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

ANSC3520 ANIMAL REPRODUCTION

Course Outline

©Fall 2023

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:**	107 Animal Science 107 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 deals with the structure, functions and interactions of the coordinating or regulatory systems in the animal body, including 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: No set time or hours. Consult my online calendar to see if I am free, and just drop in.
Office Telephone Number	204-474-9443
Email:	George.Gozho@umanitoba.ca
Preferred Method of Communication	Email, telephone, or come to the office (in-person) If you use email for communication, use the official University of Manitoba student email address. I will reply to emails and phone messages within 48 hours during the academic term, Monday through Friday. Use the subject line to state the reason for your email to expedite responses where urgency is appropriate**.** Additionally, include the course that you take from me in your email.
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

In order to understand animal reproduction, students are expected to have some sound background in anatomy, physiology, endocrinology, embryology, histology, cytology, microbiology and nutrition.

Course instruction will include two 75-minute lectures each week and 3 hours per week of laboratory practicum. It may not always be possible to get a specimen for use during laboratory demonstrations; thus, 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. In addition, students will be expected to be 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. Also, the material covered in the labs may still form part of the tests.

COURSE GOALS

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

BEHAVIOURAL 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 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 behaviour 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 give students an understanding of the principles of reproductive physiology. It contains good images and illustrations of anatomical structures and physiological processes. 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

- Lecture and tutorial notes will be posted on UMlearn

I EXPECT YOU TO

- Fully participate in class, make an effort to 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 that 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 a significant number of errors or if it is difficult to read, the assignment will be returned to you before grading for changes. In most cases, your assignment will then be late and docked points.

YOU CAN EXPECT ME TO

- Treat you with respect and I would appreciate the same courtesy in return. See Respectful Work and Learning Environment Policy.
- Change the course plan outlined herein in response to genuine concerns or events that may be beyond my or your control. Thus where necessary class topics or laboratory exercises may be changed.
- Give you feedback – particularly for tests and laboratory exercises. I expect that comments, corrections and suggestions that I make are taken seriously because that feedback is a meaningful 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 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. **Folliculogenesis /Ovigenesis:** [Formation and maturation of ova. Hormonal changes and follicular development during the follicular phase. ***Senger L Ch 8***

   Test 1: [*October 12, 2023]*

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

6. **Semen Production**: This includes; s*permatogenesis, sperm maturation tract secretions and seminal plasma* [Review of histological structures of the testes. 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***

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* [Transport, capacitation of spermatozoa in the female tract, and fertilization. Maternal recognition of pregnancy. Early embryonic development. Placentation and fetal growth and development.] ***Senger L. Ch 12, 13 & 14***

Test 2: [*November 9, 2023]*

9. **Parturition and 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***

10. **Reproductive Failure:** [Anatomical, congenital causes and endocrine disruptors in reproductive Failure] **BFW Ch 24, 25 & 26**

11. **Environmental and Nutritional Effects on Reproduction:** [How farm animals respond to environmental and nutritional stress vis a vis reproductive processes] ***BFW Ch 22 & 23***

12. **Improving 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 7	Introduction: Course content and methods of student evaluation, grading scale and deadlines		
Sept 12	Natural synchronization processes	*Senger L. Ch 5 or BFW Ch 4*	
Sept 14	Natural synchronization processes		
Sept 19	Natural synchronization processes		
Sept 21	Reproductive cycles – Onset of puberty	*Senger L. Ch 6,7 8 BFW Ch 5*	
Sept 26	Reproductive cycles – Reproductive cyclicity		
Sept 28	Folliculogenesis		
Oct 3	Folliculogenesis	*Senger L. Ch 8 /BFW Ch 8*	
Oct 5	Semen production	*Senger L. Ch 10 /BFW Ch 6*	
Oct 10	Semen production		
Oct 12	***Test 1 – Material covered from Sept 7 - Oct 3***		**Test 1 (25%)**
Oct 17	Ovulation and synchronization of estrus	*Senger L. Ch 9, BFW Ch. 18*	
Oct 19	Ovulation and synchronization of estrus		
Oct 24	Gestation: Conception to Onset of Parturition	*Senger L. Ch 12, 13 & 14 (pages 292-305) BFW Ch 8 & 9*	
Oct 26	Gestation: Conception to Onset of Parturition		
Oct 31	Gestation: Conception to Onset of Parturition		
Nov 2	Parturition and Postpartum Recovery		
Nov 7	Parturition and Postpartum Recovery		
Nov 9	**Test – 2 Material covered from Oct 3 - Oct 31**		**Test 2 (25%)**
Nov 21	Reproductive Failure:	*BFW Ch 24, 25 & 26*	
Nov 23	Reproductive Failure:	*BFW Ch 24, 25 & 26*	
Nov 28	Environment and Nutritional Effects on Reprod	*BFW Ch 22 & 23*	
Nov 30	Environment and Nutritional Effects on Reprod	*BFW Ch 22 & 23*	
Dec 5	Improving Reproductive Efficiency		
Dec 7	Improving Reproductive Efficiency		
TBA	**Final Exam. Material covered from Nov 2 - End**		

TUTORIAL SCHEDULE

Date	
Sept 11	*Tutorial #1: Embryogenesis (+ UMLearn Quiz)*
Sept 18	***No Lab/ Tutorial***
Sept 25	*Tutorial #2: The Female Reproductive System (+ UMLearn Quiz)*
Oct 16	*Tutorial #3: The Male Reproductive System (+ UMLearn Quiz)*
Oct 23	*Tutorial #4: Estrus Detection and Mating Behaviour (+ UMLearn Quiz)*
Oct 30	*Tutorial #5: Avian Reproductive System*
Nov 6	**Farm Demonstration (Glenlea) AI & Pregnancy Diagnosis in Swine*
Nov 20	**Farm Demonstration (Glenlea) AI, breeding records and optimum body condition for breeding dairy cows*
Nov 27	***Reproductive Failure/*** **Environment and Nutritional Effects on Reprod** ***(lecture)***
Dec 4	*Student Seminar Presentations: Improving Reproductive Efficiency*
**I will post two video compilations on AI and PD in swine and cows that I strongly recommend you to watch before we go to Glenlea*	

COURSE EVALUATION METHODS

Due Date:	**Assessment Tool**	**Value of Final Grade**
October 12	Term test 1	25%
November 9	Term test 2	25%
TBA	Final Exam	35%
	Quizzes from tutorials	5%
	Case study Presentation	10%

GRADING

All of your assignments and tests will be calculated as a percentage and converted into a letter grade. Your total mark, adjusted for the proportion contributed from each assignment or test, will determine the letter grade.

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%

SEMINAR ASSIGNMENT DESCRIPTIONS

Tutorials/Discussions

Short online quizzes may be given to evaluate your comprehension 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 4 members. Presentations will be on **December 6, 2021.** You must submit electronic copies of the PowerPoint presentation

SEMINAR SUBMISSION GUIDELINES

In addition to the presentation, the group must submit a written report (no more than 15 double spaced typed pages) of the assignment and a copy of their power-point presentation. Submissions must be made no later than the end of day on the day of the presentation.

PEER EVALUATION RUBRIC

Students will be asked to determine the quality of the presentation, presenters' understanding of the subject and the ability to stimulate discussion.

Criteria	**Group members**		
	Student A	***Student B***	***Student C***
Quality of presentation Organization of ideas /5 Delivery of presentation /5 Quality of slides /5			
Understanding of subject matter Identification of 5 reproductive issues /5 Proposing practical solution to each issue /5 Ability to answer questions /5			
Ability to stimulate discussion Interest generated /5			
Total marks /35			

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 present why they need it.
- 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 an 8% per working day reduction in the value of the project's grade for up to 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 need to submit a written explanation ahead of time or, if that is not possible, after the missed due date. However, other group members are expected to complete the assignment on time.

- If an extension is granted to a group, the penalty will be 2% for each working day. Only in extreme circumstances (medical note is required) 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 responsibility and routine financial support needs, social activities and commitments and stress will not be acceptable grounds for turning in your work late.

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.

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 Student 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 may 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, as well as 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 both the Fort Garry and Bannatyne Campuses. Tutors on the Fort Garry campus work in the Elizabeth Dafoe Library and the Learning Assistance Centre (201 Tier). Tutors on the Bannatyne campus work in 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/virtuallearningcommons. 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 appropriate citation formats?), and an Assignment Manager program that automatically creates a timetable for completion of each step in the writing process.

Student Accessibility Services

Student Accessibility Services (SAS) provides support and advocacy for students with disabilities of all kinds: hearing, learning, injury-related, mental health, medical, physical or visual. Students with temporary disabilities such as sprains and breaks are also eligible to 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 phone: 474-6213 (voice) or 474-9690 (TTY) for service.

Student Counselling and Career Centre

Student Counselling and Career Centre (SCC) offers individual, couple or family counselling 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 journal articles in most animal science journals. Course textbooks may also be available in the library. There currently is no course material 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. 19, 2023, *Last date to DROP Fall term and Fall/Winter term spanning courses with refunds
Sept. 20, 2023, **Last date to ADD a course for Fall term and Fall/Winter term spanning courses
Oct 2, 2023, Nationatl Day for Truth and Reconciliation
Oct 8, 2023, Thanksgiving Day
Nov. 13, 2023 - Nov. 17, 2023 Fall term break
Nov. 21, 2023, 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 12th (25% of final grade)
Term Test 2:	November 9th (25% of final grade)