International Crop Research Field Course

1. Course Basics
UMN Instructor and CIMMYT Partner:
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Number of Credits: 2 credits

Dates: This course will be offered for fall enrollment. This course will include a field component as well as discussion sessions before and after the trip. The field component will consist of a 7-day trip to the International Maize and Wheat Improvement Center (CIMMYT) in mid to late August depending on the center and instructor schedules. There will be one discussion session prior to the trip to CIMMYT to prepare students for the trip and there will be 5 discussion sessions following the trip consisting of trip reflection, student presentations, and guest speakers.

Course Participants: The course will be listed at the 5000 level, allowing both undergraduate and graduate level students to register. As such, it is necessary to develop a course program that is both stimulating to the graduate level students and accessible to the undergraduate students. It is anticipated that the majority of the registered students will be from the College of Food Agricultural and Natural Resource Sciences; however, great effort will be made to engage students in other colleges that may have an interest in international crop breeding/research, agriculture, and/or health and nutrition.

Prerequisites: Introductory biology and/or genetics course

Requirements Fulfilled by the Course: For the undergraduate students this course will be designed to meet their experiential learning requirement and potentially their capstone course depending on the major. For the graduate students this course will fulfill two elective credits.

2. Course Description
Global food security, human health and nutrition, and sustainable agricultural practices are currently major issues worldwide. This course will consider the role of international crop research to address these issues in terms of breeding for biotic and abiotic stress conditions, breeding for improved nutrient content, and international policies relating to these topics. The course will also discuss new research methods aimed to increase the efficiency of breeding, such as genomic selection, in the context of international agriculture. This course will consist of a 1-week trip to CIMMYT, an international agricultural research center located in Mexico, and discussion sessions reflecting on the trip and topics that were introduced. Such topics may include utility of
genetic resources for crop improvement, international agriculture policy, and impacts of international crop research on developing countries.

This course will deepen students’ knowledge of international agriculture, plant breeding, health and nutrition, quantitative genetics, plant sciences, and environmental sciences. This course will also provide students with an international experience that will broaden their world-view.

3. Course Goals
   1. Exposure to international crop research, international crop breeding, and maintenance/utilization of plant genetic resources
   2. Demonstrate the complexity of achieving global food security
   3. Gain understanding of plant genetic resources, the relationship between genotypic and phenotypic diversity, and utilization for crop improvement
   4. International experience for students that will expand their world-view

4. Specific Course Content
   CIMMYT Trip:
   Day 1 (Sunday): Travel day and cultural experience (i.e. visit market)

   Day 2 (Monday): Presentations by CIMMYT scientists (i.e. introduction to agriculture research, CGIAR and CIMMYT, breeding for improved nutrition (QPM and Harvest Plus), CIMMYT maize and wheat breeding programs, CIMMYT Gene Bank, etc.)

   Day 3 (Tuesday): Utilization of wild relatives - Tlaltizapan Station to see Tripsacum ex-situ conservation garden and National Institute of Public Health (lectures from nutritionists on macro vs. micro nutrients, socioeconomic status, diabetes, etc.)

   Day 4 (Wednesday): Cultural experiences*

   Day 5 (Thursday): Visit Toluca research station (breeding for disease resistance)

   Day 6 (Friday): Presentations and hands-on activities relating to the Seeds of Discovery project and applications of genomic selection at CIMMYT and visit to local farmer fields

   Day 7 (Saturday): Visit Teotihuacan Pyramids and other cultural experiences

   Day 8 (Sunday): Travel day

   *Other possible activities of interest include on-farm trials, additional breeding topics such as breeding for abiotic stress resistance (DTMA, etc), additional station visit, generation and use of doubled haploids in the breeding program

Pre/Post CIMMYT Trip:
Session 1: Pre CIMMYT trip preparation session
Session 2: Reflective presentations by students
Session 3: Reflective presentations by students and instructor
Session 4: Speaker (International Ag Policy)
Session 5: Speaker (Impact of international crop research in developing countries)

5. Internal Funding Opportunities and Financial Advising
In addition to tuition expenses, it is estimated that this course will cost approximately $1500-2000 per student including airfare, lodging, and food. The University of Minnesota has multiple resources to assist students both in terms of competitive funding opportunities and financial advising.

Internal Funding Opportunities:
• UMN Learning Abroad Center Scholarship Opportunities
  http://umabroad.umn.edu/students/finances/scholarships
• CFANS International Programs Financial Aid and Scholarships
  http://international.cfans.umn.edu/Study_Abroad/FinancialAid/index.htm
• Departmental Funds?

Internal Financial Advising Opportunities:
• Learning Abroad Financial Barriers Advisory Group
  http://www.umabroad.umn.edu/professionals/faculty/financial-barriers-advisory

6. Additional Details to Resolve
• Coordinated activities with the University of Wisconsin-Madison Global Health Field Course (coordinated by Sherry Tanumihardjo; Nutritional Science; sherry@nutrisci.wisc.edu) that will run concurrently with the field portion of this course at CIMMYT
• State Department travel warnings
• Approval as a Collegiate & Departmental Study Abroad Program
• Course development trip (Candy Hirsch to CIMMYT August 2014 during first few days of University of Wisconsin-Madison Global Health Field Course trip)
  International Travel Grants funded by UMN central administration to support internationalizing the University ($1500-2000 for curriculum development, enhance/develop course, develop curriculum for study abroad) – Due March 15