

Animal Sciences Graduate Degrees Emphasizing Nutrition

General Statement

The Nutrition program in the Animal Sciences Department takes a comprehensive view of animal nutrition. Studies range from applied animal feeding trials to basic studies on the metabolism of nutritive and non-nutritive components of diets. Studies can be directed toward molecular, sub cellular and cellular systems as well as studies focusing on integrated whole animal metabolism with an emphasis on quantitation, integration and regulation. Two general themes exist. One considers nonruminant animals and is closely linked to the Interdepartmental Graduate Program in Nutritional Sciences (IGPNS) which has the director and administrative offices in the Department of Nutritional Sciences. The other considers ruminant animals and is dependent on professors housed in the departments of Animal Sciences and Dairy Science for courses and committees to direct the graduate program. Both of these programs are supported by courses available Nutritional Sciences, Chemistry, Biochemistry, Physiology, Statistics, Medical School and School of Veterinary Medicine.

Faculty in the Departments of Animal Sciences and Dairy Science associated with Nutrition Research

Animal Sciences

David M. Barnes, Assistant Professor. Nutritional toxicology. Mechanism(s) of mineral action on cellular metabolism. Signaling mechanisms regulating protein turnover, growth, nutrition and gene expression. barnes@calshp.cals.wisc.edu

Norlin J. Benevega, Professor. Nonruminant nutrition. Neonatal metabolism with an emphasis on the pig. Fuel utilization during the first few days of life. Protein, amino acid and lipid metabolism. Other studies involve iron metabolism during the first three weeks of life. (Also Nutritional Sciences) njbeneve@facstaff.wisc.edu

Mark E. Cook, Professor. Molecular cause of skeletal deformities. Effect of nutrients on immune responses. Immune regulation of physiological processes. mcook@facstaff.wisc.edu

Thomas D. Crenshaw, Professor. Swine nutrition. Interrelationship of dietary cation-anion balance with bone and lysine metabolism. Economic impact of the post-weaning growth lag. crenshaw@calshp.cals.wisc.edu

Jess D. Reed, Professor. Research on the phytochemistry of food and livestock feeds and their effects on animal and human health and nutrition. Factors that limit the nutritive value and utilization of crop residues, forage legumes, browse, multipurpose trees, and agro-industrial byproducts. (Also Animal Science, International Agriculture, Environmental Toxicology Center) reed@calshp.cals.wisc.edu

Daniel M. Schaefer, Professor and Chair. Beef cattle nutrition and rumen microbiology. Quantifying the relationship between dietary vitamin E supplements and the color stability of fresh and frozen beef. Evaluating competition for hydrogen between ruminal-acetogenic and ruminal-methanogenic bacteria species. Single-calving-heifer beef production system. (Also Bacteriology) dmschaef@facstaff.wisc.edu

Dairy Science

Louis E. Armentano, Professor and Chair. Hepatic metabolism. Dairy cattle nutrition. Use of high fiber byproduct feeds. armentan@calshp.cals.wisc.edu

Glen A. Broderick, Professor. Protein nutrition, improving utilization of forage protein by dairy cattle. Quantifying protein degradation in the rumen. Reducing conversion of forage protein to NPN in the silo. (USDA, U.S. Dairy Forage Research Center) glenb@dfrc.wisc.edu

David K. Combs, Associate Professor. Dairy cattle nutrition and management. Forage utilization. Digestive physiology and kinetics of the digestive process in ruminants. Calf nutrition and management. (Also Extension) dkcombs@facstaff.wisc.edu

Ric R. Grummer, Professor. Fat metabolism. Fat supplementation of dairy cattle diets. Prevention of periparturient fatty liver and ketosis. Regulation of liver fatty acid metabolism in ruminants. grummer@calshp.cals.wisc.edu

Larry D. Satter, Professor. Forage utilization. Protein utilization by dairy cows, including heat processing of soybeans. Forage quality and impact on milk production. Factors limiting milk production with high forage diets. Phosphorus requirement of lactating dairy cows. (USDA, U.S. Dairy Forage Research Center) lsatter@dfrc.wisc.edu

Randy D. Shaver, Professor. Nutrition. Research on nutrition of lactating dairy cows with emphasis on carbohydrates. (Also Extension) shaver@calshp.cals.wisc.edu

Application to the Graduate School

Admission Requirements

As you apply to UW-Madison, you need to be aware of two different sets of requirements:

(1) Graduate School minimum admission requirements, and (2) department admission requirements.

(1) The Graduate School sets the minimum admission requirements for all prospective graduate students. The minimum admission requirements are:

A bachelor's degree from an approved (accredited) institution.

A minimum undergraduate grade-point average (GPA) of 3.00 (on a 4.00 scale) on the equivalent of the last 60 semester hours (approximately two years of work). Every applicant whose native language is not English, or whose undergraduate instruction was not in English, must provide official scores from the Test of English as a Foreign Language (TOEFL) or the Michigan English Language Assessment Battery (MELAB). An admitted applicant whose TOEFL (paper-based) test score is below 580; TOEFL computer-based test (CBT) score below 237; or MELAB below 82 must take an English assessment test upon arrival. You must then register for any recommended English as a Second Language (ESL) course(s) in the first semester you are enrolled. International applicants must have a degree comparable to an approved U.S. bachelor's degree and provide evidence of adequate financial resources for the anticipated duration of their program.

(2) Departmental admission requirements are in addition to the minimum requirements

set by the Graduate School. The Department of Animal Sciences bases its admission on demonstrated scholastic ability, recent GRE (Graduate Record Exam) scores, letters of recommendation, and the personal statement or reasons for graduate study.

Program in non-ruminant nutrition

This program is supported by the Animal Nutrition Emphasis Group in the IGPNS program.

M. S. IN NUTRITIONAL SCIENCES

Animal Nutrition Emphasis Group

Interdepartmental Graduate Program in Nutritional Sciences (IGPNS)

I Prerequisites for Admission

1. General chemistry, 2 semesters, equivalent with laboratory
2. Organic Chemistry, 2 semesters, equivalent
3. Analytical chemistry, 1 semester, equivalent
4. Mathematics including college algebra, trigonometry and 1 semester equivalent of calculus
5. Biochemistry course with an organic chemistry prerequisite
6. Nutrition course with a biochemistry prerequisite
7. Animal nutrition course that emphasizes feed formulation- may meet requirement of NS 626 if the course has a biochemistry prerequisite
8. Biological sciences, 2 semesters, equivalent
9. Animal physiology, 1 semester, equivalent

II IGPNS Course Requirements

1. Nutritional Science courses, 5 cr; 619 (Intermediary Metabolism), 623 (Minerals), 627 (Vitamins).
2. Two courses must be completed from the approved list of specialized courses. (see III. d.)
3. Seminars; AS/DS 931 (Advanced), 2cr. All graduate students are required to enroll, except when there is a course conflict, and they are expected to attend.

III Animal Nutrition Emphasis Group Requirements

(Minimum of 18-20 course credits) the following courses are examples; consult the current

Timetable for new course offerings.

1. Statistics 571, 572, (8cr)

2. Laboratory course, 2 cr (e.g. Biochem 651 or 653; Biomolecular Chem. 504 or 612; AHABS 529 or 701)
3. Physiology 6-8cr. Physiol 720 6 cr or Comparative Bio Sci 551, 4 cr & 506, 4cr
4. Two courses from N.S. 625, 626, 627, 700, 701, 702, 703 A.S. 505, 875a, 875b, 875c or and equivalent course approved by the IGPNS Certification Committee.
5. Research credits to meet the University of Wisconsin-Madison minimum credit requirement.

Total credits section II, 9-11, III 16-18, Total 25-29

Ph. D. IN NUTRITIONAL SCIENCES

Animal Nutrition Emphasis Group
Interdepartmental Graduate Program in Nutritional Sciences (IGPNS)

I Prerequisites for Admission

1. General chemistry, 2 semesters, equivalent with laboratory
2. Organic Chemistry, 2 semesters, equivalent
3. Analytical chemistry, 1 semester, equivalent
4. Mathematics including college algebra, trigonometry and 1 semester equivalent of calculus
5. Biochemistry course with an organic chemistry prerequisite
6. Nutrition course with a biochemistry prerequisite
7. Animal nutrition course that emphasizes feed formulation- may meet requirement (6) if the course has a biochemistry prerequisite
8. Biological sciences, 2 semesters, equivalent
9. Animal physiology, 1 semester, equivalent

II IGPNS Course Requirements

1. Nutritional Science courses, 8 cr; 619 (Intermediary Metabolism), 627 (Community & Epidemiological Nutrition), 623 (Minerals), 625 (Obesity/Diabetes), 626 (Experimental Diet Design), 627 (Vitamins).
2. Two courses must be completed from the approved list of specialized courses. (being developed)
3. Seminars; NS 600 (Introductory), 1 cr; NS 931 (Advanced), 1cr. All graduate students are required to enroll, except when there is a course conflict, and they are expected to attend.

Emphasis Group Seminar, 3 cr. students must enroll each time it is offered and present

three seminars for a letter grade. A seminar course from outside IGPNS could be

substituted for one of the three required emphasis groups seminars.

4. Teaching experience, 1-3 cr. NS 799 or equivalent experience.

III Animal Nutrition Emphasis Group Requirements- Nonruminant Nutrition

(Minimum of 20-24 course credits) the following courses are examples; consult the current

Timetable for new course offerings.

1. Statistics, Forestry 571 & 572, Agronomy 771 & 772 (10cr).

2. Laboratory course, 2 cr (e.g. Biochem 651 or 653; Biomolecular Chem. 504 or 612; AHABS

529 or 701)

3. Physiology 6-8cr. Physiol 720 6 cr or Comparative Bio Sci 551, 4 cr & 506, 4cr

4. Two courses from N.S. 625, 626, 627, 700, 701, 702, 703 A.S. 505, 875a, 875b, 875c or and

equivalent course approved by the IGPNS Certification Committee.

5. Research credits to meet the University of Wisconsin-Madison minimum credit requirement.

IV Animal Nutrition Emphasis Group Requirements- Ruminant Nutrition

1. Statistics, Forestry 571 & 572

2. Laboratory course, 2 cr

3. Two courses from N.S. 625, 626, 627, 700, 701, 702, 703

4. One course from A.S. 505, 875a, 875b, 875c (2 Cr.)

5. One graduate level course in animal breeding,, reproductive physiology or muscle biology,

3 Cr.

6. AS/AD 931 seminar 2 Cr.

