

TRENT UNIVERSITY

**Environmental and Resource Science 3360H - 2011 WI  
Agriculture and Agricultural Alternatives**

**Course Outline**

This course deals with the different approaches to farming, and to recent niche market developments. To give context, we start by discussing the origin of agriculture and the domestication of both livestock and agricultural crops and the transition from hunter-gatherer to the present era of intensive industrial agriculture. We examine the new organic, “green” and local sustainability approaches. We consider the advances made over the past 50 years and the strong reliance on a severely reduced genetic pool. Food quality and concerns over contamination of the human food chain will be discussed. At the same time that intensification is taking place, a counter current is occurring which includes expansion of organic farming, spread of low tillage practices, reduction in pesticide use, biodynamic farming, and permaculture. As well, niche markets are being developed, including “new” livestock farming with deer, buffalo, alpacas, and ratites, paralleled with increases in berry crops, vineyards, hemp, hops, sugar beet, peanuts and ginseng. Many opportunities have opened up for local food markets as a consequence. Urban agriculture and green roofs will be included in the course. Guest speakers will be a part of the course and farm visits will take place on Saturdays to be decided. These farm visits are an essential part of the course, and each student must take part in one of the visits.

**Note:** This is a science course and a knowledge of ecological concepts is expected. It is available as part of the Food and Agriculture Emphasis at Trent.

**Course Instructor:** Tom Hutchinson, 748-1011, x 1634, [thutchinson@trentu.ca](mailto:thutchinson@trentu.ca)

**Teaching Assistant:** Paul Grieve, [paulgrieve@trentu.ca](mailto:paulgrieve@trentu.ca)

**Lecture:** (two hours per week) Thursday, 5:00 – 6:50 p.m., FPHL 117

**Tutorials:** (choose one) Thursday, 7:00 – 7:50 p.m., SC W4  
Friday, 9:00 – 9:50 a.m., BL 314  
Friday, 10:00 – 10:50 a.m., BL 314  
Friday, 11:00 – 11:50 a.m., BL 314

**Text:** No required text, but consider purchasing a recommended text.

**RECOMMENDED:**

1. Guns, Germs and Steel. (1997). Jared Diamond. Norton Publ. **Very important text.**
2. Agroecology, Ecological Processes in Sustainable Agriculture. S.R. Gliessman, Ann Arbor Press, 1998.
3. Agroecology. M. Altieri, Westview Pub., 1987
4. Plant evolution and the origin of crop species. J. F. Hancock, Prentice Hall. 1992.
5. Sustainable Agricultural Systems, Ed., C.A. Edwards, etc. St. Lucie Press for Soil and Water Conservation Society. 1001.
6. Organic Farming (1990). Farming Press, U.K.
7. Permaculture - Mollison

8. Organic Field Crop Handbook. 2<sup>nd</sup> Ed. 2001. Canadian Organic Growers Inc.
9. Organic Livestock Handbook. 2000. Canadian Organic Growers.
10. The Farm as a Natural Habitat. 2002. Ed. D.L. Jackson and L. Jackson. Pub. Island Press.
11. The Fatal Harvest Reader. Ed. Andrew Kimbrell. Pub. Island Press. 2002.
12. Agroecology in Action. Extending Alternative Agriculture, by K. Douglas Warner. MIT Press. 2007.
13. In Defence of Food. Michael Pollan (2008).
14. The Omnivores Dilemma. Michael Pollan 2002.
15. Food Inc. Ed. Karl Weber. BBS Public Affairs.

### **Lecture Topics (from the following)**

All lectures by Tom Hutchinson except as noted below. Starting Thursday, January 13, 2011.

1. Origin and evolution of crops and livestock.
2. Genetic resources, breeding and selection systems, hybrid vigour, artificial insemination, embryo flushing, etc.
3. Gene conservation: gene banks, seed banks, semen and embryo storage.
4. Organic farming.
5. Permaculture, biodynamic farms. Guest lecture
6. Urban agriculture and green roofs.
7. Crop production systems and land management (wheat, oats, barley, rye, spelt, and buckwheat).
8. First Nations Agricultural Systems and History.
9. High value crops widely grown: corn, soybean, white beans, canola.
10. Vineyards, berry crops, orchards, cranberry, hemp, sugar beet, ginseng - guest lecturer.
11. Alternative meat sources: venison, buffalo, ratites, boer goats. Guest lecture.
12. Intensive systems: methods and approaches: productivity based on efficiency of conversion of food to product.
13. Sustainable systems: future approaches and true long-term goals.
14. Animal welfare: approaches and concerns. Veterinary services. Guest lecture.
15. Human food chain challenges: contamination risks, epidemics.

Guest lectures from Richard and Vida Johnson on vineries and wine production on PEC, and 1) David Sharpe on the challenges of starting a farm, 2) Rebecca LeHeup on Agrotourism, 3) Paula Anderson on biodynamic farming and permaculture, 4) Doug Moffatt on beekeeping, 5) Frank Hoftyzer on environmental farm plan and custom farming, and 6) Peter Browyer on local veterinary practice.

**Course evaluation** will be based on:

Tutorials	20% (10% for presentation, 5% for attendance and 5% for involvement)
Essay	25%
Project	25%
Final Exam	30%

**Seminar-tutorials** Each student will make a presentation to the class, in a group of 2-3. The effectiveness of the presentation will be evaluated. Participation and attendance will make up 10 of the 20 marks. Everyone will enrol in a tutorial group, held every two weeks. Within a week of your presentation a two-page summary will be handed in.

**Essay and Project.** Will be on topics from a list to be given out. Additional topics will be considered but need to be agreed to with the instructor. The project to be tackled will be outlined and allows great flexibility and initiative. Students will work in groups of 2-3. **ESSAY IS DUE MARCH 3, 2011. PROJECT IS DUE MARCH 24, 2011.**

**Farm Visits** Two Saturdays of farm visits will be held. Students must attend one of these. Visits may include a modern dairy farm, a deer, ostrich, alpaca and buffalo farm, an organic farm, a dairy goat farm, a sheep farm, and an intensive broiler operation. We may make a visit to the Woodville sales barn. We will visit Pickseed and a CSA.

## Notes

### Academic Integrity

Academic dishonesty, which includes plagiarism and cheating, is an extremely serious academic offence and carries penalties varying from a 0 grade on an assignment to expulsion from the University. Definitions, penalties, and procedures for dealing with plagiarism and cheating are set out in Trent University's *Academic Integrity Policy*. You have a responsibility to educate yourself – unfamiliarity with the policy is not an excuse. You are strongly encouraged to visit Trent's Academic Integrity website to learn more – [www.trentu.ca/academicintegrity](http://www.trentu.ca/academicintegrity).

### Access to Instruction

It is Trent University's intent to create an inclusive learning environment. If a student has a disability and/or health consideration and feels that he/she may need accommodations to succeed in this course, the student should contact the Disability Services Office (BL Suite 109, 748-1281, [disabilityservices@trentu.ca](mailto:disabilityservices@trentu.ca)) as soon as possible. Complete text can be found under Access to Instruction in the Academic Calendar.

## ESSAY - topics for selection - Worth 25%.

1. The history of plant breeding in Canada.
2. The origin of maize and its ancestors, leading to the dominant use of hybrid corn in agriculture in North America.
3. Seed banks and national programmes of FAO and CCIMYT: comment on Canada's designated responsibility.
4. Pioneer farmer David Fife from Peterborough County and the history and economic impact of his Red Fife Wheat.
5. Hemp: its history, usage and its re-establishment in Canada.
6. Origin and rise of the importance of soybeans and in agriculture and our food supply.
7. The case for organic agriculture as a health food source and for agricultural sustainability.
8. Dairy cattle, their history in Canada and the present dominance of the Holstein.
9. Hybrid vigour (heterosis) in agriculture, its use and its merits and its genetic basis - use

both plant and animal examples.

10. Permaculture in practical farming as a practical and philosophical approach to farming. While it emphasizes ecology and biodiversity, is it economically viable?
11. The role of livestock as an important element in good sustainable rotations. Note, this essay needs a lot of factual content.
12. The requirements of soil and climate in vineyards and the changing geographical locations of Ontario wineries in recent years.
13. The LCBO as a factor in market opportunities in the wine trade.
14. The history of Shorthorn cattle: breeding, uses, history in Canada.
15. The Shropshire or Cotswold sheep in Canada, their origins, history and role in world agriculture.
16. Milking sheep in the world: their importance and breeds in the Middle East and Asia, and the recent breed improvements in Canada.
17. Cloning of livestock - the technology, costs, opportunities, and the difficulties.
18. Ginseng, in Asia and North America as a native species and its cultivation and marketing in Canada (or Korea).
19. Raising deer as a commercial, domesticated source of venison and antlers.
20. Rooftop gardens: where, how and why? Values and challenges.
21. Ozone pollution and its effects on crops in North America.
22. Herbicides in modern agriculture.
23. Wheat rust and its economic impact and history in North America.
24. The origin of the potato and why P.E.I. and Idaho have become famous for their potatoes.
25. Hydroponics in modern horticulture and in the supermarket.
26. Agroforestry – can trees be farmed for biofuels?
27. Buffalo farming in North America.
28. An examination of the intensification of the hog industry in N. America and the increasing challenge of disease epidemics from viral infections.
29. Legumes and their importance in world agriculture as food for humans, livestock and plants.
30. The cultivation of tobacco in Canada.
31. The history of the Newfoundland pony in Canada.

32. Rape (canola) as a major oil crop in Canada and the importance of plant breeding in developing valuable edible oil producing varieties.
33. The rapid expansion of GMO crops, especially Round-Up Ready and Bt insect resistant ones.
34. Dairy goats and opportunities for producers in Ontario and Quebec.
35. Sugar beets are an important crop in Europe and were once in Canada. Now they are being grown again. Describe the sugar beet industry.
36. Agrotourism and gastro-tourism: the case of Prince Edward County, Ontario, Peterborough and the Kawarthas.
37. The hundred mile, local food initiative.

**Essay should be well-written, 10-12 pages long excluding tables and figures. It should be double-spaced and thoroughly referenced. Do not rely too much on web material.**

**Essay is due to be handed in on March 3, 2011.**

### **PROJECT – Worth 25% of fall term.**

Select a niche market-product or farm/horticultural-specialty that you would develop on a small farm, i.e., up to 25 acres. Provide a detailed, plausible reason for your choice and then, step-by-step, describe how you would go about this project on your farm, starting from scratch. Provide details of your marketing scheme - advertising, promotion, and end-point sales. Also provide details of the all-round costs and income you would expect to generate. You have to farm ecologically and sustainably and in an environmentally-friendly manner. Describe how you will do this, with a well-referenced account. What can you incorporate into your plan that will enhance wildlife and provide secondary habitat, e.g., hedges, forests, wetlands, pollen-nectar for bees and butterflies, etc.? What is your scientific case that this “project” will be sustainable? Some examples to consider are as follows:

Examples of niche and specialty markets include production of organic beef, chickens, goats, alpacas, ducks, pigs, sheep, organic grains or specialty products such as strawberries, raspberries, blueberries, asparagus, garlic, herbs, venison, buffalo meat, ratites (emus and ostriches) hemp, sugar beets, peanuts, sweet potatoes, goat or sheep milk and cheese, alpaca fleeces, angora goat fleeces (mohair), free range chickens and eggs. For a viable farm you will likely need to select more than one of the above. You start with a hobby farm of 10-25 acres, located either near Ottawa or Peterborough.

**Project should be 10-12 pages long excluding figures, tables and references.**

**Project due to be handed in on MARCH 24, 2011.**

### **SEMINARS**

There will be five tutorial-seminars for each student, at fortnightly intervals. Students will work in pairs. The topics for the tutorials are as follows:

1. Genetic conservation of either crops, livestock, vegetables or fruit.
2. Permaculture and biodynamic farming.
3. Urban agriculture and/or green roofs.
4. Fair trade food products.
5. First Nations agriculture: history in Ontario, Canada and N. America.