

## Collaboration in photonics training

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**Abstract:** The Connecticut Business and Industry Association and Three Rivers Community College have partnered with Connecticut's photonics industry to provide innovative training programs in optics, lasers and fiber optics. A Certificate in Fiber Optics is being delivered by distance learning with assistance by company mentors. This approach was developed to meet training objectives and company goals.

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OCIS codes: (000.0000) General

The Connecticut Business and Industry Association (CBIA) received a 2.2 million dollar grant in 2002 from the United States Department of Labor to train incumbent workers within the state's manufacturing and laser/fiber optic/telecommunications industries. The purpose of the grant is to address skill shortages in these industries so that both the workers and their employing companies remain competitive. CBIA is specifically working with community colleges that have programs which address employer training needs. The key training challenges include cross training smaller staffs as a result of downsizing, time spent off the production line, the logistics of providing training, such as scheduling for multiple shifts and distance to the class, and the economy of small classes.

In May of 2002, 3M Optical Components of West Haven, CT, a manufacturer of optical fibers for medical, aerospace, industrial and telecommunication market applications, began discussions with CBIA and Three Rivers Community College (TRCC) to teach an introductory course in fiber optics. It was ultimately decided that 3M employees would be given the opportunity to pursue a 14.5 credit Certificate in Fiber Optics. On-line courses were a necessity for 3M due to the distance to the college and the need to accommodate multiple shifts. The goal of the program was to provide 3M employees with an educational foundation in the basic optical science underlying the devices used in fiber optic telecommunications. Employees will thus increase their knowledge and skill base, ensuring that the company can operate more efficiently and competitively. A second goal was to strengthen teamwork within the company to support its lean manufacturing efforts.

The first course, Introduction to Photonics, was taught in the Spring of 2003. The instructors developed a custom textbook, online assignments including web-based applets, and a set of "home lab experiments" using simple equipment such as the Optics Discovery Kit (Optical Society of America) and a laser pointer. The faculty created videos illustrating problem solutions and lab set-up to ensure the success of auditory and visual learners. On-line office hours were scheduled and questions were posted to encourage participation in threaded discussions. Several components were designed to help improve teamwork. Four mentors (more senior staff members) were assigned to small groups of students to address learning questions, issues and challenges. Instructors and mentors encouraged participants to work together to solve problems, perform labs and in general to help each other along. 3M set aside a room for labs and provided a computer, VCR and fax machine.

The course was launched with the goal of providing a variety of options for adults to achieve their best learning. No single option was chosen more often than others, rather, participants selected the method that worked best for them. For example, not all participants viewed the videos, but several students found them very helpful. Instructors communicated via email with participants, and when questions or problems arose, instructors copied the mentors so they could follow up with live coaching. An IT mentor was available on-site when participants experienced web-site difficulties.

The blended learning experience combining web learning and on site mentoring was very successful for all involved. Participants preferred the format to traditional classroom or strictly on-line learning and their teamwork abilities with co-workers improved. On another level, the experience also strengthened the team relationship among 3M Corporation, CBIA and TRCC. Future plans call for the completion of the on-line certificate with courses in fiber optic technology and telecommunications.