



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

ANSC 7440 / FHNS 7440 PROTEIN NUTRITION AND METABOLISM – WINTER 2022

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COURSE DETAILS

Course Title & Number:	ANSC 7440 /FHNS 7440 Syllabus
Number of Credit Hours:	1.5 / 1.5
Class Times & Days of Week:	9:30 am – 11:30 AM on Wednesday
Location for classes	Remote Learning via WebEx
Pre-Requisites:	None

Instructor Contact Information

Instructor(s) Name:	Dr. C.M. Nyachoti	
Preferred Form of Address	Dr. Nyachoti	
Office Location:	224 Animal Science Bldg.	
Office Phone No.	204 474-7323	
Email	Martin.Nyachoti@umanitoba.ca	
	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 expeditiously determine which e-mails may need a quick response. Please avoid salutations such as 'Hey You' or 'Hi There'. Dear Dr. Nyachoti will be fine. Email response may take up to 36 hours. 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.	
Office Hours or Availability:	As we will be using Remote mode of instruction, it is best that all meetings are pre-arranged by scheduling an appointment.	
Contact:	Students are encouraged to approach the instructors immediately after the lecture. Use email communication only when absolutely necessary. Students are also welcome to phone the office.	

Course Description

- Lectures and critical reviews will be used to discuss recent / significant research advances in the fields of protein and amino acid nutrition and metabolism, pertinent to mammalian physiology.
- Lectures will be presented to cover selected topics related to protein and amino acid nutrition and metabolism. However, the course will be primarily based on student presentations of current literature (within the last 4 years) on protein and amino acid nutrition and metabolism.

General Course Information

Protein, and more specifically its constituent amino acids, is an important, and quite often an expensive, nutrient in human and animal nutrition. Therefore, it is important to understand the factors that influence dietary protein supply and utilization in order to accurately match dietary supply with requirements. As an important component of muscle, protein metabolism is a critical determinant of muscle growth and therefore the efficiency of nutrient utilization. In addition to serving as nutrients, several amino acids or their metabolites are known to play other roles that are critical to the physiological functions of the body. Thus, students in the course will be introduced to important concepts in protein nutrition and metabolism.

Course Goals

The objectives of the course are:

- To recognize and understand the bases for protein and amino acid requirements and the strategies used in meeting them;
- To understand the key aspects of and the factors influencing protein and amino acid metabolism.

Intended Learning Outcomes

At the end of the course, students will be able to:

- a) Understand the concepts of protein and amino acid nutrition.
- b) Understand the concept of amino acid requirements and how these are determined.
- c) Understand the determinants of protein quality.
- d) Understand the concept of protein turnover and how it is determined.
- e) Gain an appreciation of amino acid metabolism and their involvement in various physiological and metabolic processes.

Using Copyrighted Material

Please respect copyright. The content used in this course is appropriately acknowledged and is copied in accordance with copyright laws and University guidelines. Copyrighted works,

including those created by the instructors, are made available for private study and research and must not be distributed in any format without permission.

Recording Class Lectures

The instructor of the course allows no audio or video recording of lectures or presentations in any format, openly or surreptitiously, in whole or in part without permission. Course materials (both paper and digital) are for the participants' private study and research.

Textbook, Readings, Materials

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

1. Amino Acids: Biochemistry and Nutrition, G. Wu
2. Nutritional and Physiological Functions of Amino Acids in Pigs, F. Blachier, G. Wu and Y.L. Yin
3. Farm Animal Metabolism and Nutrition, J. P. F. D'Mello (Ed.).
4. Swine Nutrition, A. J. Austin and L. L. Southern (Eds.).
5. Scott's Nutrition of the Chicken, S. Leeson and J.D. Summers
6. Recent Developments in Pig Nutrition
7. Recent Developments in Ruminant Nutrition
8. Reading materials handed out in class
9. Lehninger Principles of Biochemistry (5th ed.) – Chapters 5, 18, 22, and 27
10. Relevant scientific journals
 - a. Amino Acids
 - b. Journal of Nutrition
 - c. British Journal of Nutrition
 - d. Nutrition Research Reviews
 - e. Journal of Animal Science
 - f. American Journal of Clinical Nutrition
 - g. etc.

Course Technology

Student should not participate in personal direct electronic messaging / posting activities (e-mail, texting, video or voice chat, wikis, blogs, social networking (e.g. Facebook) online and offline "gaming" during scheduled class time. If you are expecting to receive an important call

(emergency) switch your cell phone onto vibrate mode and mute your video and mic before using it.

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 you as a student and the instructor of the course 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:

I expect you to:

- a) Attend class on time so we start on time.
- b) Ask for help when you need assistance.
- c) Submit your own work for individual assignments and to work together in a team for group assigned projects.
- d) To act in a civil, respectful, and responsible manner toward all members of the U of M community.
- e) I will treat you with respect and would appreciate the same courtesy in return. See [Respectful Work and Learning Environment Policy](#).

Academic Integrity:

Group and individual assignments are expected as part of fulfilling the requirements of this course.

- (i) Group projects are subject to the rules of academic dishonesty.
- (ii) Group members must ensure that a group project adheres to the principles of academic integrity.
- (iii) Group assignments are meant to help develop an appreciation of team work in addition to academic knowledge and skills, therefore, complaints from other group members for not cooperating or doing the assigned tasks may result in dismissal from a group. In such a situation the student will not be awarded any marks nor offered to do an individual project.
- (iv) For individual assignments, while students can discuss the assignment with their colleagues, they should complete the assignment independently.

Students Accessibility Services

Student Accessibility Services

If you are a student with a disability, please contact SAS for academic accommodation supports and services such as note-taking, interpreting, assistive technology and exam accommodations. Students who have, or think they may have, a disability (e.g. mental illness, learning, medical, hearing, injury-related, visual) are invited to contact SAS to arrange a confidential consultation.

Student Accessibility Services <http://umanitoba.ca/student/saa/accessibility/>

520 University Centre

204 474 7423

Student_accessibility@umanitoba.ca

Expectations: You Can Expect Me To

A large part of teaching practice includes the use of PowerPoint lectures in class. The PowerPoint lectures provide a summary of key points. However, students are expected to attend class as discussions during lectures form part of the examinable material. Students are expected to be engaged and to give their best effort in class discussions but perfection is not expected.

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.

PERIOD	INSTRUCTOR	TOPIC
Jan 26	CMN	Protein and amino acid nutrition and metabolism / Assessment of requirements
Feb 02	CMN	Protein and amino acid nutrition and metabolism / Assessment of requirements
Feb 09	JDH	Protein quality assessment
Feb 16	CMN	Regulation of protein turnover; Critique 1 Due
Feb 23		Winter Break – No Class
Mar 02	CMN	Class presentations – Amino acid metabolism / Functional Amino acids
Mar 09	CMN	Class presentations – Amino acid metabolism / Functional Amino acids, Critique 2 Due
Mar 23		Critique 3 Due, Review Paper Due

Course Evaluation Methods

Course Evaluation: Review Paper or Paper Critique, Class Presentations, and Class Participation

<p>OPTION 1:</p> <p>Review Paper</p>	<p>50%</p>	<p>Prepare and submit a short but concise review paper on a topic relevant to protein 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 below. Alternatively, you can come up with your own topic but you <i>must discuss this with the instructor</i> before you start.</p> <p>NOTES:</p> <ol style="list-style-type: none"> 1. Maximum length: 10 pages excluding references; 1.5 line spacing 2. Any method of referencing is allowed but this must be consistent throughout the manuscript 3. Spelling errors will be penalized! 4. <u>U of M Policy on Plagiarism will be reinforced.</u> 5. A hard copy of your typed review must be submitted on March 23, 2022; late submissions will be penalized by 5% per day from earned mark. No submissions will be accepted after March 25, 2022.
<p>OPTION 2</p> <p>Paper Critique</p>	<p>50%</p>	<p>Prepare and submit three (3) paper critiques on manuscripts relevant to protein nutrition and metabolism. In addition to a brief description of the research which led to the work presented in your chosen article, these critiques should include an outline of the methods used, interpretation of the findings, comments on the writing style/clarity of the manuscripts and thoughts on the overall value of the study (with reference to other articles that have cited your chosen manuscript where possible).</p> <p>NOTES:</p> <ol style="list-style-type: none"> 1. Maximum length of three (3) pages per paper critique excluding references; 1.5 line spacing. 2. Reference style is up to the author, but consistency throughout the critique is required. 3. Improper spelling and grammar will be penalized 4. <u>U of M policy on plagiarism will be reinforced.</u> <p>A hard copy of your typed critiques must be submitted on February 16, 2022 for the first critique, March 09, 2022 for the second and</p>

		March 23, 2022 for the third. Late submissions will be penalized by 5% per day from earned mark. No submissions will be accepted after March 25, 2022 .
Oral Presentation	40%	<p><i>This is a group effort whereby 3 students will work together.</i></p> <p>Select a recent (last 4 years) peer reviewed article related to the lecture 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 scientific significance of the research; 4. position the research relative to protein nutrition and metabolism. <p>NOTES:</p> <ol style="list-style-type: none"> 1. Give a 40 min. (30 min presentation + 10 min questions) review of the background, research methodologies, and key findings of the work. <i>You will need to read additional papers to complement your chosen article!</i> 2. Provide a one page abstract of your review and a handout of your PowerPoint presentation to the class at least one day before your oral presentation. 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%	Will include asking questions, providing insights/comments, attendance, punctuality, etc.

SUGGESTED TOPICS FOR REVIEW PAPER:

- Protein quality and its effects on protein metabolism
- Amino acids and neurotransmission
- Amino acid catabolism and the efficiency of amino acid utilization
- Dietary influences on intestinal amino acid metabolism
- The role of inflammation and immune activation on protein metabolism
- Functional amino acids

- Protein turnover
- Concepts for balancing protein supply with requirements
- Metabolism of specific amino acids – e.g. arginine and tryptophan
- Methodologies for studying protein nutrition and metabolism
- Therapeutic use of amino acids in disease, sports, etc.
- Regulatory roles of amino acid on gene expression (amino acid signaling)

Grading

The grading scale for the course is given below:

Letter Grade	%	Grade Point Range	Final Grade Point
A+	91-100	4.25-4.5	4.5
A	84-90	3.75-4.24	4.0
B+	77-83	3.25-3.74	3.5
B	70-76	2.75-3.24	3.0
C+	65-69	2.25-2.74	2.5
C	60-64	2.0-2.24	2.0
D	50-59	Less than 2.0	1.0
F	Less than 50		0

University Support Office & Policies

Instructors shall provide to every student the information on university support offices and policies in [Schedule "A"](#) within the first week of classes, either through a paper copy and/or via the university's student information system (i.e., Aurora, UM Learn, or such other university information system as may be approved by the university from time to time).

Schedule "A"

Section (a) sample re: A list of academic supports available to Students, such as the Academic Learning Centre, Libraries, and other supports as may be appropriate:

Writing and Learning Support

The Academic Learning Centre (ALC) offers services that may be helpful to you throughout your academic program. Through the ALC, you can meet with a learning specialist to discuss concerns such as time management, learning strategies, and test-taking strategies. The ALC also offers peer supported study groups called Supplemental Instruction (SI) for certain courses that students have typically found difficult. In these study groups, students have opportunities to ask questions, compare notes, discuss content, solve practice problems, and develop new study strategies in a group-learning format.

You can also meet one-to-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. If you are interested in meeting with a writing tutor, reserve your appointment two to three days in advance of the time you would like to meet. Also, plan to meet with a writing tutor a few days before your paper is due so that you have time to work with the tutor's feedback.

These Academic Learning Centre services are free for U of M students. For more information, please visit the Academic Learning Centre website at:

<http://umanitoba.ca/student/academiclearning/>

You can also contact the Academic Learning Centre by calling 204-480-1481 or by visiting 205 Tier Building.

University of Manitoba Libraries (UML)

As the primary contact for all research needs, your liaison librarian can play a vital role when completing academic papers and assignments. Liaisons can answer questions about managing citations, or locating appropriate resources, and will address any other concerns you may have, regarding the research process. Liaisons can be contacted by email or

phone, and are also available to meet with you in-person. A complete list of liaison librarians can be found by subject: <http://bit.ly/WcEbA1> or name: <http://bit.ly/1tJ0bB4>. In addition, general library assistance is provided in person at 19 University Libraries, located on both the Fort Garry and Bannatyne campuses, as well as in many Winnipeg hospitals. For a listing of all libraries, please consult the following: <http://bit.ly/1sXe6RA>. When working remotely, students can also receive help online, via the Ask-a-Librarian chat found on the Libraries' homepage: www.umanitoba.ca/libraries.

Section (b) sample: re: A statement regarding mental health that includes referral information:

For 24/7 mental health support, contact the Mobile Crisis Service at 204-940-1781.

Student Counselling Centre

Contact SCC if you are concerned about any aspect of your mental health, including anxiety, stress, or depression, or for help with relationships or other life concerns. SCC offers crisis services as well as individual, couple, and group counselling. *Student Counselling Centre:* <http://umanitoba.ca/student/counselling/index.html>
474 University Centre or S207 Medical Services
(204) 474-8592

Student Support Case Management

Contact the Student Support Case Management team if you are concerned about yourself or another student and don't know where to turn. SSCM helps connect students with on and off campus resources, provides safety planning, and offers other supports, including consultation, educational workshops, and referral to the STATIS threat assessment team.
Student Support Intake Assistant <http://umanitoba.ca/student/case-manager/index.html>
520 University Centre
(204) 474-7423

University Health Service

Contact UHS for any medical concerns, including mental health problems. UHS offers a full range of medical services to students, including psychiatric consultation.
University Health Service <http://umanitoba.ca/student/health/>
104 University Centre, Fort Garry Campus
(204) 474-8411 (Business hours or after hours/urgent calls)

Health and Wellness

Contact our Health and Wellness Educator if you are interested in information on a broad range of health topics, including physical and mental health concerns, alcohol and substance use harms, and sexual assault.

Health and Wellness Educator <http://umanitoba.ca/student/health-wellness/welcome.html>

Katie.Kutryk@umanitoba.ca

469 University Centre

(204) 295-9032

Live Well @ UofM

For comprehensive information about the full range of health and wellness resources available on campus, visit the Live Well @ UofM site:

<http://umanitoba.ca/student/livewell/index.html>

Section (c) sample: re: A notice with respect to copyright:

All students are required to respect copyright as per Canada's *Copyright Act*. Staff and students play a key role in the University's copyright compliance as we balance user rights for educational purposes with the rights of content creators from around the world. The Copyright Office provides copyright resources and support for all members of the University of Manitoba community. Visit <http://umanitoba.ca/copyright> for more information.

Section (d) sample: re: A statement directing the student to University and Unit policies, procedures, and supplemental information available on-line:**Your rights and responsibilities**

As a student of the University of Manitoba you have rights and responsibilities. It is important for you to know what you can expect from the University as a student and to understand what the University expects from you. Become familiar with the policies and procedures of the University and the regulations that are specific to your faculty, college or school.

The [Academic Calendar](http://umanitoba.ca/student/records/academiccalendar.html) <http://umanitoba.ca/student/records/academiccalendar.html> is one important source of information. View the sections *University Policies and Procedures* and *General Academic Regulations*.

While all of the information contained in these two sections is important, the following information is highlighted.

- If you have questions about your grades, talk to your instructor. There is a process for term work and final **grade appeals**. Note that you have the right to access your

final examination scripts. See the Registrar's Office website for more information including appeal deadline dates and the appeal form

<http://umanitoba.ca/registrar/>

- You are expected to view the General Academic Regulation section within the Academic Calendar and specifically read the **Academic Integrity** regulation. Consult the course syllabus or ask your instructor for additional information about demonstrating academic integrity in your academic work. Visit the Academic Integrity Site for tools and support <http://umanitoba.ca/academicintegrity/> View the **Student Academic Misconduct** procedure for more information.
- The University is committed to a respectful work and learning environment. You have the right to be treated with respect and you are expected conduct yourself in an appropriate respectful manner. Policies governing behavior include the:

Respectful Work and Learning Environment

http://umanitoba.ca/admin/governance/governing_documents/community/230.html

Student Discipline

http://umanitoba.ca/admin/governance/governing_documents/students/student_discipline.html and,

Violent or Threatening Behaviour

http://umanitoba.ca/admin/governance/governing_documents/community/669.html

- If you experience **Sexual Assault** or know a member of the University community who has, it is important to know there is a policy that provides information about the supports available to those who disclose and outlines a process for reporting. The **Sexual Assault** policy may be found at: http://umanitoba.ca/admin/governance/governing_documents/community/230.html More information and resources can be found by reviewing the Sexual Assault site <http://umanitoba.ca/student/sexual-assault/>
- For information about rights and responsibilities regarding **Intellectual Property** view the policy http://umanitoba.ca/admin/governance/media/Intellectual_Property_Policy_-_2013_10_01.pdf

For information on regulations that are specific to your academic program, read the section in the Academic Calendar and on the respective faculty/college/school web site <http://umanitoba.ca/faculties/>

Contact an **Academic Advisor** within our faculty/college or school for questions about your academic program and regulations <http://umanitoba.ca/academic-advisors/>
Student Advocacy

Contact Student Advocacy if you want to know more about your rights and responsibilities as a student, have questions about policies and procedures, and/or want support in dealing with academic or discipline concerns.

<http://umanitoba.ca/student/advocacy/>

520 University Centre

204 474 7423

student_advocacy@umanitoba.ca