

Introducing Specialization in “Sustainable Energy Systems” for Under-Graduate Students in Engineering at the University of West Florida

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Project Time Period: Aug 2014 to July 2016

Summary

The objective of this proposal is to introduce a specialization in “Sustainable Energy Systems” for Undergraduate Engineering students at the University of West Florida that could also be used to educate industry professionals towards workforce development. The courses have been designed from the perspective of energy system planning, a subject that has always been complex and evolving rapidly during the past 10-15 years to accommodate dramatic changes in the industry. These changes include the ongoing transformation of the nation’s generation portfolio from being heavily dependent on fossil fuels to one that is heavily dependent on renewables (especially wind and solar) and the need for operating competitive electricity markets.

The courses designed under this specialization will assist professionals in understanding the limits of our present energy systems and lead us to a future in which we can continue to provide reliable and secure energy resources for improved human quality of life. The proposed specialization program focuses on electrical engineering sources and systems that are non-polluting, conserving of energy and natural resources, economically viable and safe for workers, communities and consumers. Coursework takes a systems level and interdisciplinary approach to solving seemingly intractable sustainable energy problems, as opposed to single disciplinary and locally optimized approaches destined to yield marginal positive impacts. Students will be able to create study programs suited to their interests and aspirations through their choice of electives and design projects. The course is electrical engineering-based but also covers a wider range of topics including economics, sustainability and environmental studies.

Discussions to offer this course as a certificate course are going on between faculty and Continuing Education department of the University. According to the designed curriculum, students were to take 4 courses from within the Specialization Core (12 credits) and one elective on Environmental Law with the schedule given below.

As the first step, a website was created for the specialization so that students can refer to it for information about faculty and contents of courses. The URL for website is

<http://uwf.edu/cas/cas-departments/electrical-and-computer-engineering/specialization-options/sustainable-energy-systems/>

The course on Renewable Energy Systems taught by Dr. Muhammad Rashid, Professor of Electrical and Computer Engineering, has been offered this fall 2014 and 34 students have enrolled for this course. Online material was developed and uploaded on to the University’s electronic learning and communicating site called ‘eLearning’. Study material and lectures for ‘Future Energy Systems’ course is under preparation by Dr. Bhuvanewari Ramachandran with assistance from a student assistant. They will be uploaded on to ‘eLearning’ by March 2015 in preparation for course offering during summer 2015. The progress made is on track with the schedule that was proposed initially.

Goals and Objectives

The objective of this project is to introduce a specialization in “Sustainable Energy Systems” for Undergraduate Engineering students at the University of West Florida that could also be used to educate industry professionals towards workforce development. Energy sustainability is about finding the correct balance between a growing economy, the need for environmental protection and social responsibilities in order to provide an improved quality of life for current and future generations. In short, it is meeting the needs of the present without compromising the needs of the future. Sustainable-energy education can inspire technical innovation with an environmentally conscious mindset. The proposed curriculum in “Sustainable Energy Systems” allows a student in any four-year undergraduate School or College to complete a coherent suite of classes that reveals the interdisciplinary nature of energy studies. The curriculum includes the essential elements of energy from the business, economics, and engineering perspectives, as taught by faculty in those areas. This program can be easily divided into modules to fit into a certificate course for professionals working in the industry and hence can aid them towards workforce development.

Project Activities, Results and Accomplishments

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The timeline for offering courses under this specialization is

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|-----------------|-------------|---|
| Year-1 | Fall 2014 | Renewable Energy Systems |
| | Summer 2015 | Future Energy Systems |
| Year-2 | Fall 2015 | Power Electronics and Drives |
| | Summer 2015 | Sustainable Power Systems: Planning, Operation, and Markets |
| Elective | Fall/Spring | Environmental Law |

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Concluding Remarks

The School of Science and Engineering (SSE) in specific and the University of West Florida as a whole are very supportive of this plan to introduce an undergraduate specialization in “Sustainable Energy Systems”. Every effort is being made by the faculty and administration to make this specialization sustain in the University for a very long time to come.