

May 2015 Progress Report

Renewable Energy Education Program at USF's Patel College of Global Sustainability

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Project Description

Given the strong international outlook for renewable energy and Florida's rich natural assets of year-round warm weather, sunshine, and biomass (top generator in the US), the State of Florida has a unique opportunity to become a national leader in the development of sustainable power and fuels. A key component of such an undertaking is the specialized education required to prepare a green workforce, a workforce capable of running and managing the green economy. Professionals skilled in sustainable practices and renewable energy are already in high demand by companies in the solar, wind, and biomass sectors and by technology innovators developing the next generation of solar cells, biofuels and green hydrocarbons from biomass and algae, smart grid, energy efficiency, and energy storage. The goal of this project is to establish an education program in renewable energy at USF's Patel College of Global Sustainability (PCGS). We will implement a new, fully online and on-campus concentration in Renewable Energy as part of the College's existing M.A. in Global Sustainability. Our goal is to place the State of Florida in a position to educate, train, and prepare students for the green jobs of today and tomorrow.

Budget: \$85,101

Universities: USF

External Collaborators: Culture Fuels Inc. and Dr. Steve Clarke (retired from Florida Crystals Corporation)

Summary of Progress

(1) Renewable Transportation Fuels (IDS 6207)

The course was offered for the first time in Fall 2014 in campus (session 001) and on line (session 201). It was taught by Dr. Philippidis on Tuesdays at 6:00-8:45 pm at USF's Patel Center and through the canvas system online. The first roster consisted of 13 graduate students in class and 4 graduate students on line.

The course focused on conventional renewable fuels from corn and sugarcane and advanced biofuels from cellulosic biomass and algae. Technology, economics, financing, policy, market penetration and prospects, regulatory, and sustainability aspects were presented and discussed.

The course was delivered in the form of weekly modules, each one consisting of a power point presentation, assigned readings from the selected textbook and the literature, and in-depth discussion, both in class and on line. Additional narrated material was posted on canvas for the on-line students, which was produced by the instructor with the assistance of USF's Innovative Education.

Guest speakers participated in 3 of the lectures: Dr. Steve Clarke (formerly Director of Industrial Research with Florida Crystals Corporation), Dr. John Kuhn (Assistant Professor at the University of South Florida), and Mr. Lawrence Walmsley (CEO of Culture Fuels Inc.). Their presentations were recorded professionally and posted on canvas for access by the on-line students.

Two exams were administered, a mid-term and a comprehensive final. For the research project the students selected their individual topic of interest and were mentored by the instructor. The students presented their research findings to their classmates and produced individual written reports at the end of the semester.

Course evaluation was conducted using two means: (1) USF's official Student Assessment of Instruction and (2) Surveys developed specifically for this class in collaboration with USF's Associate Professor Ali Yalcin from the Department of Industrial Engineering (per contract agreement).

Overall, assessment was very complimentary with a rating of 4.9/5.0 from the on-campus students (response ratio 77%) and a rating of 5.0/5.0 from the on-line students (response ratio 75%). Recommendations by the students regarding ways to further improve the course are being analyzed and will be implemented in August 2015 during the preparation of the second offering of the course in Fall 2015.

(2) Renewable Power Portfolio (IDS 6208)

The course was offered for the first time in Spring 2015 as part of the Patel College's MA in Global Sustainability: on-campus (session 001) and on-line (session 201). It was taught by the PI of this grant (Dr. Philippidis) on Tuesdays at 6:00-8:45 pm at USF's Patel Center and through the canvas system online. The roster consisted of 23 graduate students on campus and 5 graduate students on line, a 65% increase in enrollment over Fall semester's energy course.

The course focused on the various forms of renewable power: solar water heating, photovoltaics, concentrating solar power, wind, geothermal, bioenergy, and ocean energy. Technology, economics, financing, policy, market penetration and prospects, regulatory, and sustainability aspects will be presented for each of these forms of renewable energy.

The course was delivered in the form of weekly modules, each one consisting of a power point presentation, assigned readings from the selected textbook and the literature, and in-depth discussion, both in class and on line. Additional narrated material is posted on canvas for the on-line students, which was produced by the instructor with the assistance of USF's Innovative Education group.

Guest speakers participated in 3 of the lectures: Mr. Robert Singh (WTEC) on the topic of PV energy, Mr. Buck Martinez (FPL, Florida Power and Light) on the topic of wind energy, and Mr. Markus Althausen (CEO of ClimeCo International) on the topic of bioenergy through anaerobic digestion. Their presentations were recorded professionally and posted on canvas for access by the on-line students.

Two exams were administered, a mid-term and a comprehensive final. For the research project the students were split into teams of two and selected their topic of interest under the mentorship of the instructor. The students presented their research findings to their classmates and will produce individual written reports at the end of the semester.

Course evaluation were conducted using two means: (1) USF's official Student Assessment of Instruction and (2) Surveys developed specifically for this class in collaboration with USF's Associate Professor Ali Yalcin from the Department of Industrial Engineering (per contract agreement). The results are currently being analyzed.

In summary, the project is progressing according to schedule.

Funds leveraged/New partnerships created

Discussions are being held with other Colleges to market the courses as electives to graduate students from around the University. Students from Environmental Science and Policy have already enrolled in the Renewable Power Portfolio course.

Proposals

A proposal entitled “Development of Sustainable Energy-Water-Food Nexus Course” was submitted to FESC for funding on Oct. 31, 2014. Expanding on the Energy Concentration area recently created at USF’s Patel College of Global Sustainability (PCGS) for its M.A. Program in Global Sustainability, we proposed the creation and delivery of a graduate-level interdisciplinary course entitled “Sustainable Energy-Water-Food Nexus”, which will capture the essential interdependencies of the Energy, Water, and Food sectors in today’s grey economy and create a solid foundation for tomorrow’s green economy. This nexus is often missed or undervalued in existing courses, so the proposed course comes to close the gap and incorporate sustainable water and food considerations into renewable energy through the collaboration of multidisciplinary faculty.

The course will be offered in on-campus and in-class formats simultaneously and will thus become available to students and professionals across the State of Florida. A novel component of the course will be the participation of expert guest speakers from the University of Florida, which will enhance USF-UF collaboration among faculty and will help disseminate nexus knowledge to students in Florida and beyond.