



FACULTY OF AGRICULTURE

DEPARTMENT OF ANIMAL SCIENCE

UNDERGRADUATE PROGRAM

MODULE HANDBOOK

Module designation	Livestock Environmental Science
Semester(s) in which the module is taught	5 rd Semester
Person responsible for the module	Ir. Asril, M.Rur.Sc
Language	Indonesian, English
Relation to curriculum	Elective module for area of interest in Animal Praduction
Teaching methods	Lectures, audiovisual aids, discussions and Q&A sessions, and group assignments.
Workload (incl. contact hours, self-study hours)	<ul style="list-style-type: none"> ✓ 100 minutes lecture and discussion per week ✓ 120 minutes structured tasks per week ✓ 120 minutes learn to be independent per week
Credit points	2 SKS = 3.2 ECTS
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	<ul style="list-style-type: none"> ✓ Students understand the importance of knowing the influence of the environment on livestock, the relationship between environmental elements and livestock. ✓ Students are able to explain the mechanisms of adaptation and response of livestock to tropical climates, temperature zones and their relationship to the balance of livestock body temperature, the effect of hot temperatures on grazing behavior, feed intake, water consumption, growth, and reproduction in ruminant livestock. ✓ Students are able to analyze the effect of climate on feed intake in poultry, the effect of climate on reproduction in poultry, how good poultry housing management is in anticipating tropical climates. ✓ Students are able to apply the effect of climate on feeding behavior of dairy livestock, the effect of climate on the reproductive characteristics of dairy livestock and how climate affects the characteristics of milk.

Content	<p>The study of environmental temperature and its effects on livestock is essential for understanding animal physiology and productivity. Students will learn how livestock adapt and respond to changes in environmental temperature, including the mechanisms by which body heat increases or decreases. They will gain knowledge of the temperature zones related to the homeothermic mechanism that enables livestock to maintain a stable internal temperature. The course also explores how climate and temperature influence feed intake, production, and reproductive performance in various species, including beef cattle and poultry. Specific attention is given to the effects of temperature on feed intake and production performance in poultry, as well as its impact on reproductive performance. In dairy cattle, students will understand the relationship between environmental temperature and reproduction, along with its influence on milk characteristics and overall production. This comprehensive understanding enables future livestock managers to implement effective strategies for maintaining animal welfare and optimizing productivity in varying climatic conditions.</p>
Exams and assessment formats	Practice, work, independent study, quizzes, and Q&A sessions
Study and examination requirements	<ul style="list-style-type: none"> ✓ Participatory Activities (Attitude and Discussion): 20% ✓ Project Results (Posters, Reports and Presentations): 30% ✓ Cognitive/Knowledge: <ul style="list-style-type: none"> Homework/Assignments: 5% Quiz: 5% Exam 1 (From 2nd Lecturer): 20% Exam 2 (From 3rd Lecturer): 20%

Reading list	<ol style="list-style-type: none"> 1. Giannone, C., Cascone, G., Caggia, C., & Giuffrida, A. (2023). Review of the heat stress-induced responses in dairy cattle. <i>Animals</i>, 13(22), 3451. https://doi.org/10.3390/ani13223451 2. Habimana, V., Ntawubizi, M., Habiwaremye, E., & Sserunkuma, R. (2023). Heat stress effects on milk yield traits and metabolites and its economic impact in dairy cattle: A review. <i>Frontiers in Veterinary Science</i>, 10, 1121499. https://doi.org/10.3389/fvets.2023.1121499 3. Kim, H. R., Kim, S. H., & Kim, B. (2024). Effects of heat stress on the laying performance, egg quality, physiological responses, and blood profile of laying hens under different THI levels. <i>Animals</i>, 14(7), 1076. https://doi.org/10.3390/ani14071076 4. Lemal, P., Brym, P., Strabel, T., & Szyda, J. (2023). Invited review: From heat stress to disease—Immune response and health consequences in dairy cattle. <i>Journal of Dairy Science</i>, 106(x), xxx–xxx. https://doi.org/10.3168/jds.2023-23545 5. Nam, I. S., Choi, M. J., Na, J. C., & Choi, Y. H. (2024). Effect of the temperature–humidity index on the productivity of dairy cows and the correlation between the index and rumen temperature using a rumen sensor. <i>Animals</i>, 14(19), 2848. https://doi.org/10.3390/ani14192848
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