



Bachelor of Science Engineering Technology Hydrogen and Fuel Cell Education Program Concentration

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Project ID #
ed_06_sleiti

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Overview

Timeline

- **Project start date: 08/2008**
- **Project end date: 12/2009**
- **Percent complete: 50%**

Budget

- **Total project funding**
 - DOE share: \$399K
 - Contractor share: \$99.7K
- **Funding received in FY08 and FY09**
 - \$250K
- **Funding for FY10**
 - None

Barriers

- **Technical barriers**
 - None
- **Technical targets**
 - Develop courses for HFCT
 - Outreach plan and recruiting
 - Program sustainability

Partners

- **Florida Solar Energy Center**
- **University of Central Florida**





Objectives

Project Objective

- **Develop Hydrogen and Fuel Cell Technology (HFCT) education program resulting in Hydrogen and Fuel Cell Technology specialty BSET degree in Engineering Technology (ENT)**

HFCT Program Objective

- **Supply the need for educated graduates that will comprise the next generation workforce needed for HFCT research, development, and demonstration activities within government, industry, and academia.**



... Objectives

Year 2008 Objectives

- **Develop courses for the HFCT program**
 - EGN4XXX Hydrogen Fundamentals 3 Credit Hours
 - EGN4XXX Fuel Cell Technologies I 3 Credit Hours
 - EGN4XXXC Hydrogen Applications (including lab) 3 Credit Hours
 - EGN4XXXC Fuel Cell Technologies II (including lab) 3 Credit Hours
 - ETM4231 Applied Thermodynamics and Heat Transfer 4 Credit Hours
 - EGN4XXX Analysis of Renewable Energy Systems 3 Credit Hours
 - ETM4331 Applied Fluid Mechanics 4 Credit Hours
 - ETM4220 Applied Energy Systems 4 Credit Hours
- **Promoting the HFCT program and recruiting students**
- **Attending and organizing seminars and meetings**
- **Visits to community colleges, school districts and industries**
- **Start offering courses**



... Objectives

Year 2009 Objectives

- **Continue offering courses for the HFCT program**
- **Evaluate courses offered**
- **Exploring on-line course offering**
- **Continue promoting the HFCT program and recruiting students.**
- **Attending and organizing seminars and meetings**
- **Visits to community colleges, school districts and industries**
- **Prepare and present technical papers**
- **Hold advisory board meetings**



Milestones

Task	Project Milestones	Task Completion Date			Progress Notes
		Original Planned	Actual	Percent Complete	
1	Developing courses for HFCT concentration	08/09/09	01/30/09	100%	Complete.
2	Offering courses for HFCT concentration	12/30/09	12/30/09	70%	On-Track.
3	Promoting the program through extensive advertisement and outreach plan and recruiting	12/30/09	12/30/09	40%	Ongoing.
4	Course delivery for HFCT concentration	05/12/09	01/07/09	30%	On-Track.
5	Project Management and Reporting	12/30/09	30/12/09	45%	Ongoing.



Approach

Students:

- The HFCT program will accept A.S. as well as A.A. graduates of community colleges in Florida and nationwide.
- There are existing articulation agreements between area community colleges for existing ENT programs at UCF. Working on agreements that will include the HFCT program.

Program Hours:

UCF General Education	36
Lower Level Courses	24
Required BSET Core Courses	27
HFCT Core Courses	24
HFCT Technical Electives	17
Total	128

Courses:

– EGN4300C Hydrogen Fundamentals	3 Credit Hours
– EGN4731C Fuel Cell Technologies I	3 Credit Hours
– EGN4XXXC Hydrogen Applications (including lab)	3 Credit Hours
– EGN4XXXC Fuel Cell Technologies II (including lab)	3 Credit Hours
– EGN4730 Analysis of Renewable Energy Systems	3 Credit Hours



... Approach

Facilities:

The College of Engineering and Computer Science:

- A total enrollment of 6,109 students
- An undergraduate enrollment of 5,097
- \$150,000+ per year in CECS scholarships,
- 36 student chapters representing professional organizations
- Co-Op, work-study, and internships available with industry leaders
- Department, college and faculty labs

The Florida Solar Energy Center (FSEC):

- laboratory complex located on 15 acres
- 51 faculty members, 6 A&P and 43 USPS
- H2 and Fuel Cell labs

Faculty:

Experts in Academia, H2 and FC



Technical Accomplishments

Task 1.0 [Developing the courses for HFCT concentration starting from August 2008]

Developed Courses:

EGN4300C Hydrogen Fundamentals	3 Credit Hours
EGN4731C Fuel Cell Technologies I	3 Credit Hours
EGN4XXXC Hydrogen Applications (including lab)	3 Credit Hours
EGN4XXXC Fuel Cell Technologies II (including lab)	3 Credit Hours
EGN4730 Analysis of Renewable Energy Systems	3 Credit Hours
ETM4331 Applied Fluid Mechanics	4 Credit Hours
ETM4220 Applied Energy Systems	4 Credit Hours

Task 1.0 is complete



... Technical Accomplishments

Task 2.0 [Offering the courses starting from Spring 2009]

Course Title	2008-2009			2009-2010			2010-2011			2011-2012			2012-2013		
	SU	F	S												
ETM4220 Applied Energy Systems			X			X			X			X			X
EGN4300C Hydrogen Fundamentals					X			X			X			X	
EGN4731C Fuel Cell Technologies I					X			X			X			X	
ETM4331 Applied Fluid Mechanics					X			X			X			X	
ETM4231 Applied Thermodynamics and Heat Transfer						X			X			X			X
EGN4730 Analysis of Renewable Energy Systems								X			X			X	
EGN4XXXC Hydrogen Applications						X			X			X			X
EGN4XXXC Fuel Cell Technologies II						X			X			X			X

ETM4220 Applied Energy Systems was offered and taught in Spring 2009

Task 2.0 is 70% complete



... Technical Accomplishments

Task 3.0 [Promoting the program through extensive advertisement, recruiting students and outreach plans]

Visits to community colleges:

Community College (28)	HVAC	Electrical	Electronic	Construction	Eng. Techn.	Welding
Brevard CC	Certificate				AAS	Certificate
Broward College		AA	AA		AA, AAS	
Central Fla. CC	Certificate					
Chipola College			Certificate			
Daytona State College	Certificate					
Florida CC	AAS, Certificate	Certificate		AS, AAS, Certificate		
Gulf Coast CC		Apprenticeship				
Hillsborough CC			Certificate			
Indian River State College	Apprenticeship					
Lake-Sumter CC		Certificate				



... Technical Accomplishments

... Visits to community colleges:

Community College (28)	HVAC	Electrical	Electronic	Construction	Eng. Techn.	Welding
Manatee CC				AAS		
Miami Dade College	AS			AS		
Okaloosa-Walton College				AAS		
Palm Beach CC	Certificate	AS				
Pasco-Hernando CC						Certificate
Pensacola Jr. College		Certificate				
St. Johns River CC		Apprenticeship		AS		
St. Petersburg College			AS		AS	
Santa Fe CC		Classes				
Seminole CC	Certificate					
South Florida CC		Apprenticeship , AAS		AAS		
Tallahassee CC	Specialization		AAS	AAS		
Valencia CC			AS	AS		
TOTAL	9	9	6	8	3	3



... Technical Accomplishments

☐ Visits to high schools and meet with Science Resource Specialists :

- *School District of Osceola County, FL (SDOC),*
- *School District of Orange County,*
- *School District of Seminole County and*
- *School District of Brevard County*

☐ Visits to local industry:

- *Progress Energy,*
- *Siemens Power Generation,*
- *Mitsubishi Power Systems,*
- *Enterprise Florida, Inc.*
- *Florida Renewable Energy Producers Association (FREPA)*



... Technical Accomplishments

- **Participation in national and international conferences:**
 - **2008 Campus and Community Sustainability Conference, UCF from 10/19/2008 to 10/21/2008: Hydrogen and Fuel Cell Technology Education Program at UCF.**
 - **2008 Summer Faculty Conference, UCF: Engineering Technology Concentration on Hydrogen and Fuel Cells.**
 - **The team is planning to submit papers to:**
 - **American Society of Engineering Education Conference 2010**
 - **2010 NHA Conference and Hydrogen Expo.**

Task 3.0 is 40% complete (continuous process)



... Technical Accomplishments

Task 4.0 [Course delivery]

ETM4220, Applied Energy Systems was taught in Spring 09 with 36 Students

EGN4300C Hydrogen Fundamentals Fall 2009

EGN4731C Fuel Cell Technologies I Fall 2009

EGN4730 Analysis of Renewable Energy Systems Fall 2009

EGN4XXXC Hydrogen Applications (including lab) Spring 2010

EGN4XXXC Fuel Cell Technologies II (including lab) Spring 2010

Task 4.0 is 30% completed (continuous process)





Future Work

- **Continue offering the courses for the HFCT concentration**
- **Evaluate courses offered**
- **Continue working on promoting the program and recruiting students.**
- **Attending seminars and meetings to advertise program.**
- **Conduct visits to community colleges, school districts and industries.**
- **Prepare and present technical papers.**



Summary

We are developing Hydrogen and Fuel cell Technology (HFCT) education program in Engineering Technology (ENT) and FSEC at UCF

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