



# ANSC\*6070 Metabolic Regulation of Reproduction

## Fall 2023

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### 1 INSTRUCTOR

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### 2 AIMS & OBJECTIVES

#### 2.1 Calendar Description

Reproductive function in mammals demands substantial amounts and adequate balance of nutrients and energy. Consequently, reproductive physiology is tightly regulated by systemic and tissue-specific metabolism. This course uses a multidisciplinary approach to explore the metabolic regulation of reproduction and its implications to reproductive health, fertility, and developmental biology.

#### 2.2 Course Description

The overall theme of animal physiology and, more specifically, the disciplines of reproductive physiology and metabolic physiology are of great relevance in the field of Animal Biosciences. This course aims to integrate these two disciplines and discuss the metabolic regulation of reproductive physiology. Weekly meetings of approximately 3 h will be used to discuss preassigned literature reviews and original articles focused on a specific topic. In addition, students will present short proposals focused on a novel hypothesis related to theme of the week and experimental methods to test the proposed hypothesis.

Meetings will be composed of three parts, and each part will be led by a different student.

- Part 1: Discussion of pre-assigned literature reviews. One to three literature reviews of the weekly topic will be selected by the course coordinator. One student will be selected to present a 12-15 min summary of the main concepts presented in the literature review(s). This presentation will be followed by a group discussion, which will be moderated by the course coordinator.

- Part 2: Discussion of original paper. A second student will be selected to search scientific databases and identify an original paper (2018 or newer) related to the weekly topic. After approval from course coordinator (at least 4 days before the meeting), the original paper will be distributed to all students in the course. The student that selected the paper will present a 12-15 min summary of an original research article. This presentation will be followed by a group discussion of the original article, which will be moderated by the course coordinator.
- Part 3: Discussion of new hypothesis and research methods. A third student will be responsible to develop a new hypothesis on the weekly topic being discussed and perform a short presentation (up to 15 min) to explain the basis and relevance of the new hypothesis and to proposed how it could be tested. This presentation will be followed by a group discussion focused on the student's proposal, alternative hypotheses, and alternative research methods.

### **2.3 Learning Outcomes**

Upon successful completion of this course, students will have demonstrated the ability to:

1. Recognize the energy and nutrients costs of reproduction in mammals.
2. Understand reproductive physiology in the context of energy and nutrients partition.
3. Explain the metabolic regulation of mammalian reproductive physiology and its importance to reproductive health and fertility of females and males.
4. Understand the contribution of maternal and paternal metabolism to health and metabolism of pregnancy and offspring.
5. Recognize the impact of energy and nutrient status, specific nutrient deficiency, and stress on reproductive physiology and reproductive behaviour.
6. Identify opportunities for new research exploration and translation in the field of metabolic regulation of reproduction.
7. Develop skills for integration of disciplines, critical thinking, development of new hypothesis, design of hypothesis-driven experiments, and communication.

### **2.4 Instructor's Role and Responsibility to Students**

The instructor will coordinate all activities, facilitate discussions, and provide feedback.

## **3 TEACHING AND LEARNING ACTIVITIES**

### **3.1 Timetable**

Group meetings: 3 hours per week – Tuesdays, 03:00 PM - 06:00 PM.

### 3.2 Course Topics and Tentative Schedule

Week	Topic
Week 1	Introduction: Reproduction in the context of energy and nutrient partition
Week 2	Preparation time
Week 3	Metabolic regulation of hypothalamus and pituitary
Week 4	Metabolic regulation of reproductive behaviour
Week 5	Metabolic regulation of testes and male fertility
Week 6	Postnatal effects of paternal preconception metabolism
Week 7	Metabolic regulation of ovaries
Week 8	Metabolic regulation of endometrium
Week 9	Metabolic regulation of placental function and fetus
Week 10	In utero programming of postnatal characteristics
Week 11	Metabolic regulation of postpartum uterus
Week 12	Impact of stress on reproductive biology

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## 4 LEARNING RESOURCES

### 4.1 Course Website

Course material and announcements will be posted on Courselink website. Students are responsible for checking the site regularly.

### 4.2 Required Resources

Students will require access to Courselink and to scientific databases such as PubMed and Web of Science.

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## 5 ASSESSMENT

### 5.1 Dates and Distribution

Assignment	Due Date	Weighting	Learning Outcome(s) Assessed
<b>Assessment 1:</b> Short presentation(s) (15 min) of main scientific concepts from assigned literature reviews.	To be assigned on the first day of class	25%	1-7
<b>Assessment 2:</b> Short presentation(s) (15 min) of chosen original article.	To be assigned on the first day of class	25%	1-7
<b>Assessment 3:</b> Short presentation(s)	To be assigned on	25%	1-7

(15 min) of research proposal focused on a new hypothesis and description of experimental design to test the new hypothesis.	the first day of class		
<b>Assessment 4:</b> Participation in classroom discussions of literature reviews, original articles, and novel research proposals.	To be evaluated each meeting	25%	1-7

## 5.2 Assessment Descriptions

During each meeting, the course instructor will evaluate performance of each student based on presentations and group discussions. Constructive feedback from course coordinator will be provided each week. Constructive feedback among students will be encouraged but will not affect individual grades.

**Participation on discussions (25 points):** each student will be evaluated based on level of engagement (1 point) and depth of knowledge (1.5 point) on each meeting. At the end of the semester, each student should have 11 evaluations. The lowest evaluation will be dropped, and the final grade for *Participation on discussions* will be sum of the highest 10 evaluations ( $10 \times 2.5 = 25$ ).

**Presentation of literature reviews (25 points):** each student will present a short summary of assigned literature reviews at least once during the semester. Each presentation will be evaluated by the course coordinator based on 1) depth of knowledge (15 points), 2) organization of ideas (5 points), and 3) delivery of presentation (5 points). The total number of presentations will depend on the number of students enrolled in the course, and final grade for *Presentation of literature reviews* will be the average of all evaluations of this category.

**Presentation of original article (25 points):** each student will present a short summary of a chosen original research article at least once during the semester. Each presentation will be evaluated by the course coordinator based on 1) depth of knowledge (15 points), 2) organization of ideas (5 points), and 3) delivery of presentation (5 points). The total number of presentations will depend on the number of students enrolled in the course, and final grade for *Presentation of original article* will be the average of all evaluations of this category.

**Presentation of research proposal (25 points):** each student will present a short presentation of a research proposal at least once during the semester. Each presentation will be evaluated by the course coordinator based on 1) novelty and relevance of new hypothesis (10 points), 2) appropriateness of experiment design (10 points), and 3) delivery of proposal (5 points). The total number of presentations will depend on the number of students enrolled in the course, and final grade for *Presentation of research proposal* will be the average of all evaluations of this category.

### 5.3 Course Grading Policies

**Accommodation of Religious Obligations:** If you are unable to meet an in-course requirement due to religious obligations, please email the course instructor within two weeks of the start of the semester to make alternate arrangements. See the graduate calendar for information on regulations and procedures for Academic Accommodation of Religious Obligations:  
[https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/sec\\_d0e2228.shtml](https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/sec_d0e2228.shtml)

**Passing grade:** In order to pass the course, students must obtain a grade of 65% or higher on the total mark of all assessments.

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## 6 UNIVERSITY STATEMENTS

### 6.1 Email Communication

As per university regulations, all students are required to check their e-mail account regularly; e-mail is the official route of communication between the University and its students.

### 6.2 When You Cannot Meet a Course Requirement

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. The grounds for Academic Consideration are detailed in the Graduate Calendars.

Graduate Calendar - Grounds for Academic Consideration  
[[https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/sec\\_d0e2182.shtml](https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/sec_d0e2182.shtml)]

### 6.3 Drop Date

Courses that are one semester long must be dropped by the end of the last class day; two-semester courses must be dropped by the last class day of the second semester. The regulations and procedures for changing graduate course registration are available in the Graduate Calendars.

Graduate Calendar – Registration Changes  
[<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/genreg-reg-regchg.shtml>]

### 6.4 Copies of Out-of-class Assignments

Keep paper and/or other reliable back-up copies of all out-of-class assignments; you may be asked to resubmit work at any time.

### 6.5 Accessibility

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required; however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to book their exams at least seven days in advance and not later than the 40th class day.

More information can be found on the SAS website [<https://www.uoguelph.ca/sas>]

## **6.6 Academic Integrity**

The University of Guelph is committed to upholding the highest standards of academic integrity, and it is the responsibility of all members of the University community—faculty, staff, and students—to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff, and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

Graduate Calendar – Academic Misconduct

[[https://www.uoguelph.ca/registrar/calendars/graduate/2018-2019/genreg/sec\\_d0e2632.shtml](https://www.uoguelph.ca/registrar/calendars/graduate/2018-2019/genreg/sec_d0e2632.shtml) ]

## **6.7 Recording of Materials**

Presentations that are made in relation to course work—including lectures—cannot be recorded or copied without the permission of the presenter, whether the instructor, a student, or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

## **6.8 Resources**

The Academic Calendars [<https://www.uoguelph.ca/academics/calendars>] are the source of information about the University of Guelph's procedures, policies, and regulations that apply to undergraduate, graduate, and diploma programs.