

# Course Outline Form: Winter 2017

## General Information

**Course Code:** ANSC\*4470

**Course Title:** Animal Metabolism

### **Course Description:**

Current concepts in whole animal metabolism and the quantitative techniques used to measure whole body metabolic kinetics will be presented. Tissue and organ specific biochemical processes will be integrated with whole body control mechanisms.

### **Specific Description:**

We will study how regulation of the main pathways of carbohydrate, lipid and amino acid metabolism in gut, liver, muscle, adipose and mammary glands is coordinated so that farm animals may grow and lactate under a wide range of environmental influences. The quantification of metabolic fluxes using tracer kinetic methodology in organ, cell and homogenate preparations will be emphasized for its importance in mathematical model construction. Explanations of metabolic energy transformations will be a component of this course. Lectures will be interspersed with thorough in-class review of papers from scientific journals. Occasional assignments will be given for handing in on the following class day and bi-weekly quizzes will be given during classtime.

**Credit Weight:** 0.5

**Academic Department (or campus):** Department of Animal Biosciences

**Campus:** Guelph

**Semester Offering:** Winter 2017

**Class Schedule and Location:** Monday, Wednesday, Friday 09:30 a.m. – 10:20 MCKN Room 029

## Instructor Information

Instructor Name: John Cant

Instructor Email: [jcant@uoguelph.ca](mailto:jcant@uoguelph.ca)

Office location and office hours: ANNU239

## **GTA Information**

GTA Name: Ryan Laforest

GTA Email: rlafores@mail.uoguelph.ca

GTA office location and office hours: ANNU229; by appointment

GTA Name: Linaya Pot

GTA Email: lpot@mail.uoguelph.ca

GTA office location and office hours: ANNU229; by appointment

## **Course Content**

### **Specific Learning Outcomes:**

Upon successful completion of the course, students will be able to:

- 1) use knowledge of control of biochemical pathways in multiple organs to predict consequences of various perturbations to the whole animal
- 2) see that metabolism is the basis for all biological phenomena
- 3) appreciate the value of knowing fundamental metabolism for the care and management of animals, including humans
- 4) estimate rates of metabolism from isotope dilution kinetics
- 5) explain the objectives, methods and findings of a scientific journal article to a lay audience
- 6) interpret the relevance of future discoveries in biochemistry and metabolism
- 7) determine whether claims made in public about animal metabolism are correct or not
- 8) take information from different sources and integrate it together into a cohesive understanding
- 9) practice reductionism: exploring phenomena at a complex level by exploring phenomena at lower levels of organization
- 10) practice synthesis: using knowledge of underlying mechanisms to explain higher-level phenomena

**Lecture Content:**

<b>Date</b>	<b>Lecture subject</b>
Jan. 9	Introductory questions and setup
Jan. 11	Introductory questions and setup
Jan. 13, 16	Blood pools and tracer kinetics
Jan. 18	Glucose transport
Jan. 20	<b>Quiz</b>
Jan. 23, 25, 27	Glycolysis
Jan. 30	TCA cycle
Feb. 1	TCA cycle
Feb. 3	<b>Quiz</b>
Feb. 6, 8	Gluconeogenesis
Feb. 10	Glycogen metabolism
Feb. 13, 15	<i>Journal article review</i>
Feb. 17	<b>Quiz</b>
Feb. 27	Lactose synthesis and hexose metabolism
Mar. 1	Fatty acid oxidation
Mar. 3	Ketogenesis
Mar. 6, 8	Lipogenesis
Mar. 10	<b>Quiz</b>
Mar. 13	Lipogenesis
Mar. 15, 17	Protein metabolism
Mar. 20, 22	Amino acid catabolism
Mar. 24	<b>Quiz</b>
Mar. 27, 29	Integration of metabolism - energetics
Mar. 31	Integration of metabolism - modelling
Apr. 3, 5	<i>Journal article review</i>
Apr. 24	<b>Final exam</b>

**Labs:**

N/A

**Seminars:**

N/A

### Course Assignments and Tests:

Assignment or Test	Due Date	Contribution to Final Mark (%)	Learning Outcomes Assessed
Assignments	Integrated with lectures	20	4, 5, 9, 10
Biweekly quizzes	Every other Fri	50	1, 4 - 10
Final exam	Mon, Apr. 24	30	1, 4, 6 - 10

### Additional Notes (if required):

Each biweekly quiz is cumulative over the whole course. The overall quiz mark will be calculated from the top 4 marks of the 5 quizzes. There will be approximately 4 take-home assignments over the semester designed to encourage deep thought about the current topic of lecture. 1 or 2 of these assignments will be to answer questions about a journal article prior to reviewing it in class.

**Final examination date and time:** Monday, Apr. 24, 7:00 p.m. – 9:00 p.m.

**Final exam weighting:** 30%

### Course Resources

#### Required Texts:

None

#### Recommended Texts:

Any biochemistry textbook

#### Lab Manual:

None

#### Other Resources:

Available on Courselink; Lecture notes and ppt slides

#### Field Trips:

N/A

#### Additional Costs:

None

## **Course Policies**

### **Grading Policies:**

Please see the [Undergraduate Grading Procedures](#).

### **Course Policy on Group Work:**

It is highly recommended to work in groups on assignments and when studying.

### **Course Policy regarding use of electronic devices and recording of lectures:**

Electronic recording of classes is expressly forbidden without consent of the instructor. When recordings are permitted, they are solely for the use of the authorized student and may not be reproduced, or transmitted to others, without the express written consent of the instructor.

## **University Policies**

### **Academic Consideration:**

The University of Guelph is committed to supporting students in their learning experiences and responding to their individual needs and is aware that a variety of situations or events beyond the student's control may affect academic performance. Support is provided to accommodate academic needs in the face of personal difficulties or unforeseen events in the form of Academic Consideration.

Information on regulations and procedures for Academic Consideration, Appeals and Petitions, including categories, grounds, timelines and appeals can be found in [Section VIII \(Undergraduate Degree Regulations and Procedures\) of the Undergraduate Calendar](#).

### **Academic Misconduct:**

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.

Detailed information regarding the Academic Misconduct policy is available in [Section VIII \(Undergraduate Degree Regulations and Procedures\) of the Undergraduate Calendar](#).

### **Accessibility:**

The University of Guelph is committed to creating a barrier-free environment. Providing services for students is a shared responsibility among students, faculty and administrators. This relationship is based on respect of individual rights, the dignity of the individual and the University community's shared commitment to an open and supportive learning environment. Students requiring service or accommodation, whether due to an identified, ongoing disability or a short-term disability should contact the Student Accessibility Services (SAS), formerly Centre for Students with Disabilities (CSD), as soon as possible.

For more information, contact SAS at 519-824-4120 ext. 56208 or email [sas@uoguelph.ca](mailto:sas@uoguelph.ca) or visit the [Student Accessibility Services website \(http://www.uoguelph.ca/csd/\)](http://www.uoguelph.ca/csd/).

### **Course Evaluation Information:**

End of semester course and instructor evaluations provide students the opportunity to have their comments and opinions used as an important component in the Faculty Tenure and Promotion process, and as valuable feedback to help instructors enhance the quality of their teaching effectiveness and course delivery.

While many course evaluations are conducted in class others are now conducted online. Please refer to the [Course and Instructor Evaluation Website](#) for more information.

### **Drop period:**

The drop period for single semester courses starts at the beginning of the add period and extends to the Fortieth (40th) class day of the current semester (the last date to drop a single semester courses without academic penalty) which is listed in [Section III \(Schedule of Dates\) of the Undergraduate Calendar](#).

The drop period for two semester courses starts at the beginning of the add period in the first semester and extends to the last day of the add period in the second semester.

Information about Dropping Courses can be found in [Section VIII \(Undergraduate Degree Regulations and Procedures\) of the Undergraduate Calendar](#).

### **Additional Course Information**

N/A