

**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://www12.brinkster.com/ostasp/index.aspx)**

**<http://ostasp.rizontt.com/>**

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## Unit Learning Objective #1

### BACKGROUND

This course was first offered in September 1995. This is therefore the 18<sup>th</sup> 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,<sup>[7]</sup> 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]

- Making the Tropical Farms into Net Producers of Energy [Lylian Rodriguez (2010)];

**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 Neo-tropical 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 Neo-tropical 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]  
A Guide to the Use of Sugarcane and its By-Products as Animal Feed: A Manual for Farmers and Livestock Production Specialists.  
Infinity Sales and Services and GWG Publications, Trinidad and Tobago, 135 pages [This will be sent to you via email.]**

**[ii] Lylian Rodriguez [2010]  
Integrated Farming Systems for Food and Energy in a Warming, Resource-depleting World. Ph.D. Thesis  
<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.

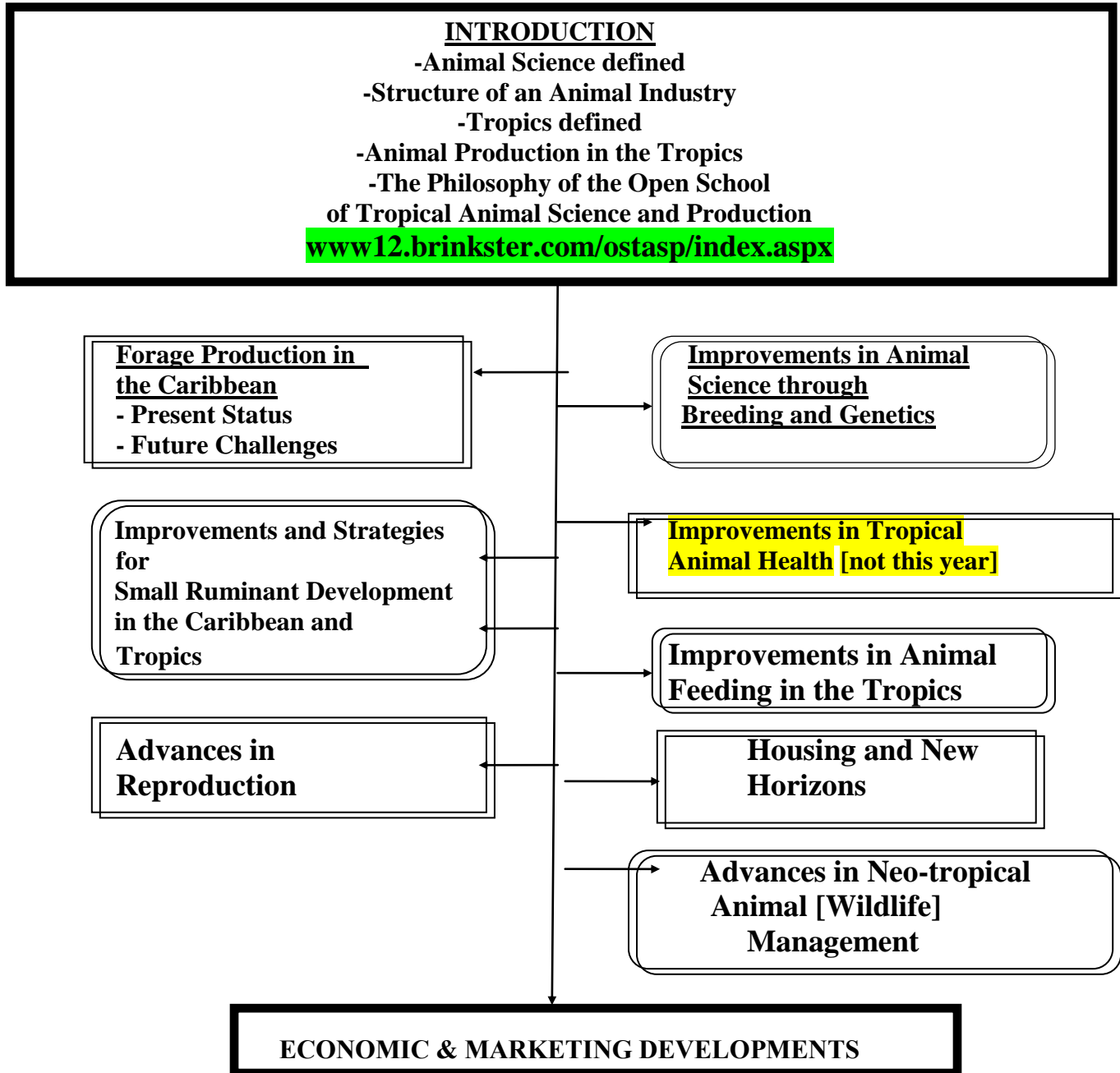
## **LEARNING OBJECTIVES**

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:





## **COURSE MODULES AND UNITS:**

### **MODULE #1: INTRODUCTION**

- Unit 1. Introduction
- Unit 2. Animal Science defined and the Structure of an Animal Industry
- Unit 3. The Tropics defined
- Unit 4A. Animal Production in the Tropics:-
  - Status
  - Horizons
- Unit 4B. The Philosophy of the Open School of Tropical Animal Science and Production [The St Augustine School of Tropical Animal Science]

### **MODULE #2: FORAGE PRODUCTION IN THE CARIBBEAN**

- Unit 5. Present Status
- Unit 6. Future Challenges

### **MODULE #3: IMPROVEMENTS IN ANIMAL SCIENCE THROUGH BREEDING & GENETICS**

- Unit 7. Improvements through Breeding and Genetics
- Unit 8. Improvements in Tropical Animal Science through Animal Selection

### **MODULE #4: IMPROVEMENTS & STRATEGIES FOR SMALL RUMINANT DEVELOPMENT IN THE CARIBBEAN & THE TROPICS**

- Unit 9. Small Ruminants

### **MODULE #5: IMPROVEMENTS IN TROPICAL HEALTH**

- Unit 10. Approaches to Animal Health care which could be relevant to animal industries in the tropics
- Unit 11. Public Health and Animal Industries
- Unit 12. Health Risks to Workers in Animal Industries  
[Not included this year as time does not permit]

**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.

List of Research Project Areas	Potentially Related Review Papers and Seminar Topics

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%]	
		- 40%
Final Examination (3 hours)		- <u>60%</u>
		<u>100%</u>

## ***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%
	<hr/>
	100%
	<hr/> <hr/>

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%
	<hr/>
	<u>100%</u>

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***

- Acker, D and Cunningham, M. 1991. *Animal Science and Industry*. Prentice Hall, Englewood Cliffs, New Jersey, Fourth Edition.
- Ahmad, N.; Garcia, G.W.; Pemberton, C.A.; Pollard, G.V. and Wilson, L.A. (1991): Perspectives on Sustainable Agricultural Development in the Caribbean: Theory and practice. In: *UWI Sustainable Development of the Caribbean. The role of the UWI*. CERMES, Cave Hill, Barbados, edited by, E.A. Moore and J. Rudder. pp. 2-12 to 23.
- Anon. 1983. *Feeding of Animals in the Caribbean*. Proceedings of a Workshop sponsored jointly by CARDI and the SFC, April 11-16, 1983, St. Augustine, Trinidad and Tobago. F. Neckles, W. Cateau and D. Walmsley (Eds.). 228 pages.
- Anon. 1993. *Dairy development in the Caribbean*. Proceedings of a workshop, Jamaica. December, 1992. CARDI, IDF and CTA.
- 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.
- Cubillos, R. 1993. *Uso del enfoque des sistemas en programas de investigacion y transferencia de tecnologia.* Paper presented at the XIII Reunion de la Asociacion Latinoamericana de Produccion Animal, Santiago Chile, July 26-30, 1993.
- Cole, H. H. and Garrett, W. N. ( 1980): *Animal Agriculture, The Biology, Husbandry and Use of Domestic Animals* . Second edition, W. H. Freeman and Co, San Francisco, USA.
- Food and Agriculture Organization. *Animal Production and Health Series.*
- Garcia, G.W. and Neckles, F.A. 1984. The potential for development of ruminant production in the Caribbean: Identification and discussion of some of the factors involved and the implications of the work of the Sugarcane Feeds Centre. In: *Proceedings of the V Regional Livestock Meeting*, Nassau, Bahamas. Department of Livestock Science, Faculty of Agriculture, St. Augustine, Trinidad and Tobago. 19 pages.
- Garcia, G.W. 1991. *Agricultural technologies for small ruminant development and farmer training.* Presented at the Roundtable Meeting on Human Resource Development Strategies, UNECLAC and the Ministry of Higher Education, Republic of Cuba, Havana, December 2-5, 1991. 16 pages.
- Gohl, B.I. 1993. *Tropical Feeds* (Diskette). FAO, Rome.
- Mc Dowell, R.E. 1993. *Animal genetic resources and sustainable production systems in Latin America.* Presented at the XIII Reunion de la Asociacion Latinoamericana de Produccion Animal, Santiago, Chile, July 26-30, 1993. 32 pages.
- Mc Dowell, R.E. 1993. *Dual purpose cattle production in sustainable agricultural systems.* (unpublished).
- Mc Intosh, C. 1984. Strategies for alleviating marketing constraints of livestock products in the Caribbean. In: *Proceedings of the V Regional Livestock Meeting*, Nassau, Bahamas. Department of Livestock Science, Faculty of Agriculture, St. Augustine. Trinidad and Tobago. 11 pages.
- Pagot, J. 1992. *Animal Production in the Tropics.* Mac Millan CTA, Mac Millan Press Ltd., London and Basingstoke.
- Proceedings of the Caribbean Veterinary Association Meetings.*
- Proceedings of the Latin American Animal Production Society (ALPA) Meetings.*

- Proceedings of the Regional Livestock Meetings 1976, 1978, 1980, 1982, 1984, 1988.* Department of Livestock Science, Faculty of Agriculture, St. Augustine. Trinidad and Tobago.
- Ruiz, M.E. 1993. *Experiencias del uso del enfoque de sistemas en America Latina y el Caribe.* Paper presented at the XIII Reunion de la Asociacion Latinoamericana de Produccion Animal, Santiago, Chile, July 26-30, 1993.
- Ruiz, M and Ruiz, Susan E. (Editors). 1992. *Ruminant Nutrition, Research Methodological Guidelines* (English Version). Inter-American Institute for Co-operation in Agriculture, San José, Costa Rica. 20 papers; 350 pages.
- Surujbally, R.S. 1984. Pre-requisites for efficient animal production in the Caribbean with special reference to dairy production. In: *Proceedings of the V Regional Livestock Meeting*, Nassau, Bahamas. Department of Livestock Science, Faculty of Agriculture, St. Augustine. Trinidad and Tobago. 11 pages.
- Wellington, K.E. 1993. *Dairy production in the tropics: breeding aspects.* Paper presented at Dairy Production Workshop, St. Stanislaus College, Guyana, August 20, 1993. 9 pages. *World Animal Review.*

## **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.			

- Alli, I; Baker, B. E.; and Garcia, G.W. (1983): The ensilage of chopped, whole-plant leucaena. In: *Proceedings of the World Conference on Animal Production* held in Tokyo, Japan, August 1983. **(R,F)**
- Alli, I; Baker, B. E.; and Garcia, G.W. (1982): "Studies on the fermentation of chopped sugarcane" *J. of Anim. Feed Sci. and Tech.*, **7** 411-417. **(R,F)**
- Alli, I; Fairbrain, R; Baker, B E; Garcia, G. (1983): "The effects of ammonia on the fermentation of chopped Sugarcane". *J. of Anim. Feed Sci. and Tech.*, **9** 291-299. **(R,F)**
- Anon. (1982). Papers presented at the IV Regional Livestock Meeting : Regional Livestock Development Program. Theme "*Forage Production, Evaluation and Utilization*, Department of Livestock Science, Faculty of Agriculture, UWI, Trinidad. **(N, R, F)**.
- Anon. (1984). Papers presented at the V Regional Livestock Meeting : Regional Livestock Development Program with the theme "*Regional Food Security - Livestock Production*". Department of Livestock Science, Faculty of Agriculture, UWI, Trinidad. **(N, R, H, P)**
- Anon. (1993). *Opportunities and Constraints for the Development of a Sustainable Small Ruminant Sub-sector in the Caribbean*. Seminar Proceedings, Barbados, September 15-17, 1992, CARDI. **(R)**
- Anon. (1990). *Caribbean Middle-Level Management Livestock Training Manual (Vol. 1) Ruminants*; Commonwealth Secretariat. **(R, P)**
- Anon. (1981). Final Report : Presented to the SFC Steering Committee, Sugarcane Feeds Centre, Faculty of Agriculture, UWI and McDonald College, McGill University, Canada. **(N, R)**.
- Anon. (1987). *1st Annual Seminar on Agricultural Research* (October 1 - 3 1987), Volume 1. National Institute of Higher Education, Research, Science and Technology (NIEHERST), Trinidad. **(N, R)**.
- Anon. (1988). *2nd Annual Seminar on Agricultural Research* (November 1988), Volume 2. NIEHERST, Trinidad. **(N, R)**.
- Anon. (1983). *Sheep Production and Preventative Medicine : Proceeding ~67*, Post Graduate Committee in Veterinary Science Refresher Course for Veterinarians, University of Sydney, Australia. **(N. R. H)**
- Anon. (1983). *Livestock Manual for the Tropics*. The Jamaica Livestock Association Ltd.; Kingston, Jamaica. **(G)**
- Anon. (1979). *The Management and Diseases of Sheep*, CAB, UK. **(H)**



- Archibald, K.A.E. (1985). Dairy Cattle feeding in the humid or high rainfall tropics. In: *Milk production in developing countries*. Proceedings of a conference held in Edinburgh, April 2-6, 1984. Ed. A.J. Smith, University of Edinburgh. pp.110-132. (N)
- Archibald, K. A. E. and Garcia, G. W. (1998): Livestock Feed Resources of the Caribbean: Prospects for contribution to sustainable development. Paper presented at  
 “ AGRICULTURE IN THE CARIBBEAN: issues and Challenges-UWI Ag.50 “
- Benn, A., Lallo, C.H.O.; Garcia, G.W. and Neckles, F.A. (1992): LEUCAENA (Wild Tamarind) as a feed for ruminants (A manual for forage production and utilization. In *Proceedings of the First International Conference on Leucaena: Theme " Leucaena in International Development"* September 1989. Editors T.U. Ferguson and G.W. Garcia, August, 1992; Faculty of Agriculture, UWI, St Augustine Campus, Trinidad and Tobago, WI. pp 187-208. (R)
- Brown, J.A, Neckles, F.A; Garcia, G.W. (1987): “Milk production, whole lactation studies on Sugarcane feeding systems. *1st Annual Seminar on Agricultural Research in Trinidad & Tobago. Vol. 1*, National Institute of Higher Education Research Science and Technology (NIHERST) pp. 19-26. (R, N)
- Campbell, Q. (1989). *Make Money with Mutton Sheep*. Bloemfontein, South Africa. (N. B. R).
- Church, D. C. (1984). *Livestock Feeds and Feeding*, Second Edition, O&B Books IWC, Oregon, USA. (N, R)
- Church, D. C. (1983). *Digestive Physiology and Nutrition of Ruminants*, Volume 1, Digestive Physiology, Second Edition. O&B books, Oregon, USA.
- Church, D. C. (1984). *Digestive Physiology and Nutrition of Ruminants*, Volume 2, Second Printing. O&B Books, Oregon, USA.
- Cole, H. H. and Garrett, W. N. ( 1980): *Animal Agriculture, The Biology, Husbandry and Use of Domestic Animals* . Second edition, W. H. Freeman and Co, San Francisco, USA.
- Devendra, C. and McLeroy, G.B. (1982). *Goat and Sheep Production in the Tropics*. ITAS, Longman. (R)
- Devendra, C. and Burns, M. (1983). *Goat Production in the Tropics*. CAB, UK. (R)
- FAO. (1976).*Non-protein nitrogen in the Nutrition of Ruminants*. FAO, Rome. (N)

- FAO. (1978).*Ruminant Nutrition*. Selected articles from World Animal Review. FAO, Rome. (N)
- FAO. (1980a).*Observations on the Goat*. FAO Animal Production and Health Series #14. FAO, Rome. (R)
- FAO. (1980b).*Prolific Tropical Sheep*. FAO, Rome. (R)
- FAO. (1980c).*Feed From Animal, Waste: State of Knowledge*. FAO, Rome. (N)
- FAO. (1980d).*Prolific Tropical Sheep*. FAO, Rome (R)
- FAO. (1982).*Sheep and Goat Breeds of India*. FAO, Rome. (R)
- FAO. (1983).*Intensive Sheep Production in the Near East*. FAO, Rome. (R)
- FAO. (1984).*Feed From Animal Wastes: Feeding Manual*. FAO, Rome. (N)
- FAO. (1985).*Crop Residues and Agro-industrial by-products in animal feeding*. FAO, Rome. (N)
- FAO. (1985).*Manual for the Slaughter of Small Ruminants in Developing Countries*. FAO, Rome. (R)
- FAO. (1985).*Better Utilization of Crop Residues and By-products in Animal Feeding: Research Guidelines. State of Knowledge*. FAO, Rome. (N)
- FAO. (1985).*Small-scale sausage production*. FAO, Rome. (C)
- FAO. (1985).*Sheep and Goats in Pakistan*. FAO, Rome. (R)
- FAO. (1985).*The Awassi sheep, with special reference to the improved dairy type*. FAO, Rome. (R)
- FAO. (1986).*Small Ruminant Production in Developing Countries*. FAO, Rome. (R)
- FAO. (1986).*Sheep and Goats in Turkey*. FAO, Rome. (R)
- FAO. (1986).*Better ..... A practical manual for research workers*. FAO, Rome. (N)
- FAO. (1987).*Small ruminants in the Near East. Vol. I; Selected Papers prepared for Expert Consultation on Small Ruminant Research and Development in the Near East. Turis, October 1985*. FAO, Rome. (R)
- FAO. (1987).*Small ruminants in the Near East. Vol. II; Selected Articles from World Animal Review 1972-1976*. FAO, Rome. (172 pp.) (R)
- FAO. (1987).*Maintenance Systems for the Dairy Plant*. FAO, Rome. (R)
- FAO. (1987).*Cross-breeding Bos indicus and Bos taurus for milk production in the Tropics*. FAO, Rome. (B)
- FAO. (1988).*Milk and Dairy products, production and processing costs*. FAO, Rome. (C)
- FAO. (1988).*Village Milk Processing*. FAO, Rome. (C)

- FAO. (1988). *Sugarcane as Feed*. FAO, Rome. (N)
- FAO. (1989). *Sheep and Goat Production in the Humid Tropics of West Africa*. FAO, Rome. (R)
- FAO. (1989). *Small Ruminants in the Near East Vol. III: North Africa*. FAO, Rome. (R)
- FAO. (1989). *Milking, Milk Production, Hygiene and Udder Health*. FAO, Rome. (C)
- FAO. (1989). *The Eradication of Ticks*. FAO, Rome. (H)
- FAO. (1990). *Manual on Simple Methods of Meat Presentation*. FAO, Rome. (C)
- FAO. (1990). *Reproduction in Camels*. FAO, Rome. (R)
- FAO. (1990). *The Technology of traditional milk products in developing countries*. FAO, Rome. (C)
- FAO. (1991). *Training manual for Embryo Transfer in Water Buffaloes*. FAO, Rome. (B)
- FAO. (1991). *Training Manual on Artificial Insemination in Sheep and Goats*. FAO, Rome. (B)
- FAO. (1991). *Feeding Dairy Cows in the Tropics*. FAO, Rome. (N).
- 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)
- Ferguson, T.U. and Garcia, G.W. (Editors) (1982). *Leucaena in Agricultural Development. Proceedings of the 1st International Conference on Leucaena*. Port-of-Spain, Trinidad and Tobago. July 10-13, 1989, Faculty of Agriculture, UWI, St. Augustine, Trinidad and Tobago. (R, F)
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**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**

Monday 3 <sup>rd</sup> September : 5-8pm <b>[FSA Room 27]</b>	[1] Introduction to Course Unit 1, 2, 3, 4 <b>Gary Garcia</b>
Saturday 8 <sup>th</sup> September : 10-12 Noon <b>[FSA Room B1]</b>	Selection of Seminar Topics  The Philosophy of the Open School of Tropical Animal Science and Production Selection of Seminar Topics <b>Gary Garcia</b>

**Week #2**

Monday 10 <sup>th</sup> September 5-8pm <b>[FSA Room 27]</b>	The Philosophy of the Open School of Tropical Animal Science and Production Selection of Seminar Topics <b>Gary Garcia</b>
Saturday 15 <sup>th</sup> September : 10-12 Noon <b>[FSA Room B1]</b>	[2] Forage Production in the Caribbean Unit 5 - Present Status <b>Francis Davis</b>  [2] Forage Production in the Caribbean Unit 6 - Future Challenges <b>Francis Davis</b>

**Week #3**

Monday 17 <sup>th</sup> September <b>[FSA Room 27]</b>	[3] Improvements in Tropical Animal Science through Breeding and Genetics Unit 7 - Breeding and Genetics <b>Nandakumar Puliyaath</b>
<b>Saturday 22<sup>nd</sup> September: 5:30 am to 3pm</b>	<b>Weekend Field Trip 5:30 am Sir Frank Stockdale Building - UFS, CLS</b>
<b>Sunday 23<sup>rd</sup> September: 8:00 am to 3pm</b>	<b>8:00 am Marylisa Farms, Penal</b>

**Week #4**

Monday 24 <sup>th</sup> September [FSA Room 27]	<b>REPUBLIC DAY PUBLIC HOLIDAY</b>  [4] Improvements and Strategies for Small Ruminant Development in the Caribbean and the Tropics [Directed Readings] Unit 9 -Small Ruminants <i>Gary Garcia</i>
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**Week #5**

Monday 1 <sup>st</sup> October: 5 to 8pm [FSA Room 27]	The Tropical Animal Farm as a Source of Sustainable Energy and Food Intensive Tropical Farm Modeling <i>Gary Garcia</i>
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**Week #6**

Monday 8 <sup>th</sup> October: 5-8 pm [FSA Room 27]	Feeding of Animals in the Tropics Sugarcane Feeding Manual <i>Gary Garcia</i>

**Week #7**

Monday 15 <sup>th</sup> October : 5-8 pm [FSA Room 27]	[6] Animal Nutrition Unit 13: Animal Nutrition Advances <i>Victor Mlambo</i>
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**Week #8**

Monday 22 <sup>nd</sup> October : 5 to 8pm [FSA Room 27]	[7] Importance of Reproductive Efficiency in Farm Animals in the Tropics [Directed Readings] <i>Nandakumar Puliyath</i> Unit 14 – [7] Advances in Reproduction <i>Nandakumar Puliyath</i> Unit 15 –
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**Week #9**

Monday 29 <sup>th</sup> October 5 to 8pm <b>[FSA Room 27]</b>	[8] Housing and New Horizons Unit 16 -Housing <i>Cicero H.O. Lallo</i>
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**Week #10**

Monday 5 <sup>th</sup> November : <b>[FSA Room 27]</b>	Unit 17 - New Horizons [Directed Readings] Unit 18 <i>Gary Garcia</i> [9] Neo-tropical Animals <i>Quo Vadis? Gary Garcia</i>  [10] Macroeconomic Considerations for Livestock Production in the Caribbean [Directed Readings] Unit 19
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**Week #11**

Monday 12 <sup>th</sup> November:  Saturday 17 <sup>th</sup> November	<b>SEMINAR #1</b>
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**Week #12**

Monday 19 <sup>th</sup> November 5 to 8pm	<b>SEMINAR #2</b>
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Saturday 24<sup>th</sup> November

**Week #13**

Monday 26 <sup>th</sup> November : 5 to 8 pm Saturday 1 <sup>st</sup> December	<b>SEMINAR #3</b>
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**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.



## **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.