



S.1.3. Demonstration of skills in applying different strategies in the actual work setting.

**Master of Science in
Animal Science**

S.1. The curriculum provides for the development of the following professional competencies;

- **MS Animal Science New Curriculum**

UNIVERSITY OF SOUTHERN MINDANAO
Kabacan, Cotabato

MASTER OF SCIENCE IN ANIMAL SCIENCE
Curriculum E conformed with CMO No. 15 s. 2019
Effective SY _____

Course No.		Descriptive Title	Lec	Lab	Units
A. CORE COURSES					
MCAGri	01	Methods of Agricultural Research	2	3	3
MFAS	02	Animal Nutrition	2	3	3
MFAS	03	Animal Breeding and Physiology	2	3	3
MFAS	04	Animal Production	2	3	3

***Students will select 2 Animal Science core courses in Courses in addition to MCAGri 601**
Major Courses

1. Animal Breeding and Physiology					
MMAS	01	Advanced Animal Breeding	2	3	3
MMAS	02	Advanced Animal Reproductive Physiology	2	3	3
MMAS	03	Animal Endocrinology	2	3	3
MMAS	04	Methods in Animal Climatology and Behavior	2	3	3
2. Animal Nutrition					
MMAS	05	Advanced Ruminant Nutrition	2	3	3
MMAS	06	Advanced Monogastric Nutrition	2	3	3
MMAS	07	Recent Advances in Animal Nutrition	2	3	3
MMAS	08	Applied Animal Nutrition	2	3	3
3. Animal Production and Management					
MMAS	09	Advanced Poultry Production and Management	2	3	3
MMAS	10	Advance Swine Production and Management	2	3	3
MMAS	11	Advanced Large Ruminant Production and Management	2	3	3
MMAS	12	Advanced Small Ruminant Production and Management	2	3	3
MMAS	12	Advanced Dairy Production and Management	2	3	3

B. Allied Major Courses					
MMAS	14	Advanced Feedlot Production and Management	2	3	3
MMAS	15	Advanced Pasture, Fodder Crop Production, Management and Utilization	2	3	3

C. Electives					
MEAS	01	Animal Waste Management and Utilization	2	3	3
MEAS	02	Animal Diseases and Parasitology	2	3	3
MEAS	03	Meat Selection and Grading	2	3	3

*** Students need to take all the major courses he/she selected. Moreover, if the student needs one subject to complete the required units of major courses the student may take it from the other allied major courses.**

D. Special Topics					
MSPAS	01	Special Topics	3	0	3
E. Master's Thesis					
MTAS	01	Thesis Writing 1			3
MTAS	02	Thesis Writing 2			3

SUMMARY*

A. Core/Foundation Courses	6 units
B. Major Courses	15 units
C. Elective Courses	6 units
D. Special Topics	3 units
E. Comprehensive Exam	---
F. Master's Thesis	6 units
Total	36 units

*** Other requirements for graduation**

- Publication in a refereed journal or juried creative work

- MS Animal Science Old Curriculum

AS601	Methods of Agricultural Research
AS602	Animal Nutrition – Composition, functions and metabolism of various nutrients, nutritive requirements for maintenance, growth, reproduction, lactation and other body functions of farm animals.
AS603	Animal Breeding – Genetics and statistical bases of animal improvement; topics in reproduction, breeding systems and selection, breeding plans for maximum rate of improvement.
AS604	Animal Physiology – General animal physiology with emphasis in circulation, respiration, digestion, metabolism, renal function, endocrinology and nervous system.
AS605	Animal Climatology – The mechanics of thermo-regulation and animal adaptations, thermal stress; the problems associated with the improvement of livestock production in tropical climate.
AS 606	Advance Animal Breeding – Population genetics, estimation and interpretation of genetic parameters in experimental population, selection I Index theory and application, breeding plans for maximum rate of improvement.
AS 607	Artificial Breeding of Farm Animals – Techniques in the artificial breeding of farm animals.
AS 608	Animal Reproductive Physiology – Comparative physiology of reproduction in higher forms of animals; factors involved in fertility; genetic and environmental variations in fertility mechanics.
AS 609	Animal Endocrinology – Anatomy and functional interrelationships of the endocrine glands on vertebrates.
AS 610	Animal Behavior – Deals with domestic animal behavior; its causes and implications for animal care and management.
AS 611	Advanced Ruminant Nutrition
AS 612	Advanced Monogastric Nutrition
AS 613	Recent Techniques in Animal Nutrition
AS 614	Applied Animal Nutrition – Deals with the more applied aspects of feeding and nutrition of ruminant and non-ruminant animals; includes the feedstuffs used by the different species of animals; methods of preparation, processing, formulation and feeding of animals.
AS 615	Advanced Poultry Production and Management – Modern practices and new concepts in commercial swine production.
AS 616	Advanced Swine Production and Management – Modern practices and new concepts in commercial swine production.
AS 617	Advanced Large Ruminant Production and Management – Recent advances in feeding, breeding, classification and other management practices in beef and carabeef production.
AS 618	Advanced Small Ruminant Production and Management – Commercial production of livestock with emphasis on goat (dairy/chevon) and sheep; feeding and management practices on the range and in confinement.
AS 619	Advanced Dairy Production and Management – Recent advances in feedlot operation, feeding and management, marketing of feeder and slaughter stocks.
AS 620	Advanced Feedlot Production and Management – Recent advances in feedlot operation, feeding and management, marketing of feeder and slaughter stocks.
AS 621	Pasture, Fodder Crop Production and Management – Basic principles and practices in the production and utilization of pasture and fodder crops, including natural grasslands, and conservation of forage crops.
AS 622	Advanced Pasture, Food Crop Utilization – Advances in pasture management, nutritional value of forage crops. Classification of pasture grasses and legumes; qualities of forage crops and utilization.
AS 623	Meat Selection and Grading – Advanced techniques in slaughtering and dressing livestock and poultry; meat selection, grading, abattoir management, meat refrigeration, hygienic practices and quality control.
AS 624	Animal Diseases – Advances in the diagnosis, prevention and control of common bacterial, viral, mycotic and metabolic diseases with emphasis in the recognized and emerging diseases of livestock and poultry.
AS 625	Animal Parasitology – Biology and control of parasite commonly affecting farm animals in the Philippines.
AS 690a	Special Problem in Animal Science
AS 690b	Special Topics in Animal Science
AS 699	Graduate Seminar – Recent advances in livestock and poultry production. Breakthrough in animal research related to breeding, nutrition, animal health, processing and handling animal products, thesis outlines and manuscript reporting.
AS 700	Master's Thesis



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2. Animal Nutrition

MMAS	05	Advanced Ruminant Nutrition	2	3	3
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D. Special Topics

MSPAS	01	Special Topics	3	0	3
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E. Master's Thesis

MTAS	01	Thesis Writing 1			3
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S.1.3. Demonstration of skills in applying different strategies in the actual work setting.

- Sample of curriculum in Advanced Poultry Production and Management course. The demonstration of skills are highlighted.



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CO URSE LEARNING PLAN								
Intended Learning Outcomes (ILO) <i>By the end of the learning experience*, students must be able to:</i>	Aligned to CO:	Time Frame (Week)	Course Content (Topics)	Teaching & Learning Activities (TLA)		Learning Materials	Assessment Tasks (AT)	Suggested Readings
				Teaching Activities	Learning Activities			
1.1 Explain ruminant digestive physiology, differentiate it from monogastric digestion, and evaluate the role of ruminants in global food security and sustainability.	CO1	1-2	Introduction to Advanced Ruminant Nutrition - Overview of ruminant digestive physiology - Differences in digestion between monogastric and ruminant animals - Role of ruminants in global food security and sustainability	Blended Learning	Self-Assessment Understanding the report Post test	Module Open educational resources	Written Examination	[1]
2.1 Analyze rumen microbial populations, explain fermentation pathways of carbohydrates, proteins, and lipids, and evaluate strategies to manipulate the rumen microbiome for improved production efficiency.	CO1	3-4	Rumen Microbiology and Fermentation - Rumen microbial ecosystem: bacteria, protozoa, fungi, and archaea - Carbohydrate, protein, and lipid fermentation pathways - Volatile fatty acid (VFA) production and absorption	Blended Learning	Self-Assessment Understanding the module Post test	Module Open educational resources	Written Examination	[1]

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				Teaching Activities	Learning Activities			
			Manipulating the rumen microbiome for improved efficiency					
3.1 Explain nutrient digestion and metabolism in ruminants, including energy and protein utilization, the role of vitamins and minerals, and nutrient partitioning during lactation, growth, and reproduction.	CO1	5-6	Nutrient Digestion and Metabolism - Energy metabolism: glucose, VFAs, and fat utilization - Protein metabolism: microbial protein synthesis, bypass protein, and amino acid balancing - Role of vitamins and minerals in metabolism - Nutrient partitioning during lactation, growth, and reproduction	Blended Learning	Perform any of the following activities: Familiarization of the various parts/make a critical paper or assessment of the technology	Module Laboratory Manual Open educational resources	Summative Exam Written Report Actual Product	[1,2,3]



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				Teaching Activities	Learning Activities			
4.1 Evaluate feedstuffs based on nutritional composition, interpret feed analysis methods, and formulate balanced rations using different application models	CO ₂	7-8	Feedstuff Evaluation and Ration Balancing - Nutritional composition of forages, concentrates, and byproducts - Methods of feed analysis: NIRS, proximate analysis, digestibility trials - Ration balancing using CNCPS, AMTS, and NRC models	Simulation-Based Learning	following activities: Familiarization of the various parts/make a critical paper or assessment of the technology	Module Laboratory Manual Open educational resources	Summative Exam Written Report Actual Product	[1, 2, 3]
All ILOs covered in Midterm		9	MIDTERM EXAMINATION					
5.1 Determine species-specific nutrient requirements, apply advanced feed formulation tools, and evaluate precision feeding strategies and feed additives for	CO ₃	9-10	Precision Feeding and Nutritional Strategies - Nutrient requirements for dairy cattle, beef cattle, sheep, and goats - Advanced feed formulation	Simulation-Based Learning	Perform any of the following activities: Familiarization of the various parts/make a critical paper or assessment	Module Laboratory Manual Open educational resources	Summative Exam Written Report Actual Product	[1, 2, 3]

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CO URSE LEARNING PLAN								
Intended Learning Outcomes (ILO) <i>By the end of the learning experience*, students must be able to:</i>	Aligned to CO:	Time Frame (Week)	Course Content (Topics)	Teaching & Learning Activities (TLA)		Learning Materials	Assessment Tasks (AT)	Suggested Readings
				Teaching Activities	Learning Activities			
improved ruminant productivity.			software and its applications • Use of feed additives: enzymes, probiotics, prebiotics, and essential oils • Precision feeding systems (automated feeding, sensors, real-time monitoring)		of the technology			
7.4 Evaluate sustainable ruminant nutrition strategies, including methane mitigation, low-carbon diets, nutrient management, and the use of agricultural byproducts in circular systems.	CO ₄	11-12	Environmental and Sustainable Ruminant Nutrition • Methane mitigation strategies (diet manipulation, feed additives, precision feeding) • Low-carbon footprint diets and alternative protein sources	Simulation-Based Learning		Module Laboratory Manual	Summative Exam Written Report Actual Product	[2,3]

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CO COURSE LEARNING PLAN								
Intended Learning Outcomes (ILO) <i>By the end of the learning experience*, students must be able to:</i>	Aligned to CO:	Time Frame (Week)	Course Content (Topics)	Teaching & Learning Activities (TLA)		Learning Materials	Assessment Tasks (AT)	Suggested Readings
				Teaching Activities	Learning Activities			
			- Nutrient management and strategies to reduce nitrogen and phosphorus excretion - Circular agriculture: utilization of agricultural byproducts in ruminant nutrition					
8.1 Analyze current trends in advanced ruminant nutrition, including nutrigenomics, alternative feed resources, and smart farming technologies for improved efficiency and sustainability.	CO5	13-15	Current Trends in Advanced Ruminant Nutrition 1. Nutrigenomics and Rumen Microbiome Research - Role of nutrigenomics in improving feed efficiency and productivity - Advances in rumen microbiome	Blended Learning	Perform any of the following activities: Field trial (STR)/review paper	Module Laboratory Manual Open educational resources	Portfolio Evaluation	[4,3]



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Course Number	AS 617	Course Title	Advanced Large Ruminant Production and Management	Rev. No.	Page 1 of 1

COURSE LEARNING PLAN								
Intended Learning Outcomes (ILO) <i>By the end of the learning experience*, students must be able to:</i>	Aligned to CO:	Time Frame (Week)	Course Content (Topics)	Teaching & Learning Activities (TLA)		Learning Materials	Assessment Tasks (AT)	Suggested Readings
				Teaching Activities	Learning Activities			
1.1 Evaluate the status of the large ruminant industry in the Philippines. 1.2 Differentiate the large ruminant industry in the national and international arena 1.3 Discuss basic and advanced practices and technologies in large ruminant production and management	CO1	1-4	I. Introduction and Status of Large Ruminant Industry II. Large Ruminant Industry in the Philippines and Globally III. Basic and advanced practices and technologies in large ruminant production and management	Online-Offline Lecture with discussion	Online Research Book Reading Group Discussion Oral Presentation	Online Educational Resources Books in Small Ruminant Production	Oral Presentation Written Report	[1] [2][3]
2.1 Conceptualize a short term research in large ruminant production and management 2.2 Set up short term research (STR) 2.3 Conduct STR 2.4 Analyze data gathered 2.5 Interpret data analyzed 2.6 Discuss results of the study 2.7 Oral presentation of the results of the study 2.8 Produce a research paper	CO2	10-14	IV. Guidelines In Conducting Research in Advanced Large Ruminant Production and Management 1. Good Animal Husbandry Practices (GAHP) in Large Ruminant Production 2. Animal Welfare Act (RA 8435) 3. Guidelines in Conducting Researches in Large Ruminant Production and Management	Online-Offline Lecture with discussion	Reading of USM Research Manual Scientific Journal Reading Writing the Short term Research Oral Presentation	Online Educational Resources USM Research and Development Guide Book 2025	Oral Presentation Short term research (hard and e-copy)	[1] [2][3]



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