



**Bahir Dar University**  
**College of Agriculture and Environmental Sciences**  
**Department of Animal Production and Technology**

**Master of Science in Animal Production**

**January, 2008**

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## **Background**

Ethiopia has an agriculture-based economy from which close to 85% of the population derive their livelihood. However, the Country has not attained food self-sufficiency despite having the highest number of cattle on the African Continent. The Country is also blessed with various species of livestock whose productivity are regarded as low.

The Amhara region in which Bahir Dar University is situated has one of the largest animal population. Livestock production, however, is done with only traditional practices and is impeded with many constraints.

To maximise the productivity of the livestock, the country needs trained Manpower which is currently in short. Bahir Dar University there fore intends to do its part in reducing the critical shortage of manpower by introducing the Master of Science Degree in Animal Production. The graduates of this program would be absorbed in the general agricultural economy of the country, improve the research capacity of the university and aid the staff development program of institutions

## **2. Rationale**

After a rigorous review of MSc in Animal Production Programs offered by local, Other African and overseas Universities, this MSc animal Production program has been produced for Bahir Dar University. The curriculum has been tailored to suit the particular circumstances and expectations of the stakeholders of Bahir Dar University in the context of its critical importance in the Amhara region. The curriculum is highly purposive, research supported, practice oriented and relevant to the developmental needs of the country in general and the Amhara region in particular.

The areas of specialization would include animal nutrition (covering all farm animal species), animal breeding and reproduction and general animal production focused on smallholder agriculture. The topics to be chosen by the students will be related to their own interest, regional and national agenda but the academic supervisor(s) would be consulted throughout the study to ensure the required quality is attained.

### 3 Programme Objectives

The main objective of the program is to produce qualified and competent professionals well versed in livestock management skills so that they can ply crucial roles in developing livestock development options and research projects and strategies aimed at solving problems associated with animal products and productivity thereby to improve the living standard of the rural population.

### 4. Staff Profile

S. No	Name	Rank	Qualification	Area of Research
1	Zelege Mekuriaw	Ass. professor	BSc MSc PhD	Animal Science Animal Production Reproductive Physiology
2	Mussie Hailemekot	Ass. professor	DVM MSc	Veterinary Medicine Tropical Vet. Medicine
3	Firew Tegegne	Ass. Professor	BSc MSc PhD	Applied Biology World Animal Production Animal Nutrition
4	Raubel Moya Ricardo	Ass. Professor	BSc MSc	Animal Nutrition
5	Yshanbel Mekuriaw	Lecturer	BSc MSc	Animal Science Animal Production
6	Kefyalew Alemayehu	Lecturer	Msc	Animal Nutrition

### 5 Graduate Profile

Equipped with the necessary knowledge and skills, the graduates of this program will be able to work as livestock producers, experts, researchers and consultants for various regional and national governmental and nongovernmental institutions and private industries involved in the livestock industry. They are also expected to work in Colleges, Universities and/or agriculture curriculum development centers.

## 6. Academic requirements

### 6.1 Admission requirements

Applicants must have completed the academic requirements for the Bachelor's degree in Animal Science, Biology or other related sciences from accredited higher learning institutions.

The candidate must pass qualifying (entrance) examination of the University. The candidate must be supported by at least three letters of recommendation preferably from the candidate under graduate instructors, employers and professional associations.

Non-animal science majors admitted to the programme may be required to take some prerequisite courses from the undergraduate program. These courses will be worked out by the department Graduate committee and approved by the graduate faculty based on the BSc. Credentials of the student

### 6.2 Duration of the study

The MSc program is a **two-year** program for regular students and a **Four-year** program for summer students. Regular and summer students will have one year (**2 semesters**) and three years (**3 summers**), respectively, taught course and one year for a research project in a specific area of specialization.

### 6.3 Assignment of course codes

The course is coded with four letters. The four letter abbreviation shows the department, the first number shows the year of the study, the second letter shows the course type and the third number shows the semester. The assignment of the numbers to represent course type as follows:

0 = Advance Animal Nutrition and Advanced Forage Production and Range Management

1= Advanced Animal Physiology, Advanced Biochemistry and farm Animal Diseases and Management

2 =Advanced Biometrics Advanced Animal Breeding,

3 = Advanced Meat Production, Advanced Processing of Animal Products and

Advanced Apiculture, Advanced Dairy Production.

4 = Current Topics in Animal Production, Seminar in Animal Production and Thesis.

The even number at the end of the course code shows second semester course and the odd number denotes course that are offered in the first semester.

#### **6.4 Assessment and evaluation**

Graduate student progress is assessed regularly and formally by the faculty through assigned department supervisors. The assessments focus on both completion of coursework and the development of professional skills in research, scientific writing and service through the following methods:

- Coursework
  1. Assignments
  2. Tests
  3. Quizzes
  4. Mid-semester examination
  5. Final semester examination
  6. Seminars
- Practical courses
  1. Laboratory reports/field reports
  2. Practical examination
  3. Written examination
- Thesis, seminars and reports presentation
  1. Quality of paper presented
  2. Way of presentation
  3. Defending material presented

#### **6.5 Graduation Requirements**

The Master of Science degree program in Animal Production has a course work requirement of at least 31 credits and six credits of research work on which a Thesis must be written and defended successfully. The students must score a minimum CGPA of 3.00 and successfully defend the Thesis.

#### 6.4 Degree Nomenclature

The degree conferred on successful candidates will be called in English: THE DEGREE OF MASTER OF SCIENCE IN AGRICULTURE (ANIMAL PRODUCTION); in Amharic: "ፖላክቲሮስ ትሬ ሰግብርና ሣይንስ (ሰንሰሳት ክርባታ)".

#### 7. List of Course

Course code	Course Title	Credit Hours
Anst 601	Advanced Animal Nutrition	3
Anst 603	Advanced forage Production & Range Management	3
Anst 611	Advanced Animal Physiology	3
Anst 613	Advanced Biochemistry	3
Anst 615	Farm Animal Diseases and Management (E)	3
Anst 621	Advanced Biometrics	3
Anst 622	Advanced Animal Breeding	3
Anst 632	Advanced Processing of Animal Products	2
Anst 634	Advanced Apiculture (E)	2
Anst 636	Advanced Meat Production	2
Anst 638	Advanced Dairy Production	3
Anst 640	Current Topics in Animal Production	1
Anst 741	Seminarr in Animal Production	1
Anst 763	Thesis	6
<b>Total</b>		<b>33 (38)</b>

## 8. Course Breakdown

### 8.2 Regular Program

#### Year I; Semester I

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<b>Course Code</b>	<b>Course Title</b>	<b>Credit Hours</b>
Anst 601	Advanced Animal Nutrition	3
Anst 603	Advanced forage Production & Range Management	3
Anst 611	Advanced Animal Physiology	3
Anst 613	Advanced Biochemistry	3
Anst 615	Farm Animal Diseases and Management (E)	3
Plsc 621	Advanced Biometrics	3
<b>Total</b>		<b>15 (18)</b>

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#### Year I; Semester II

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<b>Course Code</b>	<b>Course Title</b>	<b>Credit Hours</b>
Anst 622	Advanced Animal Breeding	3
Anst 632	Advanced Processing of Animal Product	3
Anst 634	Advanced Apiculture (E)	3
Anst 636	Advanced Meat Production	3
Anst 638	Advanced Dairy Production	3
Anst 640	Current Topics in Animal Production	1
<b>Total</b>		<b>13 (15)</b>

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## Year II; Semester I

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Course Code	Course Title	Credit Hours
Anst 741	Seminar in Animal Production	1
Anst 743	Thesis	6

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## Year II; Semester II

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Course Code	Course Title	Credit Hours
Anst 743	Thesis	6

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## 8.3 Summer Program

### Summer I

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Course Code	Course Title	Credit Hours
Anst 613	Advanced Biochemistry	3
Anst 615	Farm Animal Diseases and Management (E)	3
Anst 601	Advanced Apiculture (E)	2
Anst 611	Advanced Animal Physiology	3
Anst 621	Advanced Biometrics	3

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**Total** **11(12)**

### Distance I

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Course Code	Course Title	Credit Hours
Anst 603	Advanced Forage Production & Range Management	3

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Anst 632

Advanced Processing of Animal Product

2

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**Total**

**5**

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**Summer II**

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**Course Code**

**Course Title**

**Credit Hours**

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Anst 622

Advanced Animal Breeding

3

Anst 638

Advanced Dairy Production

3

Anst 601

Advanced Animal Nutrition

3

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**Total**

**9**

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**Distance II**

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**Course Code**

**Course Title**

**Credit Hours**

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Anst 636

Advanced Meat Production

2

Anst 640

Current Topics in Animal Production

1

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**Total**

**3**

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**Summer III**

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**Course Code**

**Course Title**

**Credit Hours**

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Anst 741

Seminar in Animal Production

1

Anst 743

Thesis

6

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## **9. Course Descriptions**

**Course title: Advanced Animal Nutrition**

**Course Code: Anst 601**

**Credit Hours: 3(2+1)**

**Course Description:** concept of food chain, Nutritional quality of feed stuff. Methodology for the evaluation of feed resources; Assessment of nutritive value through chemical analysis (the proximate (Weende) analysis method and the detergent (Van Soest) method of analysis); other analytical procedures used in the determination of feed components; estimation of nutritive value from chemical analysis data; degradability tests, digestibility, feeding and production trials; the estimation of digestibility; and the summative system; recent advances in feed analysis and prediction of nutritive value. Refractory and inhibitory substances in livestock feed environment and forage quality. Digestive systems: fermentation; rumen microbiology; biotechnology; kinetics of digestion and metabolism. Nutrient absorption and metabolism, intermediary metabolism; regulation of nutrient utilization for various animal products. Nutrient specification for various functions and least cost ration for various animal products. Nutrient specification for various functions and least cost ration for different classes of livestock. Voluntary intake and its regulation. Feed budgeting estimation and forecasting of requirement; conservation, preservation and storage of feed and fodder. Feed crises mitigation-strategic feeding; the role of unconventional feeds. Biotechnology for enhancement of nutritive value and utilization of feeds and nutrients. The technology of complete feed production.

**Course title: Advanced Forage Production and Range Management**

**Course code: Anst 603**

**Credit hours: 3 (2+1)**

**Course description:** Objectives of forage production and range management ; differences between native and improved grasslands; highland and lowland production systems; the potential and role of forage production; influence of climate on production objectives; foraging theory: relationships between forage quantity, quality and maturity versus animal output: production versus forage utilization: important native and improved forage crops; importance of legumes in pastures; morphological response to grazing or browsing. Management of forage resources: fertilization, over sowing, stocking rates, herd structures, communal and commercial grazing

strategies; principles of Grassland and Range management. Economics of forage production and range management under topical conditions.

**Course title: Advanced Animal Physiology**

**Course code: Anst 611**

**Credit hours: 3**

**Course description:** Physiology of circulatory, digestive, respiratory, urinary, neuromuscular and reproductive systems of important domestic animal. The direct and indirect effects of physical factors on physiological process and productivity of animals. Bioclimatic effect on growth, production and reproduction of livestock. Fluid and electrolyte balance, acid- base balance. Thermoregulation, acclimation and acclimatization to different environmental conditions. Analysis of mechanisms of adaptation to direct and indirect environmental stress of animals.

**Course title: Advanced Biochemistry**

**Course code: Anst 613**

**Credit hours: 3**

**Course description:** Animal cell, ultra structure of the cell, cell memoranda Structure and function of bio-molecules –protein (amino acids), lipids (fatty acids and cutin), carbohydrates, etc; plant secondary metabolites (anti-nutritional factors) ; biochemical reactions; enzymes and enzyme kinetics.

Metabolism (carbohydrate, protein, lipid and minerals), including photosynthesis in C3 and C4 plant and organ specialization. Integration of carbohydrate, protein and lipid metabolism and regulation. Biosynthesis of macromolecules. Rumen metabolism, fate of different nutrients in the rumen. The biochemistry of pregnancy, foetal metabolism and milk synthesis. Regulation of growth during postnatal development. Genetic manipulation of ruminant biochemistry and physiology for improved productivity.

**Course title: Advanced Farm Animal Diseases and Management (E)**

**Course code: Anst 615**

**Credit hours: 3 (2+1)**

**Course description:** General epidemiology chains of disease, the aetiology, source and route of infection, ways and means of disease transmission and ways of exit and impact on the host.

Aetiology, epidemiology, symptoms, diagnosis, prevention and control of external and internal parasite of farm animals with a special focus on ticks, mites, insects, helminthes and protozoa of tropical importance. Infectious diseases farm animals caused by bacteria, virus and rickettsia, zoonotic diseases of public health importance.

Non-infections disease prevention and control. Health management programs in extensive and intensive farming systems; biotechnological advances in diagnosis and prevention of livestock diseases.

**Course title: Advanced Biometrics**

**Course code: Plsc 621**

**Credit hours: 3**

**Course description:** Probability and probability distribution. Sampling and sampling distribution, testing of hypothesis based on Z, t and Chi-square and F distribution. Models and analysis of variance, assumptions of analysis of variance and their tests, alternatives in case of failures of assumptions. Correlation, linear regression and related tests. Rank and intra-class correlation, partial correlation, multiple regression and associated tests. Non linear regression. Principles of field experimentation, C.R.D., R.C.B.D, Split plot, latin square designs, incomplete block designs. Factorial experiment. Confounding and transformation. Different animal models used in analysis of variance. Analysis of non orthogonal animals data, planning of animal experiments. Matrix and generalized inverse of matrices. Regression models, variance component estimation, illustrative examples from animal science experiments.

**Course title: Advanced Animal Breeding**

**Course code: Anst 622**

**Credit hours: 3**

**Course description:** Constraints in livestock breeding in tropics, reproduction, fertility, sterility and their genetic basis. Growth, milks, meat and egg production and their genetic basis. Genetic structure of the population, gene and genotype frequencies, breeding value, phenotypic, genetic and environmental variances. Performance evaluation of indigenous and exotic breeds and their crosses, genetic improvement tools: selection and mating systems, prediction and measurement of genetic gain, selection index theory. Field and modern recording systems for growth, egg, milk, meat production and their application. Native breeds performance, scope and methods of improvement. Introduction of improved exotic breeds-choice of breed, selection

criteria, interpretation of performance records of different countries. Precautions and procedure of importation. Breeding plans for the tropics- Production environment, objective, traits, structure, organization, people's participation and constraints. Village breeding schemes. Group breeding program. Nucleus herd breeding. New breed formation. Hereditary defect. Breeding for disease resistance, heat tolerance and adaptation.

**Course title: Advanced Processing of Animal Production**

**Course code: Anst 632**

**Credit hours: 2 (1+1)**

**Course description:** Scientific principles (including Physical, Chemical and Microbiological) relevant to the processing of products from various animal species including meat, milk, eggs, hides and skin, etc. Basic processing operations. Techniques employed at slaughter, evisceration, dressing, packaging, freezing storage and transport. Marketing of quality products, quality control (emphasis on TQM- Total Quality Management and HACCP- Hazard Analysis critical control point) and maintenance, grading, Standardization, economics of storage and transport. Major spoilage organisms.

**Course title: Advanced Apiculture (E)**

**Course code: Anst 634**

**Credit hours: 2 (1+1)**

**Course description:** Bee biology, bee species and bee foraging; diseases, pests and other enemies of bees. Beekeeping systems and hive types, bee equipment. Beekeeping with wild bees, honey hunting, hives and colony management. Production and processing of hive products: beeswax, pollen, propolis, royal jelly, bee venom (bee stings) and bee broods. The apitherapeutic roles of hive products. Queen rearing, colonies and packages of bees and hiring of bees for pollination.

**Course title: Advanced Meat Production**

**Course code: Anst 636**

**Credit hours: 2**

**Course description:** Diversity of meat sources and consumption; description and evaluation of various meat production systems. Constraints for improvement of meat production in the tropics; improvement through range, feedlot, nutrition, management and breeding of cattle, sheep and

goat. Physical evaluation of slaughter animals. Carcass and meat characteristics and quality evaluation. Meat as a product and factors affecting meat. Live animals, meat and meat product trade and marketing

**Course title: Advanced Dairy Production**

**Course code: Anst 638**

**Credit hours: 3 (2+1)**

**Course description:** Milk production- national and international situation. Role of cattle, camel, Goat and sheep. Milk production systems in the topics. Recent practices of optimizing immunocompetency of young stock, growth rate and puberty. Pre and post parturition practices to maximize reproduction and milk production. Principles of replacement and culling. Housing, equipment and management in warm climates. Modern milking management- milking method, milk quality, hading and marketing. Maintenance of herd health and productivity. Small and large scale commercial dairying- Project proposal, Establishment and expansion. Administration- technical and financial records.

Efficient utilization of land, labour, feed and fodder. Technical and financial evaluation of dairy enterprise.

**Course title: Current Topics in Animal Production**

**Course code: Anst 640**

**Credit hours: 1**

**Course description:** Supervised study on advanced topics of current importance in Animal Production or related topics that are not discussed in the program and which must be approved by the DGC. Students present seminars based on literature review so that they are exposed to the methodology of the preparation and presentation of scientific papers.

**Course title: Seminar in Animal Production**

**Course code: Anst 741**

**Credit hours: 1**

**Course description:**

Progress report on thesis research presented in the form of a seminar.

**Course title: Thesis**

**Course code: Anst 743**

**Credit hours: 6**

**Course description:**

Research conducted by graduate student under the advice of graduate faculty on national and regional priority problem areas in Animal Production to Culminate in M.Sc. Thesis.



**Department: Department of Animal Science & Technology**

**Specialization: Animal Production**

**Summer Program Course break down**

**Summer I.**

<b>Course Code</b>	<b>Course Title</b>	<b>Crhr</b>	<b>Remark</b>
Anst 613	Advanced biochemistry	3	
Anst 611	Advanced Animal Physiology	3	
Anst 621	Advanced Biometrics	3	
Anst 615	Farm Animal Diseases and Management (E)	3	
Anst 634	Advanced Apiculture (E)	2	
Total		11 (12)	

**Distance I.**

<b>Course Code</b>	<b>Course Title</b>	<b>Crhr</b>	<b>Remark</b>
Anst 603	Advanced Forage production and range management	3	
Anst 632	Advanced Processing of Animal Products	2	
Total		5	

**Summer II.**

<b>Course Code</b>	<b>Course Title</b>	<b>Crhr</b>	<b>Remark</b>
Anst 622	Advanced Animal Breeding	3	
Anst 638	Advanced Dairy Production	3	
Anst 601	Advanced Animal Nutrition	3	
Total		9	

**Distance II.**

<b>Course Code</b>	<b>Course Title</b>	<b>Crhr</b>	<b>Remark</b>
Anst 636	Advanced Meat Production	2	
Anst 640	Current topics in Animal Production	1	
Total		3	

**Summer III.**

<b>Course Code</b>	<b>Course Title</b>	<b>Crhr</b>	<b>Remark</b>
Anst 741	Senior Seminar	1	
Anst 743	Thesis	6	