COURSE AGLS6001 [AL60A]
TROPICAL ANIMAL SCIENCE
in
MSc. IN TROPICAL ANIMAL SCIENCE AND PRODUCTION PROGRAM

2012-2013 Academic Year, Semester I

Group e-mail address

Websites:
www12.brinkster.com/ostasp/index.aspx

http://ostasp.rizontt.com/
http://vcnaw.rizontt.com/
http://ejneaw.rizontt.com/

DEPARTMENT OF FOOD PRODUCTION [DFP]
FACULTY OF FOOD and AGRICULTURE [FFA],
THE UNIVERSITY OF THE WEST INDIES [UWI],
ST. AUGUSTINE CAMPUS,
TRINIDAD & TOBAGO, WEST INDIES

By
Prof. Gary Wayne Garcia, Ph.D.
Professor of Livestock Science
and
CO-ORDINATOR THE OPEN TROPICAL FORAGE - ANIMAL PRODUCTION LABORATORY
[OTF-APL]
garygwg1@gmail.com

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<td>ALL WRITTEN REPORTS ARE DUE THE FRIDAY OF THE WEEK IN WHICH THE SEMINAR WAS DONE!!</td>
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UNIT LEARNING OBJECTIVE #2 ........................................................................................................... 30

12/08/2012    Gary Wayne Garcia
Unit Learning Objective #1

BACKGROUND

This course was first offered in September 1995. This is therefore the 18th year or time that this course is being offered. Since 1995 much has changed in the world. These changes have taken place in the following major areas:

1] The World’s Social and Socio-economic context
   - 2001: 9/11 and all its international ramifications [11 years ago]
   - 2007-2012: Global Financial Crisis- the crash of the International Financial Institutions and Wall Street [the last 5 years]
   - the Financial Insolvency of countries of the European Union [Spain, Portugal, Italy, Greece and others]
   - the Financial Instability of the following Economies: the USA, UK, France];
   - Increasing unemployment in these countries
   - The increase in Trade in Grains and the continued increase in World Markey Prices of Grains for direct human use and for animal feed [this is because of increase in purchases of food on the world market by countries with large populations such as China and India];

2] Changes in the International Supply Chain for Food of Plant (grains and animal feed) and Animal Origin;

3] International Crop Failures in the countries which are the major food exporters [Australia, Russia, USA]....this year it is estimated that there would be crop failures in Grain production in the USA and this has already led to increasing grain prices in the futures market...it is expected that the cost of chicken will double between July and December 2012;

4] The beginning of the Production and Use of Grains for Energy Production and the decrease in the supply of Grains for direct Human Consumption and for Animal feeding, in this regard food is being diverted away from humans;
Bioethanol is an alcohol made by fermentation, mostly from carbohydrates produced in sugar or starch crops such as corn or sugarcane. Cellulosic biomass, derived from non-food sources such as trees and grasses, is also being developed as a feedstock for ethanol production. Ethanol can be used as a fuel for vehicles in its pure form, but it is usually used as a gasoline additive to increase octane and improve vehicle emissions. Bioethanol is widely used in the USA and in Brazil. Current plant design does not provide for converting the lignin portion of plant raw materials to fuel components by fermentation.

In the current corn-to-ethanol production model in the United States, considering the total energy consumed by farm equipment, cultivation, planting, fertilizers, pesticides, herbicides, and fungicides made from petroleum, irrigation systems, harvesting, transport of feedstock to processing plants, fermentation, distillation, drying, transport to fuel terminals and retail pumps, and lower ethanol fuel energy content, the net energy content value added and delivered to consumers is very small. And, the net benefit (all things considered) does little to reduce imported oil and fossil fuels required to produce the ethanol.

Although corn-to-ethanol and other food stocks have implications both in terms of world food prices and limited, yet positive, energy yield (in terms of energy delivered to customer/fossil fuels used), the technology has led to the development of cellulosic ethanol. According to a joint research agenda conducted through the U.S. Department of Energy,[7] the fossil energy ratios (FER) for cellulosic ethanol, corn ethanol, and gasoline are 10.3, 1.36, and 0.81, respectively.

http://en.wikipedia.org/wiki/Bioethanol#Bioalcohols

5] The evolution of new approaches at animal Production within the Tropics and Neo-tropics as follows:
- Matching the Animals with the Available Feed Resources [Thomas Reginald Preston http://www.utafoundation.org/P&L/preston&leng.pdf]
- Matching the Available Animals [including Neo-tropical animals] with the Available Feed Resources [Gary Wayne Garcia]
6] The Opening up of Communication and sharing of Scientific Knowledge [SK] and Indigenous Knowledge [IK] and Technologies between and among South-South countries [with Brazil, China, Nigeria and South Africa sharing their IK and SK with Developing Countries];

7] There is the beginning of the awareness of the consciousness among Neotropical and Tropical Animal Scientists that there is and will be the need to move away from the previous North Atlantic and Euro-centric thinking about how we should proceed with Animal Production and Animal Production systems within the Tropical and Neotropical regions of the world and

8] The expanded use and availability of information on the Internet.

In light of the above, the course this year is being given a focus change with very little attention being paid to Animal Health issues. In this regard the following important references will be focused on during this course over this semester:

[i] Harry Archimede and Gary Wayne Garcia [2010]
Infinity Sales and Services and GWG Publications, Trinidad and Tobago, 135 pages [This will be sent to you via email.]

[ii] Lylian Rodriguez [2010]
http://edoc.hu-berlin.de/dissertationen/rodriguez-lylian-2010-10-12/PDF/rodriguez.pdf

[iii] University of Tropical Agriculture Website
http://www.utafoundation.org/

[iv] Livestock Research for Rural Development
http://www.lrrd.org/
I would like you to become familiar with these references. It would be important for you to have a good appreciation of the restructured course this year.

**COURSE DESCRIPTION**

The improvement of output from Tropical Livestock through animal breeding, health, feeding and housing programs integrated into animal production systems and the value added chain [aspects of processing livestock products].

**COURSE OBJECTIVES**

The following are the course objectives:
1. to highlight the Features of the Tropics that dictate the direction for Animal Science and Industry with Tropical Environments;
2. to outline the Features and Components of an Animal Industry;
3. to outline the concept of Animal Science and Tropical Animal Science;
4. to highlight advances in Animal Science with particular reference to the Neo-tropics;
5. to discuss issues of a Tropical Animal Industry and
6. to highlight the possible future directions (in the light of the dynamic world situation) for the animal industries of the tropics.

**LEARNING OBJECTIVES**

1. to understand the elements of the Tropics that impose constraints to animal production and to know strategies that can be used to deal with these constraints;
2. to enumerate and understand the avenues for the improvement of Tropical Animal Science that have been achieved through breeding;
3. [to become familiar with the general areas of improvements made in Tropical Animal Health; not included this year]
4. to become familiar with the different approaches to the feeding of tropical animals using Tropical Feed Resources;
5. to have an appreciation of what environmental management improvements have taken place for increasing the output of Tropical Animals and Animal Products;
6. to be familiar with the role of Wildlife and Neo-tropical Animals to mankind;
7. to be familiar with the implications of some of the international issues governing Livestock Production in the Tropics
8. to be able to describe and explain Livestock Research Priorities for Latin America and the Caribbean and
9. to be able to make three (3) Oral Presentations and to write three (3) Literature or Case Study Reviews.
Course Outline or Lecture Topics

Course Logic:

**INTRODUCTION**
- Animal Science defined
- Structure of an Animal Industry
- Tropics defined
- Animal Production in the Tropics
- The Philosophy of the Open School of Tropical Animal Science and Production


Forage Production in the Caribbean
- Present Status
- Future Challenges

Improvements in Animal Science through Breeding and Genetics

Improvements and Strategies for Small Ruminant Development in the Caribbean and Tropics

Improvements in Tropical Animal Health [not this year]

Improvements in Animal Feeding in the Tropics

Advances in Reproduction

Housing and New Horizons


**ECONOMIC & MARKETING DEVELOPMENTS**
COURSE MODULES AND UNITS:

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<td>Unit 1. Introduction</td>
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<td>Unit 2. Animal Science defined and the Structure of an Animal Industry</td>
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<tr>
<td>Unit 3. The Tropics defined</td>
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<tr>
<td>Unit 4A. Animal Production in the Tropics: - Status - Horizons</td>
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<tr>
<td>Unit 4B. The Philosophy of the Open School of Tropical Animal Science and Production [The St Augustine School of Tropical Animal Science]</td>
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<td>Unit 6. Future Challenges</td>
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<td>Unit 7. Improvements through Breeding and Genetics</td>
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<td>Unit 8. Improvements in Tropical Animal Science through Animal Selection</td>
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<tr>
<th>MODULE #4: IMPROVEMENTS &amp; STRATEGIES FOR SMALL RUMINANT DEVELOPMENT IN THE CARIBBEAN &amp; THE TROPICS</th>
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<td>Unit 10. Approaches to Animal Health care which could be relevant to animal industries in the tropics</td>
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<tr>
<td>Unit 11. Public Health and Animal Industries</td>
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<tr>
<td>Unit 12. Health Risks to Workers in Animal Industries [Not included this year as time does not permit]</td>
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</table>
MODULE #6: IMPROVEMENTS IN TROPICAL ANIMAL FEEDING
Unit 13A. Advances in Animal Nutrition in the Tropics
Unit 13B Sugarcane as an Animal Feed Resource in the Tropics: Revisited

MODULE #7: ADVANCES IN REPRODUCTION
Unit 14. Importance of Reproductive Efficiency for Tropical Farm Animals
Unit 15. AI, Embryo Transfer and Biotechnology

MODULE #8: HOUSING AND NEW HORIZONS
Unit 16. Housing
Unit 17. New Horizons

MODULE #9: ADVANCES IN NEO-TROPICAL ANIMAL [WILDLIFE] MANAGEMENT
Unit 18. Veterinary Regulations for the Domestic and Wildlife Trade
Unit 19. The role and contribution of wildlife to Tropical Animal Production

MODULE #10: ECONOMIC AND MARKETING CONSIDERATIONS FOR THE IMPROVEMENTS OF TROPICAL ANIMAL SCIENCE
Unit 20. Macroeconomic considerations for the expansion of Animal Production in the Caribbean
**SUGGESTED REVIEW PAPERS AND SEMINAR TOPICS**

I would like you to start addressing those topics
- that would be useful for you or
- related to the subject areas that would be in the Project Areas that you may have in mind for your M.Sc. Research Project.

I would like you to do the following to start you in the process of developing your future Research Project Areas and Review and Seminar Topics for this course.

<table>
<thead>
<tr>
<th>List of Research Project Areas</th>
<th>Potentially Related Review Papers and Seminar Topics</th>
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From the above you would select three topics for your three (3) review papers to be written up and presented to the class.
COURSE EVALUATION

Coursework
- 3 review papers [written reports] [30%]
- 3 seminars on the review papers [10%]

Final Examination (3 hours)
- 40%

60%

100%

PRESENTATION OF REVIEW PAPERS

The partitioning of the marks for the write-up will be as follows:

Clarity, Presentation and Writing Style 30%
Content of the Subject Matter 30%
Analysis and Application of Subject Matter 40%

100%

This would be then weighted out of thirty percent (30%). The Presentations would be for fifteen (15) minutes each with a further five (5) minutes for questions and answers. Each student will therefore have twenty (20) minutes allocated for each of their presentations. The presentation would be made to an Open University audience and would be evaluated as follows:

Content 50%
Visuals 10%
Clarity and Diction 10%
Response to Questions 20%
Time Utilization 10%

100%

The three (3) presentations would then be weighted out of 10%.
NOTE CAREFULLY!!!!!!!!!!!!!!
The formal write-ups must conform to the writing style and methods of referencing as outlined for the *Journal of Tropical Agriculture*. The layout should conform to the guidelines for Post Graduate Theses and Reports of the University of the West Indies:

- Title Page
- Abstract
- Table of Contents
- List of Figures
- List of Tables
- List of Appendices
- Glossary of Terms or Abbreviations
- Text
- References
- Appendices.

The report should be no longer than fifteen (15) typed pages including appendices. The font should be Times New Roman 12 point, and the line spacing should be single spaced.

**TEXTS AND RECOMMENDED READINGS**


Anon. 1993. *Proceedings of a workshop on "Opportunities and constraints for the development of a sustainable small ruminant sub-sector in the...*
Caribbean region." September 15-17, 1992, Barbados, CARDI, CIDA and Ministry of Agriculture, Food and Fisheries, Barbados. 34 papers, 305 pages.


Food and Agriculture Organization. Animal Production and Health Series.


Proceedings of the Caribbean Veterinary Association Meetings.


**JOURNALS**

Agriculture Tropical
American Journal of Animal Science
Animal Feed Science and Technology
Canadian Journal of Animal Science
Farm and Business
International Grassland Congress
Livestock Research for Rural Development (ejournal). FAO, Rome
Tropical Agriculture
Tropical Animal Health and Production
Tropical Animal Production - 1976 - 1985
Tropical Grasslands
ACTA Amazonia

**RECOMMENDED READINGS**

Key:  B - Breeding;  C - Commodities;
     D - Development;  F - Forages;
     G - General;  H - Health;
     N - Nutrition;  P - Production;
     R - Ruminants.

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FAO. (1980d). *Prolific Tropical Sheep*. FAO, Rome (R)


FAO. (1985). *Small-scale sausage production*. FAO, Rome. (C)


FAO. (1986). *Small Ruminant Production in Developing Countries*. FAO, Rome. (R)

FAO. (1986). *Sheep and Goats in Turkey*. FAO, Rome. (R)


Factsheets on Ruminants available from The Department of Agricultural Extension. Contact: Mrs. Martha Jiminez-Spence, c/o Department of Agricultural Extension, Faculty of Agriculture, Cost - $25. (R)


Garcia, G. W. and Bridgewater, S. (1998): Considerations for Success in Livestock Development Projects in Developing Countries: some experiences from the last thirty (30) years. Paper presented at “AGRICULTURE IN THE CARIBBEAN: issues and Challenges-UWI Ag.50”


Garcia, G.W, Neckles, F.A; and Benn, A. 1982. Sugarcane as a Feed for Ruminants. In: Proceedings of the Fourth Regional Livestock Meeting held in Guyana, Sept. 29 to Oct. 1, 1982. Department of Livestock Science, Faculty of Agriculture, St Augustine, Trinidad & Tobago. (R, N)


Knights, M., Garcia, G. W. and Bourne, G. (1998): Evaluation of the Reproductive Performance (Between 1990 to 1996) of the Cros-Bred Holstein (CBH) and Jamaica Hope (JH) Dairy Cattle at the University Field Station (UFS),
Trinidad and Tobago, W.I. . Paper presented at “AGRICULTURE IN THE CARIBBEAN: issues and Challenges-UWI Ag.50“


Lallo, C; Neckles, F A.; Garcia, G.W. (1984): "Intensive lamb finishing on Sugarcane based rations at the Sugarcane Feeds Centre and the implications for improving the value and contribution of Hair Sheep in the Caribbean". In: Proceedings of the Fifth Regional Livestock Meeting held in Nassau,
Bahamas, September 26 - 28, 1984. UWI Department of Livestock Science, St Augustine, Trinidad & Tobago, W.I. (R, N)


Neckles, F. A; Garcia, G.W; and Benn, A (1984): "Sugarcane: a potentially important forage for meat and milk production". In: New Technologies in Food Production (AGROTEC '83- Proceedings of an International Seminar on New Technologies in Food Production for the Eighties and Beyond) edited by L. D. Wickham, K. A. E. Archibald, T. U. Ferguson, and D. Dolly. UWI Faculty of Agriculture, St Augustine, Trinidad & Tobago, W.I. pp. 117-123. (R, N)


Regional Livestock Meetings. 1972-1988). Department of Livestock Science, Faculty of Agriculture, The UWI, St. Augustine. (N, P, R)


**SEMESTER SCHEDULE (September to December 2012)**
AGLS6001 [AL60A]: TROPICAL ANIMAL SCIENCE

All classes will be 5.00 to 8.00 p.m. on Mondays and Some Saturdays.

**Week #1**

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<tr>
<td>Monday 3(^{rd}) September</td>
<td>5-8pm</td>
<td>[FSA Room 27]</td>
<td>[1] Introduction to Course</td>
<td>Gary Garcia</td>
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<td>Unit 1, 2, 3, 4</td>
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<tr>
<td>Saturday 8(^{th}) September</td>
<td>10-12 Noon</td>
<td>[FSA Room B1]</td>
<td>Selection of Seminar Topics</td>
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<td>The Philosophy of the Open School of Tropical Animal Science and Production</td>
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<td>Selection of Seminar Topics</td>
<td>Gary Garcia</td>
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**Week #2**

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<th>Lecture</th>
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<tr>
<td>Monday 10(^{th}) September</td>
<td>5-8pm</td>
<td>[FSA Room 27]</td>
<td>The Philosophy of the Open School of Tropical Animal Science and Production</td>
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<td>Selection of Seminar Topics</td>
<td>Gary Garcia</td>
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<tr>
<td>Saturday 15(^{th}) September</td>
<td>10-12 Noon</td>
<td>[FSA Room B1]</td>
<td>[2] Forage Production in the Caribbean</td>
<td>Francis Davis</td>
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<td>[2] Forage Production in the Caribbean</td>
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<td>Unit 6 - Future Challenges</td>
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**Week #3**

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<th>Instructor</th>
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<tr>
<td>Monday 17(^{th}) September</td>
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<td>[FSA Room 27]</td>
<td>[3] Improvements in Tropical Animal Science through Breeding and Genetics</td>
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<td>Unit 7 - Breeding and Genetics</td>
<td>Nandakumar Puliyath</td>
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<tr>
<td>Saturday 22(^{nd}) September</td>
<td>5:30 am to 3pm</td>
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<td>Weekend Field Trip</td>
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<td>5:30 am Sir Frank Stockdale Building</td>
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<td>Week #4</td>
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| **Monday 24\(^{th}\) September**  
[FSA Room 27] | REPUBLIC DAY PUBLIC HOLIDAY  
[4] Improvements and Strategies for Small Ruminant Development in the Caribbean and the Tropics  
[Directed Readings]  
Unit 9 -Small Ruminants  
*Gary Garcia* |

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<th>Week #5</th>
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| **Monday 1\(^{st}\) October:**  
5 to 8pm  
[FSA Room 27] | The Tropical Animal Farm as a Source of Sustainable Energy and Food  
Intensive Tropical Farm Modeling  
*Gary Garcia* |

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<th>Week #6</th>
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| **Monday 8\(^{th}\) October:**  
5-8 pm  
[FSA Room 27] | Feeding of Animals in the Tropics  
Sugarcane Feeding Manual  
*Gary Garcia* |

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<th>Week #7</th>
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| **Monday 15\(^{th}\) October:**  
5-8 pm  
[FSA Room 27] | [6] Animal Nutrition  
Unit 13: Animal Nutrition Advances  
*Victor Mlambo* |

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<th>Week #8</th>
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| **Monday 22\(^{nd}\) October:**  
5 to 8pm  
[FSA Room 27] | [7] Importance of Reproductive Efficiency in Farm Animals in the Tropics [Directed Readings]  
*Nandakumar Puliyath*  
Unit 14 –  
[7] Advances in Reproduction  
*Nandakumar Puliyath*  
Unit 15 – |

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### Week #9

| Monday 29\(^{th}\) October 5 to 8pm [FSA Room 27] | [8] Housing and New Horizons Unit 16 -Housing *Cicero H.O. Lallo* |

### Week #10


### Week #11

| Monday 12\(^{th}\) November: | SEMINAR #1 |
| Saturday 17\(^{th}\) November |

### Week #12

| Monday 19\(^{th}\) November 5 to 8pm | SEMINAR #2 |
| Saturday 24\(^{th}\) November |

### Week #13

| Monday 26\(^{th}\) November : 5 to 8 pm Saturday 1\(^{st}\) December | SEMINAR #3 |

**ALL WRITTEN REPORTS ARE DUE THE Friday of the week in which the Seminar was done!!!!!!!!!!!!!!!**

**ACTIVITIES:**

1. To begin to assign the review topics.
2. To discuss the Overall M.Sc. Program.

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Unit Learning Objective #2.
To be able to relate this course to the other courses in the Tropical Animal Science and Production M.Sc. Program.

The M.Sc. Degree in Tropical Animal Science and Production has been designed to achieve the following **general objectives**:
(i) to provide the graduate with a deeper knowledge and sensitivity of the needs for the Science of Livestock Production in Developing Tropical Environments with particular reference to the Neo-tropics;
(ii) to provide the graduate with a deeper knowledge of the needs of the science of Tropical Ruminant and Non-Ruminant Production;
(iii) to afford the graduate the opportunity to deepen his/her knowledge in a discipline or area of his/her choice; and
(iv) to ensure that the graduate:
   (a) would develop individual research and reporting skills and
   (b) would be exposed to project proposal development and presentation.

In addition the **learning objectives** of this program are as follows:
(i) to be able to explain the status of Animal Science in the Tropics;
(ii) to be able to describe the factors affecting Tropical Commercial Livestock Development;
(iii) to be able to explain the advances in Animal Science in the Tropics and to show how these could further enhance future production;
(iv) to be able to formulate diets and develop feeding and production systems for Tropical Livestock using available tropical feed resources;
(v) to be able to present seminars, to conceptualize, to propose and to conduct an independent piece of research on an aspect of Tropical Livestock Production or Commodity use;
(vi) to be able to analyze a livestock Production System and to make practical recommendations for its improvement.

This course therefore attempts to fulfill general objectives # (ii) and (iii) and learning objectives (iv), (v) and (vi) as it relates to an overview of Animal Science in the Tropics.