



University of Manitoba Faculty of Agricultural and Food Science

Department of Animal Science

**ENERGY AND CARBOHYDRATE NUTRITION
AND METABOLISM**

ANSC 7450/HNSC 7450

Winter 2022

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Course Details

Course Title & Number: **ENERGY AND CARBOHYDRATE NUTRITION AND METABOLISM: ANSC 7450**

Number of Credit Hours: **1.5**

Lecture: **9:30 – 11:30 am Wednesdays; March 16 – April 20,2022**

Location for classes/labs/tutorials: **Class will be delivered on-line using Microsoft Teams Platform**

Pre-Requisites: **none**

Instructor Contact Information

Instructor(s) Name: **Dr. Anna Rogiewicz**

Preferred Form of Dr. Rogiewicz, Dr. Anna would also be acceptable

Office Location: 228 Animal Science Building

Office Hours or Availability: The best way to meet would be to e-mail to schedule a Microsoft Teams meeting, hosted by instructor. Instructor will start hosting the Microsoft Teams around 15 minutes before the start and will be available for students.

Office Phone No. 204 474 9527

Email: All email communication must conform to the Communicating with Students university policy. Please familiarize yourself with the policy. Use the subject line to state the reason for your e-mail and add the course number. This will help to determine which e-mails may need a quick response. Do not expect detailed or lengthy e-mail responses. If your e-mail question(s) require such a response I may ask you to come and see me in person instead.

Please avoid salutations such as 'Hey You' or 'Hi There'. Dear Dr. Rogiewicz will be fine. Email response may take up to 36 hours. E-mails will not be checked evenings or weekends. If you send an email on Friday afternoon or over the weekend you will most likely get a response no earlier than the following Monday.

Contact: Students are not able to meet with instructor, however are encouraged to approach the instructor immediately before or after the lecture. Instructor will start meeting around **15 minutes before the start and will be available for students.**
Use email for communication.

Course Description

Lectures and critical reviews will be delivered by the course instructors to discuss recent/significant research advances in the fields of carbohydrate nutrition and metabolism, pertinent to mammalian physiology.

The course will also be based on student presentations of current literature (within the last 5 years) on energy and carbohydrate nutrition and metabolism.

General Course Information

Lectures and critical reviews will be used to discuss recent/significant research advances in the field of energy/carbohydrate nutrition and metabolism, pertinent to mammalian physiology. Students in the course will be introduced to important concepts in carbohydrates nutrition and metabolism.

Course Goals

To recognize and understand the carbohydrate content of foods and feeds, carbohydrate digestion, carbohydrate contribution to energy requirements and the strategies used to improve carbohydrate utilization.

- To understand the key nutritional, physiological and health effects of carbohydrate components of dietary fiber.
- To understand the involvement of carbohydrates in Maillard reaction and protein damage.
- To discuss experimental approaches and techniques used for the measurement of available energy content.

Intended Learning Outcomes

Learning outcomes:

At the end of the course, student will:

1. Knows and describes recent developments in carbohydrate nutrition and metabolism, knows the carbohydrate contribution to energy requirements,
2. Understands and explains and the new definition of dietary fiber, knows carbohydrate components of dietary fiber.
3. Acquires knowledge about the strategies used to improve carbohydrate utilization (i.e., feed enzymes), describes the process of Maillard reaction and protein damage.
4. Understands the role of resistant starch and prebiotics in the metabolism of the carbohydrates.

5. Describes the main issues related to the energy requirements and metabolism in humans (overweight and obesity, Glycemic index, the health consequences of high fructose consumption).
6. Understands the recent advances in energy systems for animals (net energy) and humans (accelerometry, Bod Pods, etc.)

Using Copyrighted Material

Please respect copyright. Copyrighted content is used in this course. I have ensured that I will acknowledge the content I use appropriately and that it is copied in accordance with copyright laws and University guidelines. Copyrighted works, including those created by me, are available for your private study and research, and you must not distribute them in any format without permission. Do not upload copyrighted works to a learning management system (e.g., 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.

Recording Class Lectures

The Course Instructor holds copyright over the course materials, presentations and lectures, which form part of this course. No audio or video recording of lectures or presentations is allowed in any format, openly or surreptitiously, in whole or in part without permission. Course materials (both paper and digital) are for the participant's private study and research.

Textbook, Readings, Materials

There are no required texts for the course. However, students are encouraged to consult the recent books and scientific journals on animal and human nutrition. The following are good examples:

1. Lehninger Principles of Biochemistry (5th ed) – Chapters 11, 13, 14, and 15
2. Farm Animal Metabolism and Nutrition, J. P. F. D'Mello (Ed.).
3. Swine Nutrition, A. J. Austin and L. L. Southern (Eds.).
4. Scott's Nutrition of the Chicken, S. Leeson and J.D. Summers
5. Functional Food Carbohydrates, C.G. Billaderis and M.S. Izydorczyk (Eds.)
6. Dietary Fiber and Health, S.S. Cho and N. Almeida
7. Relevant scientific journals, e.g., J. of Nutrition, Br. J. of Nutrition, Nutrition Reviews, J. of Animal Science, Poultry Science, J. of Agricultural and Food Chemistry, American Journal of Clinical Nutrition, etc.

Course Technology

It is the general University of Manitoba policy that all technology resources are to be used in a responsible, efficient, ethical, and legal manner. Class will be delivered on-line using Microsoft Teams platform and UMLearn. I will make an effort to build a learning community and will try to address individual needs to make the on-line learning satisfactory and meaningful. Class notes and links to videos will be posted on UMLearn. You should be aware that the notes posted are not complete and will require you to attend class to fill in key details. Lab assignments, midterm tests and final exam will be delivered online.

Class Communication

The University requires all students to activate an official University email account. For full details of the Electronic Communication with Students, please visit:

[http://umanitoba.ca/admin/governance/media/Electronic Communication with Students Policy - 2014 06 05.pdf](http://umanitoba.ca/admin/governance/media/Electronic_Communication_with_Students_Policy_-_2014_06_05.pdf). Please note that all communication between myself and you as a student must

comply with the electronic communication with student policy

([http://umanitoba.ca/admin/governance/governing_documents/community/electronic communication with students policy.html](http://umanitoba.ca/admin/governance/governing_documents/community/electronic_communication_with_students_policy.html)). You are required to obtain and use your u of m email account for all communication between yourself and the university.

Expectations: I Expect You To

1. Attend class and be on time as much as you can.
2. Follow the university student academic and conduct guidelines.
3. Participate in teaching and learning process. I always assume that each student has some knowledge and/or experience in the subject that could be shared or discussed during the class. Students are expected to be engaged and to give their best effort in class discussions but perfection is not expected.
4. Complement the notes that I provide with your own notes that you take during lectures. The notes that I provide are incomplete and you will be expected to attend lectures in order to complete your notes. You will also be evaluated based on your comprehension of material supplied in Power-point notes, handouts and any relevant discussions during class.
5. Complete all assignments on time.

6. 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 prior to grading for changes.

7. Be courteous and civil to me and to your fellow students.

See [Respectful Work and Learning Environment Policy](#).

Expectations: You Can Expect Me To

1. Be respectful of your opinions, questions and response to questions.
2. Make every reasonable effort to answer your questions.
3. Mark your assignment in a fair, equitable and prompt fashion.
4. I will use the PowerPoint lectures in class in a large part of the teaching practice in class. Lectures provide a summary of key points.

See [Respectful Work and Learning Environment Policy](#).

Class Schedule

This schedule is **subject to change at the discretion of the instructor** (and/or based on the learning needs of the students but such changes are subject to Section 2.8 of the – [ROASS](#) Procedure). If you miss lecture(s), it is your responsibility to obtain any information announced in class. Guest speaker's lecture material will be examinable.

Lectures: Wednesdays, 9:30-11:30

The first two classes will use lecture material to discuss and identify key concepts in carbohydrate and energy nutrition and metabolism. In the third class, topics related to human nutrition will be addressed. In the last three classes, students will present the current literature on energy and carbohydrate nutrition and metabolism.

Date		Instructor	Topic
Mar.	16	A. Rogiewicz	Introductions, Course Outline, Schedules; - Carbohydrates of Foods and Feeds: Their digestion, contribution to energy requirements, physiological effects and the strategies used to improve their utilization. - Carbohydrate analysis (includes visit to the lab).
Mar.	23	A. Rogiewicz C.M. Nyachoti	- Bioenergetics and Carbohydrate Metabolism.

			- Energy Bioavailability Measurements.
Mar.	30	N. Ames A. Rogiewicz	Carbohydrates in Human Nutrition (effects of dietary fiber, glycemic index, resistant starch, etc.).
Apr.	6	A. Rogiewicz	Student presentations
Apr.	13	A. Rogiewicz	Student presentations
Apr.	20	A. Rogiewicz	Student presentations

Course Evaluation Methods

Review Paper	55%	<p>Prepare and submit a review paper on a topic relevant to carbohydrate and energy nutrition and metabolism. Your paper should critically discuss the current state of knowledge in the area and highlight areas requiring further research. Concepts and ideas covered in your paper must be adequately supported with key references.</p> <p>You may select a topic for your review paper from the list provided above. Alternatively, you can come up with your own topic but you <i>should discuss this with the instructor</i> before you start.</p> <p>NOTES:</p> <ol style="list-style-type: none"> 1. Maximum length: 10 pages, including references. Calibri, font 12, space 1 line. 2. Any method of referencing is allowed but this must be consistent throughout the manuscript. 3. Spelling errors will be penalized! 4. U of M Policy on Plagiarism will be reinforced. Please refer to statement on “Attendance at Class and Debarment” and “Plagiarism and Cheating” in the University of Manitoba’s Graduate Calendar. 5. A hard copy of your review must be submitted on April 6, 2022.
Oral Presentation	35%	<p>Select a recent (last 5 years) peer reviewed article related to the lecture objectives and topics listed above and use it as a basis for an oral presentation to be made in class. Use the peer reviewed article to:</p> <ol style="list-style-type: none"> 1. Introduce the class to pertinent background information leading up to the described research. 2. Highlight the specific techniques used in the research. 3. Highlight the significance of the research to the scientific

		literature. 4. Position the research relative to carbohydrate and energy nutrition and metabolism. NOTES: 1. Give a 35 minutes review of the background, research methodologies, and key findings of the work. 2. Provide a one-page abstract of your review and a handout of your PowerPoint presentation to the class. 3. Evaluation will be done by the instructor and the students. 4. Evaluation criteria: clarity of presentation, organization and flow of ideas, quality of presentation, evidence of additional reading, quality of abstract, etc.
Class Participation	10%	It will include asking questions, providing insights/comments, attendance, etc.

Grading

Letter Grade	Percentage out of 100	Final Grade Point
A+	91-100	4.5
A	84-90	4.0
B+	77-83	3.5
B	70-76	3.0
C+	65-69	2.5
C	60-64	2.0
D	50-59	1.0
F	Less than 50	0

Referencing Style

If applicable: Assignments should use the citation format adopted by the Canadian Journal of Animal Science. **Example of correct citation:**

Journal: Waterer, J.G., and Evans, L.E. 1985. Comparison of Canadian and American hard red spring wheat cultivars. Can. J. Plant Sci. **65**: 831–840.

Book:

Cochran, W.G., and Cox, G.M. 1968. Experimental design. 2nd ed. John Wiley and Sons, Inc., New York, NY. 611 pp.

Internet:

Irvine, B. 1998. Can producers use an in-row liquid suspension to inoculate pulse crops? [Online]. Available: <http://res.agr.ca/brandon/brc/newsnote/news191.htm> [1998 Oct. 01].

More information available on-line:

<http://www.nrcresearchpress.com.uml.idm.oclc.org/page/cjas/authors#28>

Make sure you cite only literature that is highly relevant and avoid multiple citations on the same point. Check each reference with the original article and refer to it in the text by the author and date. List multiple references in the text in chronological order. Use “et al.” when there are more than two authors but give all authors in the reference list at the end of your assignment.

Assignment Extension, Late Submission Policy, Missing Tests

Late Assignments: Hand-in, hard-copy assignment must be submitted by the end of the day (4:30 pm) on the date that it is due.

Missed Assignments: I do not anticipate any missed assignment.

Policies Related to Student Discipline

Academic Dishonesty: Plagiarism, Cheating and Examination Impersonation

Plagiarism or any other form of cheating in examinations, term tests or academic work is subject to serious academic penalty. 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 penalty. *Students should acquaint themselves with the University’s policy on plagiarism, cheating, exam impersonation and duplicate submission.*

(http://umanitoba.ca/student/resource/student_advocacy/academicintegrity/Academic-Integrity-policies-and-procedures.html).

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

Withdrawal from class

http://umanitoba.ca/student/records/leave_return/695.html