PONTIFICIA UNIVERSIDAD CATÓLICA DEL PERÚ - PUCP
FIELD SCHOOL PROGRAM IN PERU
ENGINEERING AND ECOLOGICAL TECHNOLOGIES IN CUSCO
2014 SEASON

GENERAL INFORMATION

Course:	Engineering and Ecological Technologies in Cusco
Location:	Huyro, Huayopata. Cuzco.
Time period:	1month/4 weeks.
Number of hours:	180 hours.
Coordinator:	Field School
Professor:	Ing Miguel Hadzich Marín
Professor's Assistants:	Ing Enrique Mejía Solís, Ing Wilton Lima

SUMMARY

The Engineering and Ecological Technologies course will be delivered entirely at Granja Ecológica PUCP in Huyro, which is aimed at the implementation, promotion and development of sustainable technologies for rural residents of Peru. The terrain of 6.5ha has a jungle ecosystem characterized by sunny days year-round, a rainy season very marked and diverse flora and fauna. It has allowed to make this place a space for the cultivation of different native species in their distant varieties such as mango, tea, tubers, medlar, bamboo, cane, Andean fruit, coffee, cacao, banana, among others. In some cases, Granja Ecológica PUCP is the place of recovery and conservation of the species since they are gradually disappearing from the area due to different reasons. It is just 3 hours from the archaeological ruins of Machu Picchu, which can be also reached walking.

The course focuses on teaching clean technologies that allow to live comfortably on the farm as well as production technologies to take advantage of local resources. Clean technologies include basic needs such as water, sanitation, lighting, communication, among others, and the latter teach concepts ranging from sowing, cultivation and harvesting of certain tropical products (tea, coffee, and cacao) to the use of renewable energy to operate machines used in industrial processing.

OBJECTIVES

Upon completion of the course, students will have developed the ability to, by themselves, be able to apply the theoretical and practical knowledge, such as renewable energy, agriculture and permaculture in real situations that will enable it to contribute to a sustainable life.

Learn the fundamentals of renewable energies, agriculture, permaculture, construction and design of machines that will be necessary during the course's practical development.

Apply the techniques that will be taught in the course into agriculture activities, processing of crops, manufacturing and construction of equipment, machinery, and tools.

Acknowledge the possibilities provided by the use of domestic natural resources, such as the flora or the weather, starting with the study of their properties.

REQUIREMENTS

The program accepts graduate and undergraduate students without any previous fieldwork experience. Spanish is not required, since most activities are conducted in English.

The course is designed for people with different specializations. The professionals that give the course have great experience transferring this knowledge to people with diverse background. For that reason, no prior knowledge is requested, but only willingness to participate in the course.

METHODOLOGY

The course consists of three modules:

- Appropriate technologies: Technologies based on renewable energies are taught for tea and coffee processing.

- Crop Management: Knowledge and techniques related to domestic plants farming will be taught.
- Renewable energies: In order to have a complete sustainable agriculture, there will be workshops to learn to transform water and solar energy into electricity and power for pumping water.

For participants' learning, these three components will be articulated in such way that thematic coherence will be reflected in daily activities of the course. The modular themes will not be covered independently but in parallel and connected among them.

The methodology of this course is mostly based on the learning from practical experience and daily life within the Granja Ecológica PUCP.

SCHEDULE OF ACTIVITIES

The course will be held twice a year, in June and July. In June the proposed theme will be related to green technologies and the cycle of tea. In July, green technologies and the cycle of coffee.

All weeks are divided into two modules, one where Appropriate Technologies are taught and other where Crop Management is taught.

Week 1
Appropriate technologies: June: Knowledge of tea and its traditional processing (harvest of tea, current firewood tea processing, activities of processes: withering, fermentation, drying, classification, and packing. everything will take place at the Herbi tea factory). July: Knowledge of coffee and traditional processing (harvest of coffee, current processing of solar drying processes activities: pulp removal, drying, packing. Management of crops: June: Crop seedlings, harvesting and maintenance of tea plants July: Crop seedlings, harvesting and maintenance of coffee plants.
Week 2
Appropriate technologies: June: Implementation of a solar tea factory. Processing of black and green tea in the new plant of linear solar parabolic concentrators, elaboration of different processes to differentiate the quality among them. July: Implementation of a traditional coffee processing factory. Coffee processing in Scheffler-type solar concentrator, elaboration of different processes to differentiate the quality among them. Management of crops: Management of organic gardens (crop seedlings, harvesting and maintenance)

Week 3
Renewable energy: 1) Solar water heating systems 2) Electrification with solar energy systems (photovoltaic panels). Management of crops: Cacao crop seedlings, harvesting and maintenance
Week 4
Renewable energy: 1) Systems for rural electrification with waterwheels 2) Rural pumping systems (norias, ram pumps, rope pumps, solar pumps). Management of Crops: Management of Organic gardens (crop seedlings, harvesting and maintenance)

EVALUATION

- Field activities 30%
- Participation in class 30%
- Performance during the program 40%