Expanded Course Description for 11:776:443

International Agriculture: New Crops and New Uses
(3.0 credits)

**Normally Offered:** Fall every year. By Dr. Ayeni and Dr. Lawton.

**Pre-requisites and other registration restrictions:**
None. A background in Plant Science/Agricultural Science/Environmental Science/Natural Resources is recommended

**Format:** Two 80-minute lectures

**Description:**
This is a Core Course in the International Science and Education (ISE) initiative. Faculty across Rutgers University bring their international perspectives on the subject to the class in a highly interactive forum. This 3-credit colloquium will focus on approaches for increasing the range of crops cultivated in New Jersey and the Mid-Atlantic and their uses. Discussions will highlight crop uses that are unfamiliar to people in this region but have the potential to impact how Rutgers responds to the dynamics of demographic changes occurring in this part of the country and the nation as a whole. Opportunities for the domestication of new use crops in the US and the development of biofuels as a novel use for existing and new crop species will be examined. The cultural perspectives of crop use for food (traditional recipes), biofuels and other applications (plant uses for arts, crafts, etc.) will feature in class presentations. When feasible visiting scholars from Rutgers’ collaborating institutions in Africa, the Americas and Asia will be invited to give a guest lecture on their work and their collaboration with Rutgers.

**Learning Goals:**
- Students will develop an awareness of non-traditional crops (at least, in the US) that are nonetheless important in Africa, Asia and the Americas. Students will review the biology and agricultural practices associated with cultivation, processing and marketing of these crops, along with an appreciation of the challenges associated with their domestication in NJ and the US.
- Students will develop an understanding and appreciation of the different agricultural systems for sustainable energy production. They will understand how different crops and energy producing systems can be quantified, assessed and compared and how these can be tailored for specific agricultural geographic and environmental conditions.
• Students will develop their literature research skills, their ability to work as a team and their ability to present and communicate their results to others.

Measures of Assessment:
• Class quizzes & take home exams 45%
• Two class presentations (1 Ethnic crops & 1 Biofuel crops) 45%
• Class attendance and participation 10%

Course Website:
eCollege/eCompanion

Topics:
• Colloquium Overview/New Crops & New Uses – Intro & Opportunities
• Ethnobotany African Vegetable Crops
• Vegetable Crops of the Americas
• Asian Vegetable Crops
• Developing US Markets for New Crops/New Uses
• Public Acceptance of New Crops & New Uses
• Traditional Plant-Based Foods – Africa, The Americas, Asia
• Traditional Non-Food Plant Uses – Africa, The Americas, Asia
• Biofuels: History, overview and opportunities
• Biofuels Types: Ethanolic Biofuels, Cellulosic Biofuels, Oil-based Biofuels
• Biofuels in Brazil – lessons and opportunities Renewable, solar-based fuel production
• Climate Change, Crop Adaptations and Agricultural Productivity
• Biofuel Case Studies: Sugarcane and Corn; Sugarbeet and Cassava; Oil Palm and Jatropha; Miscanthus and Switch Grass; Sweet Sorghum; Algal Biofuels
• Metabolic pathway engineering and synthetic biology

Required and Recommended Course materials:
Since no single book encompasses the contents of this broad and dynamic syllabus, the course will draw on recent reviews and articles from the scientific literature, articles from the popular and business press, government and NGO reports, as well as the wealth of experience to be shared by participating faculty, visiting scholars, and students.

Policies for Exams, Assignments, Attendance, and Grading
Grading is based on (i) two Exams (45%), (ii) two class presentations (45%), and (iii) class attendance and participation (10%). Exam 1 takes place at the end of Part I: New Crop/New Uses: Ethnic Crops; Exam 2 at the end of Part II: New Crops New Uses: Biofuel Crops. Each exam carries 22.5% of total course grade. Class exams are generally a mixture of multiple choice and short answer questions. There are two class presentations: one on Ethnic crops and one on Biofuel crops. Each presentation carries 22.5% of total class grade. Topic of presentation will be selected from several options to be given to the class at the beginning of each of the two parts of the course. Class attendance and participation are highly essential in this course. Laptops may be used to take notes, but internet surfing is not allowed. Cell phones or
similar distractions are to be turned off during lecture. Students who are absent for a scheduled class are responsible for materials covered during that period. A total of three (3) absences from lectures without special note expressing reason for absence are allowed. Subsequent absences without good reason supported with written note from a recognized Rutgers' authority will be penalized. Grades will be classified based on Rutgers approved system: A, B, B+, C, C+, D, F etc

Other Information:

Internships/Excursions: Students who complete this course successfully will be eligible to apply for summer research internships and field excursions to collaborating international institutions. The course coordinator with the help of faculty will select applicants for internship opportunities. The number of selected applicants will depend on funds, available locales and research partnerships

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