ANSC*4350 - Experiments in Animal Biology

Winter 2025 Course Outline
Section: 01
Credits: 0.50

Calendar Description

This course provides an opportunity for directed hands-on projects involving live animals and laboratory techniques. A set of selected projects will be provided by Animal Biosciences faculty within their broad fields of study.
Restriction(s): Restricted to students in BSCH.ABIO,BSAG.ANSC and BBRM.EQM. Instructor consent required.
Department(s): Department of Animal Biosciences

Course Description

Over the course of the semester, groups of students will be involved in conducting a single experiment on agricultural animals at one of the research stations. Students will be provided with an outline for the experiment but will develop their own hypotheses and experimental plan and execute data collection. Individual groups conducting separate projects will meet separately for the development of hypotheses, experimental design, data collection and analysis. Students will be responsible for measuring behaviour, monitoring growth, production or reproduction and collecting blood or saliva. Students will learn and practice sampling techniques and assays for measuring hormones or metabolites. They will also analyze data and interpret and present their results in written and oral format.

Students will meet weekly (Tuesday at 2:30 p.m., ANNU Room 030 or 102) for presentations on techniques used in different areas of research, to present group status reports and perform hormone assays. This will expose students to the variety of experimental approaches used in various fields of research. Students will be expected to integrate or consider the impact of these ideas in their experimental design.

Lecture Schedule

Timetable

Tuesday 2:30 p.m. - 5:30 p.m., ANNU 030. Individual groups will arrange their schedules for performing experimental work in consultation with the TAs. Timetable is subject to change. Please see WebAdvisor for the latest information.

Final Exam

There is no final exam. The different groups will present their results during the final class (April 1) and individual lab reports are due the end on the final week (April 4)

Instructor Information

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Teaching Assistants

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Learning Resources

Project Descriptions

Project 1 (a/b) - Behaviour and physiology of sows and/or piglets in different farrowing environments

Background

Neonatal mortality accounts for significant losses to the swine industry, and crushing by the sow is most often the cause of these losses during the first week postpartum. Farrowing crates were developed to prevent crushing, as they slow the sow down when she transitions from standing to laying, but they restrict the sows' movements. Because piglets require a much higher environmental temperature than sows, supplemental heat (i.e., heating pad or heat lamp) is used in the farrowing environment to provide piglets with a comfortable thermal environment. The supplemental heat source may be located some distance from the sow's udder, which attracts piglets away from the sow and may also reduce crushing.

On the day before farrowing, sows are highly motivated to engage in nest-building behaviours. Farrowing crates are criticized on animal welfare grounds because they prevent nest-building behaviours and may increase sow stress. Their design may also impair the sow's ability to perform the movement required for normal postural adjustments (i.e. changing from lying to standing and vice-versa) and the resulting stress can impair lactation performance. Alternative farrowing systems furnished with straw, provide more space to the sow and allow sows to perform nest-building, but they can also affect piglet thermoregulatory and suckling behaviours. There is some evidence that performing behaviours associated with nesting is more important than the availability of nesting material. Therefore, simple modifications to the crate (e.g., the addition of cloth tassels) may improve sow welfare while the piglets are still protected through the crate structure. Enriched farrowing environments have also been shown to affect the behaviour of piglets.

Objectives and overview

The objectives of this project are to examine the effects of farrowing accommodation or environmental enrichment on the behaviour and physiology of sows and their piglets. Fourteen sows (gilts) will be available beginning a few days before farrowing. The sows can be separated into two different treatment groups of your choosing (e.g., open vs. closed farrowing crates, different types of supplemental heat, enriched vs. non-enriched farrowing crates etc.). Litter characteristics will be recorded (e.g., number of stillbirths, total born alive, litter birth weight). The behaviour of sows and piglets can be measured using live observation and video recordings. Routine management practices such as teeth clipping and castration of male piglets will be done by animal care staff. Body weights, growth rates and mortality (incidence and apparent cause) of piglets can be recorded. Endocrine changes associated with parturition and onset of lactation or stress response can be analyzed from saliva samples collected from the sows. There are several different approaches that groups can use to address this topic. For example you can:

- Compare nest-building behaviour, stress response and immune status of sows in two farrowing environments (e.g., use different heat sources and placement for piglets, provide nesting material, or change the configuration of the farrowing crate etc.)
- Assess the effect of farrowing environment on thermoregulatory behaviour, suckling behaviour, and growth rates of piglets
- Compare the standing and lying behaviour of sows in two farrowing environments in relation to risk of crushing piglets
- Compare the responses of piglets to teeth clipping, tail docking, or castration in the different farrowing environments

Note: Two groups could potentially work on this project, one focusing on sows and the other focusing on piglets, but careful coordination must occur between the groups to ensure both projects are successful.

References:

Cronin, G.M. and J.A. Smith, 1992. Suckling behaviour of sows in farrowing crates and straw-bedded pens. Appl. Anim. Behav. Sci. 33:175-189.

Cronin, G.M., J.A. Smith, F.M. Hodge and P.H. Hemsworth, 1994. The behavior of primiparous sows around farrowing in response to restraint and straw bedding. Appl. Anim. Behav. Sci. 39: 269-280.

Hrupka, B.J. et al., 1998. The effect of farrowing crate heat lamp location on sow and pig patterns of lying and pig survival. J. Anim. Sci. 76:2995-3002.

Jarvis, S., Calvert, D.M. Weary, E.A Pajor, D. Fraser and A.M. Honkanen 1996. Sow body movements that crush piglets: a comparison between two types of farrowing accommodation. Appl. Anim. Behav. Sci. 49: 149-158.

Jarvis, S., D'Eath, R. B., Robson, S. K., and A.B, Lawrence. 2006. The effect of confinement during lactation on the hypothalamic-pituitary-adrenal axis and behaviour of primiparous sows. Physiol. & Behav. 87, 345-352.

McGlone, J.J., T.M., Widowski, K.D., Stricklen, D. Mitchell, S.E., Curtis. 1996. Sow access to tassel pre-farrowing: preliminary evidence of stillbirth rate. J. Anim. Sci. 74 (1), 127, Suppl.

Sulabo, R. C., J. Y., Jacela, M. D., Tokach, S. S., Dritz, R. D., Goodbrand, J. M., DeRouchey, and J. L., Nelssen. 2010. Effects of lactation feed intake and creep feeding on sow and piglet performance. J. Anim. Sci. 88: 3145-3153.

von Borell, et al. 2009. Animal welfare implications of surgical castration and its alternatives in pigs. Animal 3:1488-1496.

Vanheukelom, V., B. Driessen and R. Geers, 2012. The effects of environmental enrichment on the behaviour of sucklings piglets and lactating sows: A review. Livestock Science 143:116-131.

Widowski, T,M., S.E., Curtis. 1990. The influence of straw, cloth tassel or both on the pre-partum behavior of sows. Appl. Anim. Behav. Sci, 27, 53-71.

Project 2: Utilizing a palatability enhancer in lactating sows to increase milk production and piglet growth

Background

After 14 days of lactation, sow milk production begins to limit piglet growth rates (Theil and Jorgensen 2016). The sow's voluntary feed intake limits her milk production (Wang et al., 2021; NRC 2012). Since milk is the primary nutrient source for suckling piglets, even when they are provided creep feed, the production of milk remains limiting (Christensen and Huber 2021). By using a palatability enhancer in the lactation diet to increase feed intake, it is hypothesized to have a sparing effect on sow body condition and result in increased milk production and piglet weaning weights.

Objective and Overview

The objective of this study is to determine the efficacy of using a palatability enhancer in lactation diets to increase milk production. For this study, 12 sows will be recruited (6 fed a conventional lactation diet; 6 provided the conventional lactation diet with the inclusion of Krave-AP-P at 0.05%). Sows and piglets will be followed for the suckling period until piglets are weaned on 21 days of age). Study outcomes may include but not limited to:

- Sow BW at farrowing, 14 days post-farrow and at weaning
- Piglet BW at birth, 14 days of age and at weaning
- Milk production estimates (using NRC based on piglet BW)
- Piglet behavior: ex. Piglet- time spent suckling
- Sow body condition: back fat and loin depth
- Milk composition
- Quantify sow stress (I.e., salivary cortisol)

References:

Christensen, B., and L.-A. Huber. 2021. The effect of creep feed composition and form on pre- and post-weaning growth performance of pigs and the utilization of low-complexity nursery diets. Transl. Anim. Sci. 5:txab211.

NRC. 2012. Nutrient requirements of swine. 11th ed.Washington (DC): National Academy Press.

Theil, P. K., and H. Jørgensen. 2016. Fat, energy, and nitrogen retention of artificially reared piglets1. J. Anim. Sci. 94:320–323.

Wang, R., N. Liu, Y. Yang, Y. Lei, J. Lyu, Z. Dai, I. H. Kim, J. Li, Z. Wu, and D. Li. 2021. Flavor supplementation during late gestation and lactation periods increases the reproductive performance and alters fecal microbiota of the sows. Anim. Nutr. 7:679–687.

Project 3: Effect of variation on pig body weight at weaning

Background

Pigs that are weaned at lighter body weight tend to remain lighter throughout the nursery period and often require more days to reach market weight (Winters et al., 2023). This in part is due to their low order in the social hierarchy that limits their access to feed (Tong et al., 2019). Lighter pigs are more likely to need treatments and require more management to ensure they are performing well (Romero et al., 2022). Previous work demonstrated that splitting pigs based on body weight was an effective strategy to increase creep feed intake of lighter pigs (Hunting et al., 2017).

Objective and Overview

The objective of this project is to determine if reducing the body weight variation at weaning will allow low body weight piglets improved access to feed, therefore improving growth rates. This project will recruit 3 pens of 12 pigs per pen. In one pen light and heavy pigs will be housed together (CV around 20%), in the second pen, only light pigs (<6kg) will be housed together, and the third pen will have heavy pigs housed together (>6kg weaning weight; target CV <8%). Study outcomes may include but are not limited to:

- Pig growth performance (pig body weight and feed intake)
- Assess behavior of pigs (i.e., fighting, laying, sleeping, eating) feeding latency (time between weaning and eating first meal), lesion scores
- Quantify stress response (ex. Cortisol)

References

Huting, A. M. S., K. Almond, I. Wellock, and I. Kyriazakis. 2017. What is good for small piglets might not be good for big piglets: The consequences of cross-fostering and creep feed provision on performance to slaughter. J. Anim. Sci. 95:4926–4944.

Romero, M., L. Calvo, J. I. Morales, A. I. Rodríguez, R. M. Escudero, Á. Olivares, and C. López-Bote. 2022. Short- and long-term effects of birth weight and neonatal care in pigs. Animals (Basel). 12:2936.

Tong, X., C. Shen, R. Chen, S. Gao, X. Liu, A. P. Schinckel, and B. Zhou. 2019. Reestablishment of social hierarchies in weaned pigs after mixing. Animals (Basel). 10:36.

Winters, J. F. M., L. Foldager, and L. J. Pedersen. 2023. Postweaning growth and feeding behaviour in pigs: effect of heavier hybrid and weaning intact litters in farrowing pens for loose-housed sows. Animal. 17:100688.

Project 4- Effect of stocking density on growing pig performance

Background

Growing pigs are housed in pens with other pigs that are their same size and age. When there are too many pigs in a pen, this reduces access to feed and water and can increase fighting and reduce growth, increasing the number of days to reach market weight and increasing stress. (Fu et al., 2016; Li et al., 2020). On the other hand, when there are too few pigs in a pen, the producer must pay more per pig to house them which can negatively impact their profits (Potter et al., 2010). There are animal Canadian Code of Practice in place to act as a guideline for minimum space allowance for pigs; however, research has shown that growth performance will increase with more space allowance above current recommendations (Potter et al., 2010). Producers aim to optimize space allowance to provide enough space for pigs to move around and access feed and water, but not too much where they operate at a deficit.

Objective and Overview

The objective of this project is to determine the effects of reducing stocking density of growing pigs (approx. 30kg) on growth performance, endocrine response, and production costs. This project will recruit 56 pigs, who will be placed in 4 grower pens (2 pens of 16; 2 pens of 12) to provide them with either 3.49sq ft or 4.65 sq ft of space per pig. Some outcomes you may investigate but are not limited to include:

- Pig growth performance (pig body weight, and feed intake)
- Assess behavior of pigs (fighting, lying, eating, sleeping)
- Quantify stress response (eg. cortisol)

References

Fu, L., H. Li, T. Liang, B. Zhou, Q. Chu, A. P. Schinckel, X. Yang, R. Zhao, P. Li, and R. Huang. 2016. Stocking density affects welfare indicators of growing pigs of different group sizes after regrouping. Applied Animal Behaviour Science 174:42–50.

Li, X., X. Xiong, X. Wu, G. Liu, K. Zhou, and Y. Yin. 2020. Effects of stocking density on growth performance, blood parameters and immunity of growing pigs. Anim. Nutr. 6:529–534.

Potter, M. L., M. D. Tokach, J. M. DeRouchey, R. D. Goodband, J. L. Nelssen, and S. S. Dritz. 2010. Effects of increasing stocking density on finishing pig performance (2010). Kansas Agricultural Experiment Station Research Reports:216–222.

Project 5 – Nutritional strategies for supporting persistency in egg production and liveability in laying hens

Background

Extending the life of hens to 100 weeks in the first cycle of production is a strategy for sustainable egg production, but a critical consideration in keeping hens longer is lay persistency and livability. The risks of keeping laying hens in production longer includes 1) controlling egg weight, 2) declining eggshell quality, 3) declining nutrient (Ca) absorption capacity, 4) liver dysfunction, and 5) osteoporosis. The balance between synthesis and secretion of lipids is critical in regulating hepatic and extrahepatic fat deposition in hens. Glucose derived from cereal grains is the primary fuel for hepatic lipogenesis and lipoprotein formation. The quality of nutrients available for metabolic processes will be a function of the efficiency of the digestive processes which will include the degree of denaturation, yield for enzymatic hydrolysis, rate of passage of digesta, speed of intestinal absorption and the role of intestinal microflora. Including fibre degrading enzymes (B-mannanase and Xylanase) in layer diets increased egg production and eggshell quality, which are linked to improved nutrient utilization and metabolism in 63- to 83-week-old hens.

Objectives and overview

The objective of this project is to evaluate the impact of fibre level and supplementation with fibre degrading enzymes on egg production, egg quality, and metabolism in white laying hens +60 to 100 weeks of age. You will have access to a subset of birds assigned to one of 8 dietary treatments (**AUP 4518;** 4 birds/cage; 20 birds/treatment). The dietary treatments are:

ID		MAN (Natupulse®)	XYL (Naugrain®)
T1	Positive control (PC)[1]	0	0
T2	Negative Control, high fiber (NC)[2]	0	0
T3	NC	0.5 dose (50g/400TMU)	0
T4	NC	0.5 dose (50g/400TMU)	1 dose (100g/560TXU)
T5	NC	0	1 dose (100g/560TXU)
T6	NC	1 dose (100g/800TMU)	0
T7	NC	1 dose (100g/800TMU)	1 dose (100g/560TXU)
T8	NC	0.5 dose (50g/400TMU)	0.5 dose (50g/280TXU)

[1]Meets specifications, [2]100 kcal/kg less; 3-4% reduction in CP and AA

These animals will already be enrolled in a nutrition study, so coordination with the tech/student is critical.

Body weights, feed intake, egg production and egg weight can be recorded routinely. Mortalities (frequency and apparent cause) can be recorded. Eggshell defects will be recorded (cracks, punctures, excess calcium deposits, abnormal shape, dirty eggs) and measurement of eggshell thickness and breaking strength, haugh units/albumen height can be made.

Excreta samples will be collected for energy and nutrient retention (at 10, 20 weeks and the last week of the experiment for determination of gross energy, crude protein, crude fat, minerals (ca, P) and NDF retention. Two birds per cage will be individually weighed, bled for plasma, necropsied for abdominal fat liver weight and fat. Plasma metabolites may be maesuerd: Avian biochemistry (Glucose, minerals, albumin, globulin, and enzyme activities (alanine aminotransferase, alkaline phosphatase, amylase, aspartate aminotransferase, creatine kinase, γ-glutamyltransferase and lipase)

There are several different approaches that groups can use to address this topic. For example you can:

- Compare egg production and quality and production efficiency among treatment groups
- Assess differences in behaviour and/or behavioural responses to different stimuli
- Compare endocrine and metabolic markers of growth and/or health and/or stress among treatment groups (e.g., estrogen, white blood cell counts and characterization, corticosterone, avian biochemistry)

References

Hanlon C, Takeshima K, Kiarie EG, Bédécarrats GY. Bone and eggshell quality throughout an extended laying cycle in three strains of layers spanning 50 years of selection. *Poultry Sci* 2022; **101**(3): 101672.

Bain MM, Nys Y, Dunn IC. Increasing persistency in lay and stabilising egg quality in longer laying cycles. What are the challenges? *Br Poult Sci* 2016; **57**(3): 330-8.

Park JA, Sohn SH. The Influence of Hen Aging on Eggshell Ultrastructure and Shell Mineral Components. *Korean J Food Sci Anim Resour* 2018; **38**(5): 1080-91.

Rozenboim I, Mahato J, Cohen NA, Tirosh O. Low protein and high-energy diet: a possible natural cause of fatty liver hemorrhagic syndrome in caged White Leghorn laying hens. *Poult Sci* 2016; **95**(3): 612-21.

Robinson S, Kiarie E. Production and metabolic consequences of high-energy and low-crude-protein diet fed to 49-wk-old Shaver white leghorn without or with top-dressed organic selenium. *Can J Anim Sci* 2019; **99**(4): 848-57.

Leeson S, Summers JD. Commercial poultry nuttition. 3 ed. Guelph, ON, Canada: University Books; 2005.

Whitehead CC. Plasma oestrogen and the regulation of egg weight in laying hens by dietary fats. *Animal Feed Science and Technology* 1995; **53**(2): 91-8.

Kiarie E, Romero LF, Nyachoti CM. The role of added feed enzymes in promoting gut health in swine and poultry. *Nutr Res Rev* 2013; **26**(1): 71-88.

Kiarie E, Walsh MC, Romero LF, Arent S, Ravindran V. Nutrient and fiber utilization responses of supplemental xylanase in broiler chickens fed wheat based diets are independent of the adaptation period to test diets. *Poultry Sci* 2017; **96**(9): 3239-45.

Kiarie EG, Steelman S, Martinez MA. Does supplementing β-mannanase modulate the feed-induced immune response and gastrointestinal ecology in poultry and pigs? An appraisal. *Frontiers in Animal Science* 2022; **3**.

De Cloet CA, Maina AN, Schulze H, Bédécarrats GY, Kiarie EG. Egg production, egg quality, organ weight, bone ash, and plasma metabolites in 30-week-old Lohmann LSL lite hens fed corn and soybean meal-based diets supplemented with enzymatically treated yeast. *Poultry Sci* 2023; **102**(4): 102527.

Neijat M, Casey-Trott TM, Robinson S, Widowski TM, Kiarie E. Effects of rearing and adult laying housing systems on medullary, pneumatic and radius bone attributes in 73-wk old Lohmann LSL lite hens1. *Poultry Sci* 2019; **98**(7): 2840-5.

Project 6 - Egg quality and behaviour of hens of different heritage breeds

Background

Certain heritage breeds are becoming popular with backyard and organic systems. Many heritage breeds are considered 'dual purpose' as they can be used for both egg and meat production. As these breeds have not undergone intensive selection for egg production, egg quality characteristics and hen behaviour vary widely among genotypes. Characterizing egg production, quality, and hen behaviour will assist producers in selecting the best genotype for their farming objectives.

In enriched, conventional cages, four different heritage breeds are available for comparison (White Leghorn, Columbian rock, Rode Island Red, Plymouth Barred Rock); 112 birds/breed.

Objectives and overview

The objective of this project is to conduct a survey of egg quality characteristics (e.g., shell thickness, breaking strength, Hugh unit, yolk colour), behaviour (e.g., hen-hen interactions), and/or stress response (e.g., to different stimuli) of different heritage breeds.

References

NFACC. 2017. Code of Practice for the Care and Handling of Pullets and Laying Hens. Egg Farmers of Canada and the National Farm Animal Care Council Ottawa, Canada

Karcher, D. M., D. R. Jones, Z. Abdo, Y. Zhao, T. A. Shepherd, and H. Xin. 2015. Impact of commercial housing systems and nutrient and energy intake on laying hen performance and egg quality parameters. Poult. Sci. 94: 485-501. doi: 10.3382/ps/peu078

Mwaniki, Z., M. Neijat, and E. Kiarie. 2018. Egg production and quality responses of adding up to 7.5% defatted black soldier fly larvae meal in a corn-soybean meal diet fed to Shaver White Leghorns from wk 19 to 27 of age. Poult Sci 97(8):2829-2835. doi: 10.3382/ps/pey118

Onbasilar, E. E., N. Unal, E. Erdem, A. Kocakaya, and B. Yaranoglu. 2015. Production performance, use of nest box, and external appearance of two strains of laying hens kept in conventional and enriched cages. Poult. Sci. 94: 559-564. doi: 10.3382/ps/pev009

Sosnowka-Czajka, E., E. Herbut, I. Skomorucha, and R. Muchacka. 2011. Welfare levels in heritage breed vs. commercial laying hens in the litter system. Annal. Anim. Sci. 11: 585-595. doi: 10.2478/v10220-011-0010-2

Vits, A., D. Weitzenburger, H. Hamann, and O. Distl. 2005. Production, egg quality, bon strength, claw length, and keel bone deformities of laying hens housed in furnished cages with different group sizes. Poult. Sci. 84: 1511-1519. doi: 10.1093/ps/84.10.1511

Project descriptions and lab protocols are also posted on Course Link

Course Resources

- Lecture notes and additional information pertinent to the course are posted on CourseLink

Campus Resources

If you are concerned about any aspect of your academic program: Make an appointment with a Program Counsellor (https://www.uoguelph.ca/uaic/programcounsellors/) in your degree program. If you are struggling to succeed academically: There are numerous academic resources offered by the Learning Commons (https://www.lib.uoguelph.ca/using-library/spaces/learning-commons/) including, Supported Learning Groups for a variety of courses, workshops related to time management, taking multiple choice exams, and general study skills.

Cost of Textbooks and Learning Resources

Textbook / Learning Resource	Required / Recommended	Cost
N/A		

Library Course Reserve (Ares)

For this course, you will be required to access course reserve materials through the University of Guelph McLaughlin Library. To access these items, select **Ares** on the navbar in CourseLink. Note that you will need your Central Login ID and password in order to access items on reserve.
For further instructions on accessing reserve resources, visit How to Get Course Reserve Materials (https://www.lib.uoguelph.ca/find/course-reserves-ares/).
If at any point during the course you have difficulty accessing reserve materials, please contact the e-Learning Operations and Reserve Services staff at:
Tel: 519-824-4120 ext. 53621 | Email: libres2@uoguelph.ca | Location: McLaughlin Library, First Floor, University of Guelph

Course Learning Outcomes

1. Be familiar with issues of animal care and safety in the laboratory.
2. Be familiar with the development of hypotheses and the design of experiments.
3. Be exposed to laboratory techniques used in different areas of animal biology research.
4. Develop skills for observing and measuring animals; behavioural and endocrine responses to the physical, social or nutritional environment.
5. Be able to organize your group time to perform experiments, collect and analyse data.
6. Critically evaluate and interpret your results to integrate various measures of response in order to deepen understanding of biological function.
7. Write a scientific paper and present your results to the class.

Communicating with Your Instructor

During the course, your instructor will interact with you on various course matters on the course website using the following ways of communication:

- **Announcements:** The instructor will use **Announcements** on the Course Home page to provide you with course reminders and updates. Please check this section frequently for course updates from your instructor.
- **Questions**: All questions should be directed to the TA first for resolution. If necessary, it will be escalated to the instructor.
- **Email:** If you have a conflict that prevents you from completing course requirements, or have a question concerning a personal matter, you can send your instructor a private message by email. The instructor will attempt to respond to your email within 24 hours.

Statement on Inclusive Verbiage
This class is founded on an environment of mutual respect. All students are encouraged to share, engage in discussion, and learn from one another. Respect will be a requirement for participation in this course. In line with respecting others, we will use the names and pronouns that members of this class ask for us to use in reference to them. Please share with the instructors and/or the class (as you feel comfortable) the name(s) and pronouns you would like for us to use for you, if they ever differ from information available to us on CourseLink.

Schedule of Topics and Assignments

Week of	Topic	Activities	Due
1/6	Introduction to the course and presentation of projects	Organize groups, choose topic and discuss/ plan the literature review	
1/13	Guest lecture on Behaviour data collection techniques	Develop hypotheses and work schedule	
1/20	Presentation of research protocols	Set up experiments	
1/27	Animal Care (Dr. Anna Bolinder) Farm and Lab Safety (Christi Cooper, EHS)	Data and sample collection	
2/3		Data and sample collection	
2/10	Groups present status reports	Data and sample collection	
2/17		Winter Break	

2/24	Hormone assay validation	Hormone assays
3/3	Groups present status reports	Hormone assays
3/10	Guest lecture, Dr Lisa Hodgins, Manager of Poultry Nutrition, New Life Mills	Hormone assays complete/data analysis
3/17	Discussion of data analysis and report preparation	Data analysis and organization of results
3/24	Draft report for comments	
3/31	lab report due and presentation of projects	

Labs

PLEASE NOTE THIS SCHEDULE IS BY WEEK- CLASS IS ALWAYS ON THE TUESDAY BUT YOU MUST SCHEDULE ADDITIONAL TIME TO COMPLETE LAB WORK.

The class will be divided into groups, with each group conducting a different project at either Arkell Poultry Station (Arkell) or the Ontario Swine Research Station (Elora). Students will focus on measuring performance, behaviour and endocrine changes in the animals.

The potential projects are:

Project 1a/b - Behaviour and Physiology of Sows and/or Piglets in Different Farrowing Environments

Project 2: Utilizing a palatability enhancer in lactating sows to increase milk production and piglet growth

Project 3: Effect of variation on pig body weight at weaning

Project 4- Effect of stocking density on growing pig performance

Project 5 – Nutritional strategies for supporting persistency in egg production and liveability in laying hens

Project 6 Egg quality and behaviour of hens of different heritage breeds

Each group of students will conduct one experiment and individuals within each group will receive training and be assigned responsibility for animal handling, sample collection and hormone analysis. Sample and data collection and analytical procedures will be conducted both during and outside of scheduled lab time as arranged by the groups. Each group member is expected to do their fair share of the work and to participate in group meetings. Evaluations of all individual group members will be conducted at the end of the course. Technical assistance will be provided as needed. Schedules vary with experiment but all animal measurements and sampling will be completed by early March.

All groups will provide updates on their progress using a slide presentation at set times during the semester.

Each member of the group will receive a complete data set for their experiment and will write an individual lab report in the format of a journal paper (*Journal of Animal Science*). **Please refer to links under "Writing Up your Report" posted on CourseLink for instructions, format and help guides.**

Each group will present their experimental results in the last week of the semester. The format of the presentation may be similar to that of the lab report.

Assessment Breakdown

Description	Weighting (%)	Due Date
Literature review	15%	Jan 21
Presentation of research protocol	10%	Jan 21
Presentation of final results	25%	Apr 1
Lab report - Journal format	40%	Apr 4
Participation and contribution to group work	10%	

Assessment Details

Project

Literature Review **15%**

Development of Hypotheses and Experimental Design.
Assignment details given in lecture and available on CourseLink

Course Learning Outcomes Assessed: 2, 3, 4, 5

Presentation of Research Protocol **10%**
Course Learning Outcomes Assessed: 2, 3, 4, 5, 6

Presentation of final results **25%**
Course Learning Outcomes Assessed: 4, 5, 6, 7

Laboratory Report - Journal Format **40%**
Course Learning Outcomes Assessed: 4, 5, 7

Participation

Participation and contribution to group work **10%**
Course Learning Outcomes Assessed: 6

Last Day to Drop Course

The final day to drop Winter 2025 courses without academic penalty is the last day of classes: April 04

After this date, a mark will be recorded, whether course work is completed or not (a zero is assigned for missed tests/assignments). This mark will show on the student's transcript and will be calculated into their average.

If you drop the course, please let your group members know so they can adjust their schedules.

Course Grading Policies

Grading Policies

Assignments should be submitted via dropbox by 4:30 p.m. on the due date. Late penalties of 2 % per day will be assessed for late submissions.

Course Policy on Group Work

All groups will determine and agree to expectations for themselves and their fellow group members using a contract with terms given below. At the end of the semester, group members will provide a review of themselves and their fellow group members regarding compliance with the expectations and contract. 10% of the course mark will reflect each student's participation and contribution to the group.

Each group should complete this Group Contract

List Group members:

Expectations (grade) for major project:

Five Processes for Effective Teams:

1. How will we make decisions? (e.g. consensus, leader dictates)
2. How do we make sure that everyone gets a chance to discuss or raise concerns?
3. How will we handle differences amongst us?
4. How will we ensure the completion of our work?
5. How will we change things that are not producing results?

Signatures:

Note: Instructors and TAs are not notified when a student drops the course. If you intend to drop the course, please notify your group members so they can adjust the distribution of work accordingly.

Dropbox Submissions

Assignments should be submitted electronically via the online **Dropbox** tool. When submitting your assignments using the **Dropbox** tool, do not leave the page until your assignment has successfully uploaded. To verify that your submission was complete, you can view the submission history immediately after the upload to see which files uploaded successfully. The system will also email you a receipt. Save this email receipt as proof of submission.

Be sure to keep a back-up copy of all of your assignments in the event that they are lost in transition. In order to avoid any last-minute computer problems, your instructor strongly recommend you save your assignments to a cloud-based file storage (e.g., OneDrive), or send to your email account, so that should something happen to your computer, the assignment could still be submitted on time or re-submitted.

It is your responsibility to submit your assignments on time as specified on the Schedule. Be sure to check the technical requirements and make sure you have the proper computer, that you have a supported browser, and that you have reliable Internet access. Remember that **technical difficulty is not an excuse not to turn in your assignment on time.** Don't wait until the last minute as you may get behind in your work.

If, for some reason, you have a technical difficulty when submitting your assignment electronically, please contact your instructor or CourseLink Support.

http://spaces.uoguelph.ca/ed/contact-us/

Statement on the use of AI

Students' work must reflect their unique intellectual capacity and demonstrate the application of critical thinking and problem solving. Therefore, the use of AI (e.g., Chat GPT) to complete any form of assessment is **not permitted** in this course. Submission of materials completed by AI constitutes an offence under the University's academic misconduct policies, either as a form of plagiarism or the use of unauthorized aids.

Standard Statements for Undergraduate Courses

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.

The Academic Misconduct Policy (https://calendar.uoguelph.ca/undergraduate-calendar/undergraduate-degree-regulations-procedures/academic-misconduct/) is outlined in the Undergraduate Calendar.

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 make a booking at least 10 days in advance, and no later than the first business day in November, March or July as appropriate for the semester. Similarly, new or changed accommodations for online quizzes, tests and exams must be approved at least a week ahead of time. For students at the Guelph campus, information can be found on the SAS website. (https://www.uoguelph.ca/sas/)

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 Academic calendar for information on regulations and procedures for Academic Accommodations of Religious Obligations (https://calendar.uoguelph.ca/undergraduate-calendar/undergraduate-degree-regulations-procedures/academic-accommodation-religious-obligations/).

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.

Drop Date

Students will have until the last day of classes to drop courses without academic penalty. The deadline to drop two-semester courses will be the last day of classes in the second semester. This applies to all undergraduate students except for Doctor of Veterinary Medicine and Associate Diploma in Veterinary Technology (conventional and alternative delivery) students. The regulations and procedures for course registration are available in the Undergraduate Calendar - Dropping Courses (https://calendar.uoguelph.ca/undergraduate-calendar/undergraduate-degree-regulations-procedures/dropping-courses/).

Email Communication

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

Health and Wellbeing

The University of Guelph provides a wide range of health and wellbeing services at the Vaccarino Centre for Student Wellness (https://wellness.uoguelph.ca/). If you are concerned about your mental health and not sure where to start, connect with a Student Wellness Navigator (https://wellness.uoguelph.ca/navigators/) who can help develop a plan to manage and support your mental health or check out our mental wellbeing resources (https://wellness.uoguelph.ca/shine-this-year/). The Student Wellness team are here to help and welcome the opportunity to connect with you.

Illness

Medical notes will not normally be required for singular instances of academic consideration, although students may be required to provide supporting documentation for multiple missed assessments or when involving a large part of a course (e.g., final exam or major assignment).

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.

Resources

The Academic Calendars (http://www.uoguelph.ca/registrar/calendars/?index) are the source of information about the University of Guelph's procedures, policies and regulations which apply to undergraduate, graduate and diploma programs.

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. See the Undergraduate Calendar for information on regulations and procedures for Academic Consideration. (https://calendar.uoguelph.ca/undergraduate-calendar/undergraduate-degree-regulations-procedures/academic-consideration-appeals-petitions/)