Growing a photonics program in good times and bad

Judith Donnelly and Randall Seebeck
Three Rivers Community College 574 New London Turnpike, Norwich, CT 06030
telephone: 860 885-2353; fax: 860 886-5063; e-mail: jdonnelly@trcc.ccommnet.edu

Abstract: Three Rivers Community College began an associate degree program in Photonics Engineering Technology in 1998 when telecommunications was booming. Five years later the program continues to grow. Support from industry and from the National Science Foundation have been key to keeping the program moving forward. Creating a pipeline of entering students remains a challenge.

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The Three Rivers' Photonics Engineering Technology (PET) two-year associate degree program was approved by the CT Board of Higher Education in the summer of 1997 at the height of the telecommunications boom. At that time, Connecticut photonics-related companies announced plans to hire dozens of new workers per quarter, and it was anticipated that graduates of the new program would be snapped up by local industry. By the time the second class of photonics technicians graduated in 2001, the first graduates were already being downsized form their telecommunications related jobs. The challenges to the program since that time have been to broaden the curriculum, increase the variety of hands-on lab experiences, and attract increasingly skeptical students.

The original Photonics Engineering Technology curriculum was based on the well-established Electrical Engineering Technology associate degree program. The emphasis was on electronic telecommunications, with final semester courses in fiber optics and telecommunications, and little was done to integrate the optics and electronics courses. To better prepare students for employment in laser manufacturing and lighting related companies, a course in Laser Electronics was introduced, replacing the generic Electronics II. Elective courses were also added, allowing students to tailor their programs by taking CAD, manufacturing processes, statistics or additional electronics courses such as digital circuits. Not only is technician education enhanced, but transfer to four year programs can be maximized by proper choice of electives. Finally, a course in Advanced Laser Topics was added as a capstone course allowing the instructor to choose topics most relevant to the current economy and to student interests.

In 1997, the photonics program “laboratory” consisted of two cabinets in the physics laboratory containing HeNe lasers and an assortment of components, four fiber optics experiment kits and hand tools and a source and meter for applying connectors to fiber optic cable. The first two years, laboratories were taught in a variety of locations, including the physics and electricity/electronics labs. Materials acquisition for the laboratories, now numbering three, has been an upward spiral, beginning with a grant from the National Science Foundation (NSF) Instrumentation and Laboratory Improvement program, which supplied fusion splicers, OTDRs, electronic instrumentation plus additional tools, sources, and meters for the fiber optics course. A college overmatch to the grant, plus a round of industry donations, brought an assortment of lasers, components, mounts, optical benches, tables and breadboards. A second grant from NSF has provided additional instrumentation, including an optical spectrum analyzer, single mode lasers, modulators and WDMs, and an EDFA experimentation kit. Due to severe budget cuts, the college was unable to meet the required cash match, however, the industry downturn resulted in additional matching donations from downsizing companies, including two complete fiber optics workstations and two Newport optics kits from JDS Uniphase Electro-Optics Products group. In addition, once prohibitively expensive components are available through Internet auction and surplus sites at pennies on the dollar.

After a brief period of increase, the enrollment in the Photonics Engineering Technology program has begun to drop; fewer than 12 new students enrolled in Fall 2002. Several factors have contributed to the lack of students, including news proclamations that “fiber optics is dead” and the loss of a corporate-sponsored scholarship for photonics students. A more fundamental problem is that the word “photonics” is foreign to most high school students and their parents. An informal survey of 25 students attending a vocational-technical high school next door to the college revealed that not one student could define the term. Future plans include creating Tech Prep 2+2 programs with regional high schools; aggressive recruiting, aided by the college’s SPIE student chapter educational light show; seeking support for new scholarships to encourage promising low income students.