

Final Scientific/Technical Report
Covering Period October 1, 2010 through March 31, 2013
Date of Report June 29, 2013

Award Number: DE-EE0003746

Recipient Organization: Central Piedmont Community College, PO Box 35009, Charlotte, North Carolina 28235-5009

Project Title: Carolinas Energy Career Center

Project Directors: Dr. Anver Classens, Dick Hooper, Bruce Johnson
Cost sharing partners – N/A

Technical Contact: Michael Horn, CPCC, PO Box 35009, Charlotte, NC 28235-5009, 704-330-5963, 704-330-5476 (FAX),
Michael.Horn@cpcc.edu

Business Contact: Heather Parusel, CPCC, PO Box 35009, Charlotte, NC 28235-5009, 704-330-5968, 704-330-5476 (FAX),
Heather.Parusel@cpcc.edu.

1. Executive Summary

Central Piedmont Community College (CPCC), located in Charlotte, North Carolina, established the *Carolinas Energy Career Center* (Center) – a comprehensive training entity to meet the dynamic needs of the Charlotte region's energy workforce. The Center provides training for high-demand careers in both conventional energy (fossil) and renewable energy (nuclear and solar technologies/energy efficiency).

CPCC completed four tasks that will position the Center as a leading resource for energy career training in the Southeast:

- Development and Pilot of a New Advanced Welding Curriculum,
- Program Enhancement of Non-Destructive Examination (NDE) Technology,
- Student Support through implementation of a model targeted toward Energy and STEM Careers to support student learning,
- Project Management and Reporting.

As a result of DOE funding support, CPCC achieved the following outcomes:

- Increased capacity to serve and train students in emerging energy industry careers;
- Developed new courses and curricula to support emerging energy industry careers;
- Established new training/laboratory resources;
- Generated a pool of highly qualified, technically skilled workers to support the growing energy industry sector.

The Center provides emerging workers with the training and laboratory resources needed to be prepared to enter the rapidly evolving energy industry. Training provided by the Center reflects the goals and objectives of the National Energy Technology Laboratory by emphasizing energy security, competitiveness, reliability, environmental protection and energy efficiency, as well as ensuring a robust energy future for the nation. The approved grant period was October 1, 2010 through March 31, 2013.

Project Spend Plan							
Quarter	From	To	Estimated Federal Share of Outlays*	Actual Federal Share of Outlays	Estimated Recipient Share (Cost Share) of Outlays*	Actual Recipient Share (Cost Share) of Outlays	Cumulative Actual Outlays (Federal + Recipient)
	Start		Note 1		Note 1		
			Note 2		Note 2		
1Q	10/1/10	12/31/10		180,690.42		0	180,690.42
2Q	1/1/11	3/31/11		32,300.82		0	212,991.24
3Q	4/1/11	6/30/11		1,000.00		0	213,991.24
4Q	7/1/11	9/30/11		1,250.00		0	215,241.24
1Q	10/1/11	12/31/11		33,799.52		0	249,040.76
2Q	1/1/12	3/31/12		159,594.02		0	408,634.78
3Q	4/1/12	6/30/12		32,757.17		0	441,391.95
4Q **	7/1/12	9/30/12		48,120.30		0	489,512.25
1Q	10/1/12	12/31/12		5,708.70		0	495,220.95
2Q	1/1/13	3/31/13		29,779.05		0	525,000.00
Etc.							
Totals							

2. Accomplishments:

Timetable of Accomplishments, Progress and Status
Carolinas Energy Career Center at Central Piedmont Community College

Task 1.0 - Develop and Pilot New Curriculum for Advanced Welding Training

Goals, Objectives and Milestones	2010 Progress, status , accomplishments and estimate % completion	2011 Progress, status , accomplishments and estimate % completion	2012 Progress, status , accomplishments and estimate % completion	2013 Progress, status , accomplishments and estimate % completion
Subtask 1.1 Identify contracted services and full-time instructor to lead program development	Oct-Dec 2010: Search for candidates initiated. 25 % complete.	<p>Jan-March 2011: Completed Request to Hire documentation and PAQ to add new job description. Next step was to advertise the position. 35 % complete.</p> <p>April-June 2011: Recruiting start date was 5/10/2011 and two (2) applications were received despite efforts to advertise in various journals and recruiting sources. Applicants interviewed during the week of August 1. 50 % complete.</p> <p>July-Sept 2011: Of the two candidates who applied for the position, one candidate was interviewed. on 08/5/2011 before a hiring committee of 6 staff. The interview included a series of predetermined questions and a teaching exercise demonstration. The appropriate documentation was submitted to Human Resources for processing and approval of the selected candidate. The division waited for approval to hire on the basis of credentialing. 75 % complete.</p> <p>Oct-Dec 2011: A full-time instructor was hired to teach welding, automation classes and serve in a leadership role for the program. Instructor Terry Mayes began his duties on 11/29/2011. 100% complete.</p>	<p>July-September 2012: Division Director attended International Institute of Welding, July 10-13, 2012. Welding instructor attended robotics and cutting machine training, July 30 to August 3, 2012. In addition, Welding instructor took Certified Welding Inspector exam on August 19, 2012.</p>	Not applicable. Subtask complete.

<p>Subtask 1.2 Develop and adapt two courses in support of the advanced welding program. Establish two new curriculum certificates and train 12 students.</p>	<p>Oct-Dec 2010: Met with industry partner, Liburdi Dimeetrics on December 15 to initiate plans for implementation. Two new curriculum certificates identified. 25 % complete.</p> <p>Jan-March 2011: Awarded contract to Liburdi Dimeetrics to develop courses. Two temporary classes (WLD 265 and WLD 293F) were scheduled for the Fall 2011 semester. When the curriculum was developed, CPCC requested new course numbers and obtained State approval. 35 % complete.</p> <p>April-June 2011: Course development continued and accelerated once the instructor was hired. Liburdi Dimeetrics billed for contracted services. 40 % complete.</p> <p>July-Sept 2011: Completion of the course development was contingent on hiring of a welding instructor. WLD 265 is an existing and approved course. Once details of the course were completed, a request was submitted to the state office for approval. 50 % complete</p> <p>Oct - Dec 2011: Liburdi Dimeetrics delivered curriculum package for orbital welding course. The newly hired welding instructor reviewed the package and assessed its completeness. This assessment included onsite practice with course materials at the partner's facilities. In addition, instructor participated in other training to prepare for welding automation (WLD 265); specifically robotics welding training at Lincoln Electric.</p> <p>WLD 293F scheduled for the 2nd 8-week session in the Spring 2012 semester as a "special topics" class and may be revised following its initial offering. The process for state approval of the orbital welding course (WLD 293F) began in the spring semester. It is expected that final approval for WLD 293F will be in place by the beginning of the Fall 2012 semester. WLD 265 will be offered in the Fall 2012 semester. 75 % complete.</p> <p>Jan-March 2012: Package of change requests submitted to CPCC curriculum committee for new course, two new certificates and revised program of study:</p> <p>WLD 270 – New course will be implemented for orbital welding.</p> <p>C50420-C9 – New certificate for specialization in orbital welding.</p> <p>C50420-C8 – New certificate for the specialization in robotic welding.</p> <p>The CPCC curriculum committee approved all change requests. 90% complete.</p> <p>April-June 2012: The following have been submitted for approval:</p> <p>WLD 270 – new course for orbital welding, Certificate C50420-C9- new certificate for orbital welding, and</p> <p>Certificate C50420-C8- new certificate for robotic welding.</p> <p>Seven students completed the pilot course (WLD 293F). WLD 265, Welding Automation, is on schedule to be offered in the Fall 2012 semester. Students toured Liburdi Dimeetrics. 95% complete.</p> <p>July-September 2012: WLD 265 offered for the Fall 2012 semester with 6 students enrolled.</p> <p>WLD293F conducted as a special topic class with 9 students enrolled. To date, 13 students have been trained. WLD270 was approved by the North Carolina Community College System Office and will be offered during the Spring 2013 semester. Two new certificates have been approved by CPCC for offering. 95 % complete.</p> <p>October-December 2012: Students visited Freightliner to observe the application of robotics. WLD 270 was scheduled for the Spring 2013 semester. 95 % complete.</p>
--	--

<p>Subtask 1.3 Purchase equipment and supplies to support hands on training</p> <p>Oct-Dec 2010: Equipment quotes received. 15 % complete.</p> <p>Jan-March 2011: Request to purchase equipment submitted to the purchasing department. A justification for sole source procurement submitted with other purchasing documents. Quotes received from vendor were within budget. 35 % complete.</p> <p>April-June 2011: The order for the equipment was awarded to Liburdi Dimetrics on June 7, 2011 in the amount of \$100,886.84. In an effort to stay within the budgeted amount, Liburdi Dimetrics adjusted the cost of the equipment downward without lowering the value of the equipment. 50 % complete</p> <p>July-Sept 2011: Liburdi in the final stage of assembling the equipment. It was anticipated that delivery of the equipment would be by the middle of November 2011. Some delays in receipt of key components were experienced. 75 % complete.</p> <p>Oct-Dec 2011: The equipment purchased for the orbital welding course was delivered. Final receiving and billing underway and expected to be completed by January 31, 2012. 95 % complete.</p>	<p>**Jan-March 2013: Additional welding supplies were purchased including consumables such as wire, tungsten electrodes, gas cups, torches; steel pipe and special gases to support WLD 265 and WLD 270.</p> <p>Jan-March 2012: Equipment was purchased and received in this reporting period. The pilot course, WLD 293F, was initiated in March following delivery of the equipment. Payment was issued to the vendor on 2/14/2012. 100% complete for equipment.</p> <p>**July-September 2012: Various welding supplies were purchased. 90% complete.</p> <p>**October-December 2012: Balance of funds was transferred to purchase NDE and Welding supplies. A no-cost extension was approved to assure that all purchased items would be received prior to the grant close-out. 95% complete.</p>
--	--

****NOTE:** Due to the submittal and approval of a no-cost extension in October 2012, funds were transferred to supplies and the estimated percent completion was adjusted.

Task 2.0 - Program Enhancement of Non-Destructive Examination Technology

Goals, Objectives and Milestones	2010 Progress, status , accomplishments and estimate % completion	2011 Progress, status , accomplishments and estimate % completion	2012 Progress, status , accomplishments and estimate % completion	2013 Progress, status , accomplishments and estimate % completion
Subtask 2.1 Select and purchase equipment	Oct-Dec 2010: Equipment purchased from Olympus related to program enhancement of Non-Destructive Examination Technology, Ultrasonic Testing. Also received gift from GE Hitachi Nuclear Energy of 19 UT reference blocks. 100% complete.	Not applicable. Subtask complete.	Not applicable. Subtask complete.	Not applicable. Subtask complete.
Task 3.0 - Student Support: Implement Model to Support Student Learning Targeted to Energy and STEM				
Goals, Objectives and Milestones	2010 Progress, status , accomplishments and estimate % completion	2011 Progress, status , accomplishments and estimate % completion	2012 Progress, status , accomplishments and estimate % completion	2013 Progress, status , accomplishments and estimate % completion
Subtask 3.1 Identify content experts to develop 4 contextualized learning modules for math	Oct-Dec 2010: A framework was developed for the contextualized developmental mathematics courses to serve students in the targeted degree programs related to the grant. Courses include the use of diagnostic testing, the integration of computer-based learning tools and project-based learning labs that place an emphasis on connecting energy concepts with the related mathematics learning objectives. 15 % complete.	Jan-March 2011: MAT 121 (Algebra/Trig 1) and MAT 115 (Mathematical Models) were identified as the courses that will be used to facilitate the modularized instructional approaches with energy related, contextualized themes. A collaborative team of faculty members representing mathematics instruction and the affected academic program areas was established. This team served as the content experts. 100% complete.	Jan-March 2012: Contextualized math courses began to be offered during the Spring 2012 semester.	Not applicable. Subtask complete.

<p>Subtask 3.2 Identify and hire full time instructional program coordinator</p> <p>Oct-Dec 2010: Position requests submitted to College Human Resources. 10 % complete.</p>	<p>Jan-March 2011: Position search in progress. 50 % complete.</p> <p>April-June 2011: Position search in progress. 75 % complete.</p> <p>July-Sept 2011: Program Coordinator (Shana Neely) hired and began collaborating with math faculty and representatives from other program areas. 100 % complete.</p>	<p>July-September 2012: Program Coordinator accepted another position within the College but continued to provide support to the grant. 100% complete.</p>	<p>Not applicable. Subtask complete.</p>
	<p>Jan-March 2012: Preparation for Professional Development training included identifying date, securing location, confirming presenters and estimating costs. 40% complete.</p> <p>April-June 2012: Date for workshop rescheduled for Fall 2012 to accommodate the schedule of the keynote speaker. Marketing efforts underway and workshop agenda finalized. 50% complete.</p>	<p>Jan-March 2012: Preparation for Professional Development training included identifying date, securing location, confirming presenters and estimating costs. 40% complete.</p> <p>April-June 2012: Date for workshop rescheduled for Fall 2012 to accommodate the schedule of the keynote speaker. Marketing efforts underway and workshop agenda finalized. 50% complete.</p>	
<p>Subtask 3.3 Conduct professional development for CPCC faculty. 56 faculty trained.</p> <p>Oct-June 2011: No Activity. 0 % complete.</p>	<p>July-September 2011: Program Coordinator began developing initial framework for professional development activities. 10 % complete</p> <p>Oct-Dec 2011: The prescribed mathematics courses were scheduled and development of contextualized content initiated for Spring 2012 implementation. The process used to develop course content, coordinate interdisciplinary collaboration, infuse technology into curriculum and leverage developmental education redesign efforts served as the blueprint foundation that guides professional development activities. 20 % complete.</p> <p>July-September 2012: The Professional Development workshop was held on August 2, 2012 and was attended by 53 faculty members from various CPCC departments. Participants received a summary of the grant project and an overview of best practices in contextualized math by a nationally renowned researcher. Additionally, attendees participated in activities to identify how to expand the practices into math classes in their program areas. The work is now being extended to other program areas within the College. 100% complete.</p>		<p>7</p>

<p>Subtask 3.3, continued Conduct professional development for CPCC faculty. 56 faculty trained.</p>	<p>October-December 2012: A document was produced that outlined the plan for extending efforts to other areas of the College. The goal is to have comparable access to contextually relevant mathematics courses that are also complete with streamlined development content to all career and technical degree program areas. Refer to the attached document. 100% complete.</p>																				
<p>Task 4.0 – Project Management</p>																					
<p>Goals, Objectives and Milestones</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center; background-color: #d9e1f2;">2010</th> <th style="text-align: center; background-color: #d9e1f2;">2011</th> <th style="text-align: center; background-color: #d9e1f2;">2012</th> <th style="text-align: center; background-color: #d9e1f2;">2013</th> </tr> <tr> <th style="text-align: center;">Progress, status , accomplishments and estimate % completion</th> <th style="text-align: center;">Progress, status , accomplishments and estimate % completion</th> <th style="text-align: center;">Progress, status , accomplishments and estimate % completion</th> <th style="text-align: center;">Progress, status , accomplishments and estimate % completion</th> </tr> </thead> <tbody> <tr> <td data-bbox="763 1277 796 2061"> <p>Subtask 4.1 Convene meeting of project implementation team to review project goals, tasks and deliverables</p> </td><td data-bbox="796 1277 845 2061"> <p>Oct-Dec 2010: Meeting held October 20, 2010. Ongoing activity.</p> </td><td data-bbox="845 1277 894 2061"> <p>Jan-March 2011: A quarterly progress meeting was conducted on February 2, 2011. Ongoing activity.</p> </td><td data-bbox="894 1277 943 2061"> <p>Jan-March 2012: Meeting was held on for April 18, 2012. Ongoing activity.</p> </td></tr> <tr> <td data-bbox="845 1277 894 2061"></td><td data-bbox="894 1277 943 2061"> <p>April-June 2011: A quarterly progress meeting was conducted in May 2011 to review project progress and discuss reporting requirements. Ongoing activity.</p> </td><td data-bbox="894 1277 943 2061"> <p>April-June 2012: Meeting was held on April 18, 2012. Ongoing activity.</p> </td><td data-bbox="943 1277 992 2061"> <p>July-September 2012: Meeting was held on July 18, 2012. Ongoing activity.</p> </td></tr> <tr> <td data-bbox="894 1277 943 2061"></td><td data-bbox="943 1277 992 2061"> <p>Oct-Dec 2011: A quarterly progress meeting was conducted in August 2011 to review project progress and discuss reporting requirements. Ongoing activity.</p> </td><td data-bbox="943 1277 992 2061"> <p>October-December 2012: Meeting was held on October 17, 2012. Ongoing activity.</p> </td><td data-bbox="992 1277 1246 2061"> <p>Oct-Dec 2012: A quarterly progress meeting was held on December 7, 2011. Ongoing activity.</p> </td></tr> </tbody> </table>	2010	2011	2012	2013	Progress, status , accomplishments and estimate % completion	Progress, status , accomplishments and estimate % completion	Progress, status , accomplishments and estimate % completion	Progress, status , accomplishments and estimate % completion	<p>Subtask 4.1 Convene meeting of project implementation team to review project goals, tasks and deliverables</p>	<p>Oct-Dec 2010: Meeting held October 20, 2010. Ongoing activity.</p>	<p>Jan-March 2011: A quarterly progress meeting was conducted on February 2, 2011. Ongoing activity.</p>	<p>Jan-March 2012: Meeting was held on for April 18, 2012. Ongoing activity.</p>		<p>April-June 2011: A quarterly progress meeting was conducted in May 2011 to review project progress and discuss reporting requirements. Ongoing activity.</p>	<p>April-June 2012: Meeting was held on April 18, 2012. Ongoing activity.</p>	<p>July-September 2012: Meeting was held on July 18, 2012. Ongoing activity.</p>		<p>Oct-Dec 2011: A quarterly progress meeting was conducted in August 2011 to review project progress and discuss reporting requirements. Ongoing activity.</p>	<p>October-December 2012: Meeting was held on October 17, 2012. Ongoing activity.</p>	<p>Oct-Dec 2012: A quarterly progress meeting was held on December 7, 2011. Ongoing activity.</p>
2010	2011	2012	2013																		
Progress, status , accomplishments and estimate % completion	Progress, status , accomplishments and estimate % completion	Progress, status , accomplishments and estimate % completion	Progress, status , accomplishments and estimate % completion																		
<p>Subtask 4.1 Convene meeting of project implementation team to review project goals, tasks and deliverables</p>	<p>Oct-Dec 2010: Meeting held October 20, 2010. Ongoing activity.</p>	<p>Jan-March 2011: A quarterly progress meeting was conducted on February 2, 2011. Ongoing activity.</p>	<p>Jan-March 2012: Meeting was held on for April 18, 2012. Ongoing activity.</p>																		
	<p>April-June 2011: A quarterly progress meeting was conducted in May 2011 to review project progress and discuss reporting requirements. Ongoing activity.</p>	<p>April-June 2012: Meeting was held on April 18, 2012. Ongoing activity.</p>	<p>July-September 2012: Meeting was held on July 18, 2012. Ongoing activity.</p>																		
	<p>Oct-Dec 2011: A quarterly progress meeting was conducted in August 2011 to review project progress and discuss reporting requirements. Ongoing activity.</p>	<p>October-December 2012: Meeting was held on October 17, 2012. Ongoing activity.</p>	<p>Oct-Dec 2012: A quarterly progress meeting was held on December 7, 2011. Ongoing activity.</p>																		

<p>Subtask 4.2 Identify and hire project personnel</p> <p>Oct-Dec 2010: Search for candidates initiated for welding training. Position request submitted to HR for math personnel. 25 % for welding training and 10 % for math component.</p>	<p>Jan-March 2011: Ongoing activity. 25 % for welding and 50 % for Math.</p> <p>April-June 2011: Ongoing activity. 50 % for welding and 75 % for Math.</p> <p>July- September 2011: Hiring process completed for math component. Candidate selected for welding and materials submitted to HR. 100 % complete for Math and 75 % complete for Welding.</p> <p>Oct-Dec 2011: Full time instructor hired November 29, 2011 to teach welding automation and provide program leadership role. 100 % complete.</p>	<p>Not applicable. Subtask complete.</p>	<p>Not applicable. Subtask complete.</p>
<p>Subtask 4.3 Monitor Progress and meet agency reporting requirements</p>	<p>Oct-Dec 2010: Orientation meeting was held on October 20, 2010. Ongoing activity.</p>	<p>Jan-March 2011: Team meeting was conducted in February 2011 and scheduled for the duration of the grant. Ongoing activity.</p>	<p>Jan-March 2013: Meeting was held on March 25, 2013</p>

3. Summary of Project Activities: (Summarize project activities for the entire grant period including approaches used, problems encountered, departure from plan and impact on results)

Advanced Welding Training and Program Enhancement of Non-Destructive Examination Technology

Grant tasks included the development and piloting of a new Advanced Welding curriculum and enhancement of the Non-Destructive Examination (NDE) Technology program. Activities involved acquiring equipment and supplies, hiring a welding instructor, and curriculum development to increase the College's training capacity to meet the demand for energy-related jobs in the region. The grant project can be categorized into three areas of impact: the role of the industry partnership, personnel development, and the acquisition of equipment and tools to enhance the programs.

Industry Partnership-

The primary grant partner, Liburdi Dimetrics, played a key role in the success of the project by providing the following resources:

- Curriculum development support was provided for the creation of WLD 270, Orbital Welding. The course has been approved by the North Carolina Community College System Office for application at all community colleges in North Carolina.
- The consignment of equipment was arranged, including the use by students at the Liburdi Dimetrics facility, which created a valuable opportunity for students to gain hands-on experience with different equipment models in a real work environment.
- At least 4 graduates were hired for full time employment at Liburdi Dimetrics.
- A paper on the project was presented by CPCC and Liburdi Dimetrics to the education delegates at the International Institute of Welding (IIW) in Colorado.
- Training was offered by Liburdi Dimetrics to CPCC instructional staff on the use of orbital welding equipment.
- An instructional manual was delivered by Liburdi Dimetrics to support the orbital welding course.

Personnel Development-

Grant funds were used to hire and train a full-time faculty position to teach both the orbital welding as well as the robotic welding courses (WLD 270 and WLD 265). Grant funds were also used to cover training costs for the instructor to participate in the following:

- AWS Certified Welding Inspector Seminar and Testing
- Certified Welding Educator Seminar and Testing
- Robotic Arc Welding Training

Equipment Acquisition-

Various equipment purchases were made to enhance both the welding and NDE programs with state-of-the art training tools. The following equipment purchases were made during the period of the grant:

- Fifteen (15) Olympus 1000i ultrasonic testing units with scanning probes were added to the NDE program. Olympus offered CPCC a 50% discount for the units, provided updates on software, and has since invited students and faculty to participate in web-

based training activities to assist with updates on new techniques and equipment improvements.

- Two complete automatic Gas Tungsten Arc Welding (GTAW) machines, a manual front end C-Torch, a weld power supply and a Lathe System were purchased for the orbital welding course (WLD 270). One of the GTAW machines is a custom designed unit and is used for introducing students to basic GTAW using a traditional automatic GTAW approach. The other unit is used after students are familiar with the first method and are ready to engage in remote operations where the machine rotates around the pipe. The full function power supply provides high precision welding in standard tube and pipe welding applications. The Lathe system is engineered to provide a versatile and rugged industrial platform for circumferential welding applications. This equipment was purchased from Liburdi Dimetrics at a discounted price.

It is essential to note the value of coordinating and timing the acquisition of equipment, the hiring and training of personnel, and the development of curriculum. The purchase and installation of equipment along with the hiring and training of the instructor were critical precursors to the development of curriculum and subsequent course offerings. For example, a delay in the acquisition of equipment due to the procurement process could result in postponing the installation of equipment, training of the instructor on utilization of the equipment as well as curriculum development and course offerings.

Contextualized Learning Modules for Math

CPCC identified a critical need to revise the instructional strategies that were practiced in its developmental mathematics classrooms. With grant funds, this was accomplished by examining the learning objectives and assessment strategies of the courses and modifying how content is delivered to students. As part of the redesign, CPCC implemented technology as a remediation and instructional tool, contextualized courses (connect mathematical principles to other curriculum areas) and conducted faculty professional development to improve student learning outcomes.

Grant funds were used to hire an Instructional Program Coordinator to manage the implementation of a model to support student learning in math. Additionally, CPCC hired expert faculty to adapt and contextualize the math courses. Outcomes achieved include the following:

- Four (4) mathematics learning modules contextualized for energy career training (Engineering and Sustainability Technologies)
- Professional development and training for 53 faculty members

4. Products Developed:

CPCC developed and adapted two Advanced Welding courses and four contextualized math learning modules.

Advanced Welding Courses	
Product	Product Description
Welding 265 – Automated Welding/Cutting (activation of existing course)	This course introduces automated welding equipment and processes. Topics include setup, programming and operation of automated welding and cutting equipment. Upon completion, students should be able to set up, program, and operate automated welding and cutting equipment. Credit hours: 4 and Contact Hours: 8.
Welding 270 – Orbital Welding TIG/Pipe (new course created)	This course introduces automated tungsten inert gas (TIG) welding hardware, equipment, and processes required to apply specified, accurate, automated, and consistently repetitive pipe welds. Emphasis is placed on proper identification of automated welding process variables, how each relates to the functionality of orbital equipment and components, and how changes in variables directly influence weld quality. Upon completion, students should be able to produce quality pipe welds through the appropriate operation and control of automated TIG welding equipment. Credit hours: 4 and Contact Hours: 8.
Contextualized Math Modules	
Product	Product Description
Developmental Math 040 – Expressions, Linear Equations, Linear Inequalities	This course provides a conceptual study of problems involving linear expressions, equations, and inequalities. Emphasis is placed on solving contextual application problems. Upon completion, students should be able to distinguish between simplifying expressions and solving equations. Students will also be able to apply this knowledge to problems involving linear expressions, equations, and inequalities. Credit Hours: 1 and Contact Hours: 1.25.
Developmental Math 050 – Graphs and Equations of Lines	This course provides a conceptual study of problems involving graphic and algebraic representations of lines. Topics include slope, equations of lines, interpretation of basic graphs, and linear modeling. Upon completion, students should be able to solve contextual application problems and represent real-world situations as linear equations in two variables. Credit Hours: 1 and Contact Hours: 1.25.
Math 115 – Mathematical Models	This course develops the ability to utilize mathematical skills and technology to solve problems at a level found in non-mathematics-intensive programs. Topics include applications to percent, ratio and proportion, formulas, statistics, function notation, linear functions, probability, sampling techniques, scatter plots, and modeling. Upon completion, students should be able to solve practical problems, reason and communicate with mathematics, and work confidently, collaboratively, and independently. Credit Hours: 3 and Contact Hours: 4.
Math 121 – Algebra/Trigonometry I	This course provides an integrated approach to technology and the skills required to manipulate, display, and interpret mathematical functions and formulas used in problem solving. Topics include simplification, evaluation, and solving of algebraic and radical functions; complex numbers; right triangle trigonometry; systems of equations; and the use of technology. Upon completion, students should be able to demonstrate an understanding of the use of mathematics and technology to solve problems as well as analyze and communicate results. Credit Hours: 3 and Contact Hours: 4.



From: Bruce A. Johnson, Division Director
Date: 14 December 2012
Re: Carolinas Energy Career Center - Mathematics

The success of our August 2012 Contextualized Mathematics workshop exceeded our expectations. Of the 50+ faculty participants, a resounding number of them indicated a strong interest in partnering to establish unique developmental math pathways for their students and to develop college-level mathematics courses that are filled with content that is contextually relevant to their career aspirations. As a result of this surge in interest, a committee of mathematics faculty was formed, with the goal of partnering with six different career and technical education program areas to duplicate the efforts that were done for our energy related academic program areas. Please see below for a listing of the mathematics courses that will undergo a transformation of their included topics of discussion in effort to become more in concert with the goals of the degree programs that make use of them:

Mathematics Course	Academic Program Area
Algebra/Trigonometry I: A math course intended for the associate of applied science programs that are more technical in nature.	Sustainability Technologies Civil Engineering Technologies
College Algebra: A math course that focuses on applications of algebra for students in general education, health science and social science related program areas.	Multiple Allied Health/Health Science program areas
Mathematical Modeling: A math course that focuses on the creation and application of mathematical models for students in associate of applied science program areas.	Culinary Arts
Survey of Mathematics: A math course that focuses on a wide array of math topics and their application in the modern world.	Business Administration Early Childhood Education

Projected Timeline

2012 - Fall Semester

- Identify targeted program areas for expansion and establish partnerships between program area faculty and mathematics faculty
- Examine overlap of content and identify topics that can receive contextualized focus in the appropriate math course
- Select math courses

2013 – Spring Semester

- Begin development of projects and establish course pace schedules
- Perform initial enrollment analysis
- Develop marketing strategies
- Schedule courses

2013 – Fall Semester

- Implement new courses (Phase II)
- Recruit new academic program areas for further expansion

[About E-Link](#) | [Help](#) | [Access Request](#) | [Log On](#)
[FAQ](#) | [Contact Us](#) | [Site Map](#)


STIP | OSTI | DOE


[HOME](#) | [NOTICES: 241.3 - 241.4 - 241.6](#) | [AUTHORITIES](#)

Submitted to Releasing Official
sent email to:debra.ball@netl.doe.gov fits@netl.doe.gov

[Please print this page for your records]

Announcement Notice 241.3
 (02/2010)

U.S. Department of Energy

Announcement of Scientific and Technical Information (STI)

(For use by Financial Assistance Recipients and Non-Major Site/Facility Contractors)

OSTI ID: 1084490

SITE CODE: NETL - National Energy Technology Laboratory, Pittsburgh, PA, and Morgantown, WV (United States)

Part I: STI PRODUCT DESCRIPTION

A. STI PRODUCT IDENTIFIERS:

*1. Report/Product Number(s): DOE/EE/3746-1

*2. DOE Contract Number(s): EE0003746

3. Other Identifying Number(s): NA

*B. ORIGINATING RESEARCH ORGANIZATION: Centra Piedmont Community College

*C. STI PRODUCT TITLE: Advanced Welding courses: Automated Welding/Cutting and Orbital Welding TIG/Pipe

*D. AUTHOR(s): Last Name: Classens First Name: Anver Middle Name: Email Address: anver.classens@cpcc.edu ORCID: Affiliation:

Contributor Organization(s):

*E. STI PRODUCT PUBLICATION/ISSUE DATE: 12/31/2012

Availability: Contact author

*F. STI PRODUCT TYPE: Other

Other (specify type): Curricula

G. STI PRODUCT OR TECHNICAL REPORTING PERIOD: 10/01/2011 thru 03/31/2013

H. SPONSORING ORGANIZATION: USDOE; USDOE Office of Energy Efficiency and Renewable Energy (EERE)

I. SUBJECT CATEGORIES: 22 GENERAL STUDIES OF NUCLEAR REACTORS; 20 FOSSIL-FUELED POWER PLANTS; 14 SOLAR ENERGY

Keywords: Curricula, Advanced Welding, Automated Welding/Cutting, Orbital Welding TIG/Pipe

Welding 265 - Automated Welding/Cutting is a course that introduces automated welding equipment and processes. Topics include setup, programming and operation of automated welding and cutting equipment. Upon completion, students should be able to set up, program, and operate automated welding and cutting equipment. Welding 270 - Orbital Welding TIG/Pipe is a course that introduces automated tungsten inert gas (TIG) welding hardware, equipment, and processes required to apply specified, accurate, automated and consistently repetitive pipe welds. Emphasis is placed on proper identification of automated welding process variables, how each relates to the functionality of orbital equipment and components, and how changes in variables directly influence weld quality. Upon completion, students

should be able to produce quality pipe welds through the appropriate operation and control of automated TIG welding equipment.

***K. INTELLECTUAL PROPERTY / DISTRIBUTION LIMITATIONS:**

UNL

***L. RECIPIENT / CONTRACTOR POINT OF CONTACT**

***Name and/or Position:** Dr. Anver Classens, Division Director, Applied Technologies

***E-mail:** anver.classens@cpcc.edu

***Phone:** 704-330-4413

***Organization:** Central Piedmont Community College

Part II: STI PRODUCT MEDIA/FORMAT and TRANSMISSION***A. MEDIA/FORMAT INFORMATION:**

***1. Medium:** Announcement Notice Only

***B. TRANSMISSION INFORMATION:**

***1. STI Product is Being Transmitted:** a. Electronically Via E-Link: [Full-Text File NOT Uploaded](#)

C. LOCATION:

1. STI Product is Available Electronically At:

a. Digital Object Identifier Number:

New 241.3 Announcement Notice

Some links on this page may take you to non-federal websites. Their policies may differ from this site.

Office of
Science[Website Policies/Important Links](#)

Last Updated: 06/25/2013

[About E-Link](#) | [Help](#) | [Access Request](#) | [Log On](#)[FAQ](#) | [Contact Us](#) | [Site Map](#)

STIP | OSTI | DOE

[HOME](#) | [NOTICES: 241.3 - 241.4 - 241.6](#) | [AUTHORITIES](#)

Submitted to Releasing Official
sent email to:debra.ball@netl.doe.gov fits@netl.doe.gov

[Please print this page for your records]

Announcement Notice 241.3
(02/2010)

U.S. Department of Energy

Announcement of Scientific and Technical Information (STI)

(For use by Financial Assistance Recipients and Non-Major Site/Facility Contractor)

OSTI ID: 1084491

SITE CODE: NETL - National Energy Technology Laboratory, Pittsburgh, PA, and Morgantown, WV (United States)

Part I: STI PRODUCT DESCRIPTION

A. STI PRODUCT IDENTIFIERS:

*1. Report/Product Number(s): DOE/EE/3746-2

*2. DOE Contract Number(s): EE0003746

3. Other Identifying Number(s): NA

*B. ORIGINATING RESEARCH ORGANIZATION: Central Piedmont Community College

*C. STI PRODUCT TITLE: Contextualized Math Courses

*D. AUTHOR(s): Last Name: Johnson First Name: Bruce Middle Name: Email Address: bruce.johnson@cpcc.edu ORCID: Affilia

Contributor Organization(s):

*E. STI PRODUCT PUBLICATION/ISSUE DATE: 12/31/2012

Availability: Contact author

*F. STI PRODUCT TYPE: Other

Other (specify type): Curricula

G. STI PRODUCT OR TECHNICAL REPORTING PERIOD: 10/01/2011thru03/31/2013

H. SPONSORING ORGANIZATION: USDOE; USDOE Office of Energy Efficiency and Renewable Energy (EERE)

I. SUBJECT CATEGORIES: 97 MATHEMATICS AND COMPUTING

Keywords: Curricula, Contextualized Math, Developmental Math, Mathematical Models, Algebra/Trigonometry I

Developmental Math 040 – Expressions, Linear Equations, Linear Inequalities is a course that provides a comprehensive study of problems involving linear expressions, equations and inequalities. Emphasis is placed on solving contextual application problems. Upon completion, students should be able to distinguish between simplifying expressions, solving equations and apply this knowledge to problems involving linear expressions, equations and inequalities. Developmental Math 050 – Graphs and Equations of Lines is a course that provides a conceptual study of problems involving graphic and algebraic representations of lines. Topics include slope, equations of lines, interpretation of basic graphs, and linear modeling. Upon completion, students should be able to solve contextual application problems and represent real-world situations as linear equations in two variables. Math 115 - Mathematical Models is a course that develops the ability to utilize mathematical skills and technology to solve problems at a level found in non-mathematics-intensive programs. Topics include applications to percent, ratio, proportion, formulas, statistics, function notation, linear functions, probability, sampling techniques, scatter plots, modeling. Upon completion, students should be able to solve practical problems, reason and communicate with mathematics, and work confidently, collaboratively, and independently. Math 121 - Algebra/Trigonometry I is a course that provides an integrated approach to technology and the skills required to manipulate, display, and interpret mathematical functions and formulas used in problem solving. Topics include simplification, evaluation, and solving algebraic and radical functions; complex numbers; right triangle trigonometry; systems of equations; and the use of technology. Upon completion, students should be able to demonstrate an understanding of the use of mathematics and technology to solve problems as well as analyze and communicate results.

J.

DESCRIPTION/ABSTRACT:***K. INTELLECTUAL PROPERTY / DISTRIBUTION LIMITATIONS:**

UNL

L. RECIPIENT / CONTRACTOR POINT OF CONTACT**Name and/or Position:** Bruce Johnson, Associate Dean, STEM***E-mail:** bruce.johnson@cpcc.edu***Phone:** 704-330-6073***Organization:** Central Piedmont Community College**Part II: STI PRODUCT MEDIA/FORMAT and TRANSMISSION*****A. MEDIA/FORMAT INFORMATION:*****1. Medium:** Announcement Notice Only***B. TRANSMISSION INFORMATION:*****1. STI Product is Being Transmitted:** a. Electronically Via E-Link: **Full-Text File NOT Uploaded****C. LOCATION:****1. STI Product is Available Electronically At:**

a. Digital Object Identifier Number:

New 241.3 Announcement Notice

Some links on this page may take you to non-federal websites. Their policies may differ from this site.

U.S. DEPARTMENT OF
ENERGY
Office of
Science

Website Policies/Important Links



Last Updated: 06/25/2013