various reproductive biotechnologies used in farm animals and determine the most appropriate to employ in different practical situations

TEXTBOOK, READINGS, MATERIALS

Senger, P.L. 2005. *Pathways to Pregnancy and Parturition*. 3rd Edition. (Herein referred to as Senger L) Current Conceptions, Inc. Washington State University, Pullman, Washington.

This text is designed to help students understand the principles of reproductive physiology. It contains good images and illustrations of anatomical structures and physiological processes, and the writing style is easy to understand. It also features graphics that allow you to make anatomical comparisons among farm animals.

Bearden, H.J., J.W. Fuquay, and S.T. Willard. 2004 (6th ed). *Applied Animal Reproduction*. Pearson Prentice Hall, New Jersey. (Herein referred to as BFW)

According to the authors, the textbook is intended to give the undergraduate student majoring in animal or dairy science a complete overview of the reproductive process.

Hafez, E.S.E. and B. Hafez. 2000. *Reproduction in Farm Animals*. Lea & Febiger, Philadelphia. (Herein referred to as Hafez & Hafez)

The book is divided into six sections. Each section is then divided into a) Anatomical components of the reproductive system, b) Regulation of the reproductive process, and c) Steps controlling ovulation up to the initiation of parturition. The 7th Edition has been updated to consider significant advances in the role of biotechnology in animal reproduction, such as gonadotropin-releasing hormones and their analogs.

COURSE TECHNOLOGY

- Skeleton lecture and tutorial notes will be posted on UMLearn

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I EXPECT YOU TO

- Fully participate in class, consult recommended textbooks on issues that may not be clear to you, pay attention in class, and contribute to class discussions.
- Complement the notes I provide with the notes you take during lectures.
- You will also be evaluated based on your comprehension of the material covered in the lectures, handouts, and any relevant discussions during class.
- Produce university-level quality writing: legible and proofread. I encourage you to type and submit hard copies of assignments. If there are any errors or it is difficult to read, the assignment will be returned to you before grading for changes. If you resubmit your assignment after the due date, that will result in docked points.

YOU CAN EXPECT ME TO

- I will treat you respectfully and appreciate the same courtesy in return. For more information, see the [Respectful Work and Learning Environment Policy](#).
- Change the course plan outlined herein in response to genuine concerns or events beyond my or your control. Thus, where necessary, class topics or laboratory exercises may be changed.
- Provide feedback, particularly for tests and laboratory exercises. I expect that my comments, corrections, and suggestions will be taken seriously, as feedback is a valuable way to learn.
- Provide clarity when you face difficulties understanding some of the concepts for the course
- Treat you as adult learners with the related style of respect.

COURSE SYLLABUS

1. **Course Description:** Assignments, tests, and grading. Overview of reproductive processes/functional anatomy of reproductive systems
2. **Natural Synchronization Processes:** *Fundamentals of endocrinology & neuro-endocrinology related to reproduction.* [Elements of the endocrine system, neural reflexes, neuroendocrine reflexes. Role of the hypothalamus and pituitary gland in the control of reproduction processes. The relationship between the hypothalamus and the pituitary gland. Classification and characteristics of hormones of reproduction. Mode of hormone action. Patterns of hormone secretion and how hormones are metabolized and excreted.] **Senger L. Ch 5**
3. **Reproductive Cycles:** Estrous cycles, seasonality of reproduction. [Hormonal patterns in the fetus, neonate, prepuberal, and sexually mature female. Hormonal control of the estrous cycle. Discuss the factors that affect the onset of puberty and ovarian activity. Descriptions and characteristics of different types of estrous cycles.] **Senger L. Ch 6 Ch 7**
4. **Gametogenesis: Folliculogenesis /Ovigenesis:** [Formation and maturation of ova. Hormonal changes and follicular development during the follicular phase. **Senger L Ch 8**
5. **Gametogenesis: Semen Production:** This includes spermatogenesis, sperm maturation, tract secretions, and seminal plasma [Review of histological structures of the tests. Description of semen components and why semen from different species has different characteristics. Hormonal and non-hormonal control of spermatogenesis. Description of components of seminal plasma.] **Senger L. Ch 10**

6. **Avian reproduction:** [Gross Anatomy of the hen and rooster's reproductive tracts, endocrine control of reproduction in poultry.]

Test 1: [October 13, 2026]

7. **Ovulation and Synchronization of Estrus:** *Ovulation and manipulation of the estrous cycle.* Ovulation and formation of the corpus luteum. Mechanism of progesterone synthesis. Utero-ovarian vascular countercurrent transport system. CL regression. Principles and the rationale for synchronization of estrus. Estrus synchronization protocols in farm animals.] **Senger L. Ch 9**
8. **Gestation: From Conception to Onset of Parturition:** Fertilization. [Transport, spermatozoa capacitation in the female tract, and fertilization. **Senger L. Ch 12.**
9. **Gestation: Early Development of the embryo:** Maternal recognition of pregnancy. Early embryonic development. **Senger L. Ch 13**
10. **Gestation: Differentiation and Fetal Growth:** Placentation and fetal growth and development.] **Senger L. Ch 14**
11. **Postpartum Recovery:** [Endocrine control of parturition. Physical and physiological changes associated with parturition. List some chemical agents that are used to induce parturition. Uterine involution and resumption of ovarian activity] **Senger L Ch 14 (page 306-311) & Ch 15**

Test 2: [November 17, 2026]

12. **Reproductive Failure:** [Anatomical, congenital causes and endocrine disruptors in reproductive Failure] **BFW Ch 24, 25 & 26**
13. **Environmental and Nutritional Effects on Reproduction:** [How farm animals respond to environmental and nutritional stress vis-à-vis reproductive process] **BFW Ch 22 & 23**
14. **Measures of Reproductive Efficiency:** [Measures of reproductive efficiency and the factors that can affect these measures.]

Final examination: [TBA]

Class Schedule

The following is a proposed course schedule with approximate dates, though these are subject to change at my discretion as your learning needs evolve. Any such changes are subject to Section 2.8 of the ROASS Procedure.

Date	Class Content	Recommended pre-class preparation	Evaluation
Sept 10	Introduction: Course content and methods of student evaluation, grading scale, and deadlines		
Sept 15	Natural synchronization processes	<i>Senger L. Ch 5 or BFW Ch 4</i>	
Sept 17	Natural synchronization processes		
Sept 22	Natural synchronization processes		
Sept 24	Reproductive cycles – Onset of puberty	<i>Senger L. Ch 6,7 8 BFW Ch 5</i>	
Sept 29	Reproductive cycles – Reproductive cyclicity		
Oct 1	Gametogenesis: Folliculogenesis	<i>Senger L. Ch 8 /BFW Ch 8</i>	
Oct 6	Gametogenesis: Spermatogenesis	<i>Senger L. Ch10 /BFW Ch 6</i>	
Oct 8	Gametogenesis: Spermatogenesis	<i>Senger L. Ch10 /BFW Ch 6</i>	
Oct 13	Test 1 – Material covered from Sept 3 - Oct 7		Test 1 (26%)
Oct 16	Ovulation and synchronization of estrus	<i>Senger L. Ch 9, BFW Ch. 18</i>	
Oct 20	Ovulation and synchronization of estrus		
Oct 22	Gestation: Gamete Transport and Fertilization	<i>Senger L. Ch 12, 13 & 14 (pages 292-305) BFW Ch 8 & 9</i>	
Oct 27	Gestation: Conception to Onset of Parturition		
Oct 29	Gestation: Maternal recognition of pregnancy		
Nov 3	Gestation: Differentiation and Fetal Growth		
Nov 5	Parturition and Postpartum Recovery	<i>Senger L Ch 15</i>	
Nov 9 - 13	Fall Term Break – No classes		
Nov 17	Test 2		Test 2 (26%)
Nov 19	Reproductive Failure:	<i>BFW Ch 24, 25 & 26</i>	
Nov 24	Environment and Nutritional Effects on Reprod	<i>BFW Ch 22 & 23</i>	
Dec 1	Measuring Reproductive Efficiency		
Dec 3	Measuring Reproductive Efficiency		
Dec 8	TBA		
Dec 10	Course review		
TBA	Final Exam.		

This schedule is only a guide and is subject to change as circumstances may dictate.

TUTORIAL SCHEDULE

Date	
Sept 14	<i>Tutorial #1: Embryogenesis [Online quiz]</i>
Sept 21	Tutorial #2: The Female Reproductive System [Online quiz]
Sept 28	<i>Tutorial #3: The Male Reproductive System [Online quiz]</i>
Oct 5	<i>Tutorial #4: Estrus Detection and Mating Behaviour [Online quiz]</i>
Oct 12	Thanksgiving
Oct 19	Tutorial #5: Avian Reproductive System [Online quiz]
Oct 26	<i>No Tutorial</i>
Nov 2	Farm Demonstration (Glenlea) AI, breeding records, and optimum body condition for breeding dairy cows (Group 1) [Online quiz]
Nov 9	Fall term break
Nov 16	No Tutorial - Remembrance Day
Nov 23	Farm Demonstration (Glenlea) AI, breeding records, and optimum body condition for breeding dairy cows (Group 2) [Online quiz]
Nov 30	Independent work on the final presentations
Dec 7	<i>Student Seminar Presentations: Improving Reproductive Efficiency</i>

COURSE EVALUATION METHODS

Due Date:	Assessment Tool	% of Grade
October 13, 2026	Term test 1	26%
November 17, 2026	Term test 2	26%
TBA	Final Exam	26%
A week after the tutorial	Quizzes from tutorials	12%
TBA	Case study presentation	10%

GRADING

Your assignments and tests will be calculated as percentages and converted to letter grades. Your total mark will determine the letter grade, with the proportion contributed by each assignment or test taken into account.

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Letter Grade	Marks
A+	92-100%
A	85-91.9%
B+	78-84.9%
B	70-77.9%
C+	62-69.9%
C	55-61.9%
D	50-54.9%
F	Less than 50%

LAB AND FARM TOUR ASSIGNMENT DESCRIPTIONS

Tutorials/Discussions

Short online quizzes may be administered to assess your understanding of tutorial material.

Group Presentations: Case Studies on Improving Reproductive Efficiency

This is a group assignment, which will be completed and presented to the class during the final laboratory period of the semester. Evaluations will be based on the presentation's content and the group's ability to respond to questions. Topics will be made available at a later stage. This is a group presentation, and groups can have up to 5 members. You must submit electronic copies of the PowerPoint presentation.

ASSIGNMENT GRADING TIMES

Your marks will be available about one week after submitting your assignment or test. Final grades will be posted in Aurora 7 days after you write the final examination.

ASSIGNMENT EXTENSION AND LATE SUBMISSION POLICY

- All assignments should be submitted by the due date listed in the course schedule. If an extension is required, all group members must agree.
- Groups that fail to submit work on time and do not ask for an extension are subject to the late assignment penalty. The penalty is a 5% reduction in the project's grade value for each working day, up to a maximum of five working days. After that point, the work is worth zero percent. Students who cannot contribute to group work and may otherwise hold everyone back due to health or other compassionate reasons must submit a written explanation in advance. If this is not possible, they may submit the explanation after the missed due date. However, other group members are expected to complete the assignment on time.
- If a group is granted an extension, the penalty will be 2% for each working day. Only in extreme circumstances will an extension be granted with no late deductions.
- We all live and work in an environment that requires us to balance many demanding tasks. To that end, excuses such as computer failure, employment responsibilities, routine financial support needs, social activities and commitments, and stress will not be accepted as grounds for late work.

POLICIES RELATED TO STUDENT DISCIPLINE

Academic Dishonesty: Plagiarism, Cheating, and Examination Impersonation

You should acquaint yourself with the University's policy on plagiarism, cheating, and examination impersonation as detailed in the General Academic Regulations and Policy section of the University of Manitoba Undergraduate Calendar, or you may refer to Student Affairs at <http://www.umanitoba.ca/student>.

Use of Generative AI

The use of Artificial Intelligence tools (e.g. ChatGPT, Manus AI, DeepSeek, etc) is discouraged. Students are expected to do their own work. Any use of such tools must be fully disclosed at the beginning of an assignment. The disclosure statement must indicate the version, all AI tools used, and the specific task performed by each AI tool. Failure to disclose the use of AI will result in a 50% deduction from the attained grade.

Policy on Respectful Work and Learning Environment

http://umanitoba.ca/admin/governance/governing_documents/community/566.html

Inappropriate and Disruptive Student Behaviour

http://umanitoba.ca/admin/governance/governing_documents/students/279.html

Accessibility Policy for Students with Disabilities

http://umanitoba.ca/admin/governance/governing_documents/students/281.html

Writing [and Learning] Assistance

The following information from the Learning Assistance Centre may be helpful to those of you who struggle with content or writing papers.

[The Learning Assistance Centre \(LAC\)](#)

Through the LAC, you may meet with a study skills specialist to discuss concerns such as time management, reading and note-taking strategies, and test-taking strategies. You may also meet one-on-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. Writing tutors can also give you feedback if you submit a draft of your paper online. Please note that the online tutors require 48 business hours (i.e., Monday to Friday) to return your paper with comments. (Located in 201 Tier Building)

[Writing Tutors \[and Learning Skills Tutors\]](#) work on the Fort Garry and Bannatyne Campuses. The Fort Garry campus tutors work in the Elizabeth Dafoe Library and the Learning Assistance Centre (201 Tier). Tutors on the Bannatyne campus work in the 245 "T" wing (Basic Science Building). Check scheduled hours of availability online through the Learning Assistance Centre site (www.umanitoba.ca/student/u1/lac) or call 480-1481 (Fort Garry Campus) or 272-3190 (Bannatyne Campus).

The **[Virtual Learning Commons](#)** is a unique learning and social networking site at the University of Manitoba. Students can access a variety of Learning Assistance Centre resources online at www.umanitoba.ca/virtualllearningcommons. Of special interest are several links to excellent, brief online tutorials on integrity in academic work (e.g., what is plagiarism? How do you paraphrase? What are the appropriate citation formats?), as well as an Assignment Manager program that automatically creates a timetable for completing each step in the writing process.

[Student Accessibility Services](#)

Student Accessibility Services (SAS) supports and advocates for students with disabilities: hearing, learning, injury-related, mental health, medical, physical or visual. Students with temporary disabilities such as sprains and breaks can also use our services. SAS acts as a liaison between students, the faculty and staff of the University of Manitoba, and support agencies within the province of Manitoba. Please call for service at 474-6213 (voice) or 474-9690 (TTY).

Student Counselling and Career Centre

Student Counselling and Career Centre (SCC) offers individual, couple, or family counseling in individual and group formats. Please phone: 474-8592 or visit SCCC at 474 University Centre.

University of Manitoba Libraries

Students can access e-journals to look up the most recent articles in most animal science journals. Course textbooks may also be available in the library. No course material is currently placed on reserve.

IMPORTANT DATES

For a complete list of important dates, please see 'Important Dates and Deadlines' under Registrar's Office on the university website: <https://umanitoba.ca/registrar/important-dates-deadlines>

General Dates

Sept. 22, 2026: *Last date to DROP Fall term and Fall/Winter term spanning courses with refunds

Sept. 23, 2026: **Last date to ADD a course for the Fall term and Fall/Winter term spanning courses

Oct. 7, 2026: Tuition fee payment deadline

Nov. 24, 2026: Voluntary Withdrawal (VW) deadline - Fall term classes

**Course Drop date – the last date to drop a course with a refund.*

***Course Add Date – the last date to add a course in the revision period.*

Course Specific Dates

Term Test 1: October 13th (26% of final grade)

Term Test 2: November 17th (26% of final grade)