

A Cohort Master of Science Program in Advanced Technology

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Abstract

An interdisciplinary cohort program for Master of Science in Advanced Technology (MSAT) to meet the diverse technological needs of industry was implemented in 1996 at the State University of New York Institute of Technology, Utica, New York. The 33-credit program was jointly developed and implemented by the departments of electrical, mechanical and industrial engineering technologies. The purpose of this paper is to review the results of the cohorts thus far completed and to discuss our plan to make the future MSAT program focus on three areas of concentration mentioned above. To make the program more accessible some courses are offered on the Internet. It is expected that such a program will respond better to the need of current industrial environment and will attract more full time graduate students, which is one of the future goals of the college.

I. Introduction

State University of New York (SUNY) Institute of Technology is an upper division Institution for transfer and graduate students. It is one of the 64 campuses of SUNY system and is located in central New York. The college has a number of graduate programs, including accounting, advanced technology, applied sociology, business, computer science, nursing , information design technology, and telecommunications. The school of Information Systems and Engineering Technology also has undergraduate ABET accredited programs in electrical, mechanical, industrial and civil engineering technologies.

In the early nineties the economy of the central New York was slowing down because of industrial closure, downsizing and layoffs in the military and civilian sectors. The employees in a small and medium sized corporation had to have knowledge in a wide range of advanced technologies in addition to their area of expertise. In order to respond to these needs, a practice oriented, interdisciplinary, Master of Science Program ¹ in Advanced technology was launched in the Fall of 1996 by including courses from the departments of electrical, mechanical and industrial engineering technologies. The objective was to prepare the students in a wide range of engineering and technology practices so that they could help to improve the productivity at their place of work. All the courses included in the program were of applied nature and had applications to industry. The students accepted in the program were mainly graduates of engineering technology programs from the areas of electrical, mechanical and industrial. At the time of starting the program, there was no other Master of Science program in the Northeast where graduates from engineering technology programs could continue their studies for Master's

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degree without taking any additional courses. The program was developed by the executive committee specifically formed to develop and implement the program and it consisted of faculty from the departments of electrical, mechanical and industrial engineering technologies. The committee decided to start the program as a cohort on a part-time basis. Two courses were offered on Saturdays for a duration of 12 weeks. For the 33 –credit program ² all students had to take the same ten core courses and a graduate project. The program is currently running a third cohort which will be completed in the Fall of 2001. Student surveys for the program were conducted and the feedback was continuously incorporated into the program.

Currently, the economic environment of central New York is changing, and the industry needs personnel in focused areas of specialization. To respond to this change, we propose to introduce three separate options by adding three courses in each area of electrical , industrial and mechanical engineering technologies including the project. The students still have to take at least eight courses (24 credits) in a common core. We feel that by introducing such an option, the students can concentrate in the area of their expertise and will be able to help their industry more effectively. This will also allow us to run the program on a full time basis which in turn will attract more students, including the international students.

II. Implementation of MSAT Program

The first cohort was started at SUNY Utica/Rome campus with 28 students in the Fall of 1996. At the completion 22 students graduated in the Spring of 1999. The classes were held on Saturdays for the duration of 12 weeks. Most of the students admitted to the program consisted of engineers and technicians working in small sized industries, and faculty teaching at area community colleges. In order to make our offering more attractive, the two courses offered in the first semester were MST 580 (Computer and Robotic Vision) and MST 682 (Reliability and Quality Assurance). These courses attracted additional students from other programs. A student survey was conducted toward the end of the Fall of 1996 semester and students' suggestions were incorporated in the program. Most of the students chose the projects relating to their work in industry.

The second cohort was started at Albany area in the Spring of 1998 and the course work was finished in the Fall of 2000. The program continued to accept students for an additional two semesters. Nearly half of the students admitted in the program were the graduates of SUNY Utica/Rome outreach programs in electrical and industrial engineering technologies. The classes were held in the evenings at Hudson Valley Community College, Troy, New York. Most of the students in this cohort held technical jobs in local industries and two were senior engineers. After reviewing the program at the completion of first cohort, it was decided to offer MAT 500 (Topics in Applied Mathematics) and MAT 503 (Special Topics in Advanced Technology) as the first two courses. The decision was based on the proper sequencing of the courses to be followed and students' feedback.

The third cohort was started at SUNY Utica/Rome in the Fall of 1999 and will finish in the Fall of 2001 for a duration of 12 weeks. There are about 12 students from the Utica and Syracuse

area. Two of the students in this cohort are faculty members of the local community colleges, one is a math teacher, one is a plant manager, and the rest are engineers / technicians employed by the local industry. One of the students in the current cohort commutes from Pennsylvania State. It is decided to offer the last two courses, MST 580 (Computer and Robotic Vision) and MST 580 (Reliability and Quality Assurance) by way of web-based distance education provided by SUNY Learning Network ³. SUNY Learning Network (SLN) is an synchronous learning network started by SUNY System administration through the help of over 40 SUNY Institutions, and has trained over 1000 faculty, offering 35 full online degree programs with more than 1500 courses and over 20,000 students enrolled ⁴.

III. Courses for the current cohort.

In the first three cohorts students were required to take all the following courses. A student, however, could transfer up to 6-credit from other programs by the approval of the program committee.

MAT 500	Topics in Applied Mathematics
MAT 502	Advanced Engineering Economics
MAT 503	Special Topics in Advanced Technology
MST 520	Network Technology for Multimedia Systems
MST 576	Finite Element Theory
MST 580	Computer and Robotic Vision
MST 622	Intelligent Control Systems
MST 673	System Simulation
MST 680	Reliability and Quality Assurance
MST 682	Advanced Topics in Computer Integrated Manufacturing
MST 690	Project

IV. Proposed Options in the MSAT Program

In the proposed new MSAT program, students are required to take only 8 courses (24 credits) from the current core. The other two courses (6 credits) and the project (3 credits) will be from the area of their concentration. Three options are introduced in the area of electrical, manufacturing/quality and mechanical systems as shown below. A student can however transfer up to 6 credits from other programs approved by the MSAT program committee.

Common Core (8 courses)

MAT 500	Topics in Applied Mathematics
MAT 502	Advanced Engineering Economics
MST 520	Network Technology for Multimedia systems
MST 576	Finite Element Theory
MST 580	Computer and Robotic Vision
MST 622	Intelligent Control Systems
MST 673	System Simulation

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MST 680 Reliability and Quality Assurance
MST 682 Advanced Topics in Computer Integrated Manufacturing

Two courses and a project will be required from the following options.

Concentration in Electrical Systems

MST xxx Optical Networking
MST xxx Data Hiding and Digital watermarking
MST xxx Signal Processing Systems
MST 690 Project

Concentration in Mechanical Systems

MST xxx Applied Dynamics
MST xxx Refrigeration and Air- Conditioning
MST 690 Project

Concentration in Manufacturing / Quality Systems

MST xxx Design of Experiments
MGT xxx Total Quality Management
MAT xxx Applied Statistics
MST 690 Project

These proposed concentrations will allow the MSAT students to be more focused in any one of the areas while the common core will preserve the interdisciplinary nature of the program. At the last industry advisory board meeting the representatives from industry approved the proposed changes and liked some of the courses offered.

Conclusion

Two cohorts of our Master of Science program in Advanced Technology have successfully been graduated. The feedback from those graduates has been positive. They overwhelmingly liked the interdisciplinary nature of the program with some emphasis to make the program suited to their needs. The program helped most of the students at work and helped some in their career advancement. The cohort nature of the program helped students to network and consult each other in homework assignments and with technical problems at work. The proposed options will further meet the need of industry and help recruit more students which is the mission of the college. With the use of distance learning in some courses the program will be made available to a bigger pool of students and will make it easier for working students who can not commute from long distance.

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Biography

Atlas Hsie is an Associate Professor in the department of industrial engineering technology at the State University of New York Institute of Technology, Utica/Rome. He holds an M.S. degree in industrial engineering from the University of Michigan, and an M.S. degree in Physics (Materials) from the University of Akron. His areas of expertise are in the field of robotics, quality assurance and engineering economics. He is currently director of MSAT program.

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