Photonics Technician Certificate Program

A program to bring unemployed workers back into the workforce as photonics technicians

Background of the Program

- **WORKFORCE CENTRAL FLORIDA (WCF)** received additional funding as a result of the American Reinvestment and Recovery Act of 2009 which was signed into law by President Obama on February 17, 2009. The purpose of the Recovery Act is to preserve and create jobs, promote the nation's economic recovery, and to assist those most impacted by the recession.

- Success will be measured by "the progress in **helping unemployed, underemployed, and dislocated workers find new, good jobs** and to access and remain in the middle class; and to help low-skill or low-income workers acquire 21st century skills, find family-supporting jobs in healthy industries and access the middle class"

- WCF identified the new and emerging industries to be targeted for funding: digital media, **optics / photonics**, and new and emerging occupations within the healthcare industry.

Forecasted Photonics industry technician needs

- ~25% of the 270+ photonics companies in Florida employ photonics technicians.
- According to a survey reported in the "*2008 Report on Florida's Photonics Cluster*", "Responding companies expected to increase their existing photonics workforce roughly 10% in 2009, with a slightly greater demand for certificate and technician-level workers over workers with higher degrees. This trend was projected to continue over the next 36 months, with the photonics workforce expected to grow by roughly 9% per year and the greatest need demand being shown for technicians."
- A survey conducted by the Florida Photonics Cluster of its 20 member companies in August 2008 and updated in May 2009 indicated an immediate need (next 6 months) of over 30 new photonics technicians and over 40 more in the following 12 months.
- Surveys conducted by OP-TEC (NSF-funded National Center for Optics & Photonics Education) in 2003 and updated in 2009 have indicated ~6,000 open photonics technician positions nationwide and a supply of only ~600 annually.

Photonics Technician Certificate for Florida Industry

- Primary Objectives:
  - Grant Photonics Training Certificates to at least 20 displaced workers most impacted by the recession and to have them employed by June 30, 2010.
  - Create a long-term sustainable program to meet the continuing needs of Florida's photonics companies

Photonics Technician Certificate Program

- UCF's Continuing Education department, with strong support from the Florida Photonics Cluster and several other organizations, proposed and was awarded a contract – announced in late June.
- Program is expected to start in August 2009
- The WCF requirement is that the project will train at least 20 eligible individuals with completion of training by no later than 6/30/2010.
- "Eligible individuals" must be either economically disadvantaged or individuals who have been laid off from their job and are receiving (or have exhausted) unemployment compensation.

Photonics Technician Certificate Program – Program Participants

- Program Lead: Division of Continuing Education, University of Central Florida
  - Program manager: Maria Cherjovsky, Assistant Division Director, (407)882-0247; mariac@mail.ucf.edu
- Organizational Participants:
  - UCF:
    - Division of Continuing Education (UCF/CE)
    - CREOL, The College of Optics and Photonics
    - Engineering Technology (ET) department
  - Valencia Community College
  - SPIE - The International Society for Optics and Photonics
  - OP-TEC, National Center for Optics and Photonics Education
  - Florida Photonics Cluster

Photonics Technician Certificate Program – Goals

- Recruit a minimum of 20 students into photonics/fiber technician training programs. The target group for these students are those individuals who are either economically disadvantaged or individuals who have been laid off from their job and are receiving (or have exhausted) unemployment compensation. A potential additional group is existing employees who have been notified of layoff, but who will be able to continue employment as photonics technicians.
- Deliver training to a minimum of 20 individuals who meet the eligibility criteria, but offer the training to all interested parties.
- Assist students trained in this program in finding and interviewing for employment opportunities in Florida companies.
- Develop internship/apprentice programs with Florida companies to attract and employ students for the photonics technician programs.
- If needed, modify the curriculum and develop additional curriculum and lab capabilities to meet the training and retraining needs as defined by industry.
- Develop and utilize an Industry Advisory Council with industry and other organizational stakeholder participants to guide design and execution of all program activities and to assure sustainability of the education and training programs beyond this 1-year funding.

Photonics Technician Certificate Program – Initial Basic Curriculum outline

- **Course 1 - Introduction to Photonics - 6 hours**
- This course will introduce students to the field of Photonics. Course will begin with nature and properties of light and then advance to photonics devices and systems. Topics to include: optics, fiber optics, lasers, and optical systems.
- **Course 2 - Geometrical Optics - 3 hours**
- This course will introduce students to the Geometrical Optics. Course will begin with lessons on thin lens calculations and progress towards computer ray tracing of complex lens systems.
- **Course 3 - Wave Optics - 3 hours**
- This course will introduce students to the field of Physical Optics. Students will learn about the wave properties of light in different media.
- **Course 4 - Laser Systems - 6 hours**
- This course will introduce students to laser systems. The course will begin with the theory of lasers and progress to the analysis of standard laser systems.
- **Course 5 - Optical Detection- 3 hours**
- This course will introduce students to the detection of light. The course will cover single detectors, array detectors and other means of detecting light.

Photonics Technician Certificate Program – Possible Additional Curriculum Content

- **Course 6 - Fiber Optics – 6 hours**
- This course will introduce students to the use of light for communication. The main topic will be fiber telecommunication.
- **Course 7 – Mathematics for Photonics Technicians – 6 hours**
- This course provides the necessary mathematics foundation for students with limited math knowledge.
- **Course 8 – Photonics Laboratory – 6 hours**
- This course provides hands-on experience with optical elements, laser and other light sources, detectors, and instrumentation.
- **Courses 9-11 – Fiber Optics Technician Courses**
  The Basic Fiber Optics Networking Course is designed for anyone interested in learning basic fiber optic networking and becoming a Certified Fiber Optics Technician.

  The Advanced Fiber Optics Network Testing and Maintenance Course as well as the Splicing Specialist one are designed for students who seek advanced training with the testing and maintenance of fiber optics networks.
- **Other optional courses**

  The courses and modules developed by OP-TEC (see http://op-tec.org/curriculum/laser.php) may be offered as requested/required by specific employers to meet their particular needs. These modules address topics specific to several applications including manufacturing, biomedicine, forensics, and optoelectronics.

Photonics Technician Certificate Program – 3 possible curriculum tracks

- Track 1: Student with no prior technical training or experience – 36 - 42 hours
  - Mathematics for Photonics Technicians – 6 hours
  - Introduction to Photonics – 6 hours
  - Geometrical Optics – 3 hours
  - Wave Optics - 3 hours
  - Laser Systems - 6 hours
  - Optical Detection- 3 hours
  - Photonics Laboratory – 6 hours
  - Industry-specific application module(s) – 3-9 hours

Photonics Technician Certificate Program – 3 possible curriculum tracks

- Track 2: Student with some technical training or experience – 24-30 hours
  - [Some courses may be waived depending on the specific education and work experience of the student]
  - Introduction to Photonics – 6 hours
  - Geometrical Optics – 3 hours
  - Wave Optics - 3 hours
  - Laser Systems - 6 hours
  - Optical Detection - 3 hours
  - Photonics Laboratory – 3-6 hours
  - Industry-specific application module(s) – 3-6 hours

Photonics Technician Certificate Program – 3 possible curriculum tracks

- Track 3: Student with basic technical training or experience – 71 hours [for students interested in pursuing a Fiber Optics concentration leading to employment in the telecommunication industry.]
  - Introduction to Photonics – 6 hours
  - Laser Systems - 6 hours
  - Optical Detection - 3 hours
  - Certified Fiber Optics Technician – 24 hours
  - Testing and Maintenance – 16 hours
  - Splicing Specialist – 16 hours

Photonics Technician Certificate Program – Tentative schedule

	2009						2010					
Task	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June
I. Finalize Project Resources												
Develop and utilize Industry Advisory Council	—							—	—			
finalize training curriculum		—	—									
Start development of requirements for a photonics certification program					—	—						
II. Student Recruitment												
Publicize the program		—	—									
Work with companies on possible internship programs & technician needs	—	—										
Work with Workforce Brevard to develop needs for retraining of technicians at KSC subject to layoff					—	—	—					
III. Conduct of Education Programs												
Deliver identified curriculum courses			—			—			—			
IV. Placement of Graduates												
Identify job opportunities												
Develop internship/apprentice programs with companies						—	—		—			—
provide resume writing and interviewing skills if necessary			—	—			—			—		