Abstract

The Master of Science of Professional Science (MSPS) program at Middle Tennessee State University is a new, up-and-coming degree which trains students in Science, Technology, Engineering, and Mathematics (STEM) while incorporating core business classes into the curricula. This interdisciplinary degree, founded by the Sloan Foundation, is one of over 300 programs that make up what is known nationally as the Professional Science Master’s. The MSPS program originally contained two concentrations at its inception: Biotechnology and Biostatistics. With tremendous success, the program expanded to contain four additional concentrations: Actuarial Science, Healthcare Informatics, Geoscience, and Engineering Management.

Middle Tennessee State University’s Master of Science in Professional Science Engineering Management (EM) program represents the future of the Engineering Technology degree. The EM program provides students with leadership, management, and engineering skills necessary for success in manufacturing, industry and business. This unique EM program requires students to take courses focusing on project management, safety planning, research methods, and technology trends. In addition, students receive credit towards Project Management Institute (PMI) and are awarded full certification in both Lean and Six-Sigma methodologies.

Introduction

The Professional Science Master’s (PSM) degree is a two-year interdisciplinary graduate program that is funded by the Alfred P. Sloan Foundation and is designed to provide students with intensive training in science, technology, engineering, and mathematics (STEM) disciplines, combined with training in management and additional workplace skills such as communication, finance, and teamwork. This state-of-the-art degree helps meet the demand for employees who possess not only the technical and scientific skills, but also the soft skills needed in today’s workplace. Students are prepared for careers in industry, government, academia, business, or non-profit organizations where workforce needs are increasing. This non-thesis degree concludes with an internship which reinforces classroom learning while working on a scientific industry project.

The PSM program takes form as the Master of Science in Professional Science (MSPS) program at Middle Tennessee State University. Founded in 2004, the MSPS was the first of its kind in Tennessee. The MSPS program serves as the national model for PSM programs, and is the fastest growing graduate program at MTSU. When first launched, this program contained two concentrations—Biostatistics and Biotechnology. After great success, the program expanded its skill sets available to students to include additional concentrations such as Actuarial Science.
Geoscience, Health Care Informatics, and the most recent Engineering Management. The goal of the MSPS program is to merge the boundaries of science and business, and create a new breed of scientist by providing expertise training in both areas of science and business.

The interdisciplinary nature of the MSPS program fills a niche in industry management by narrowing the gap between science and business. By obtaining proficient training in both science and business the career prospects are increased for the graduates of this program. Students are given a solid foundation of education by taking courses focused on advanced knowledge of scientific principles and research experience. MSPS graduates prove to be a valuable asset to the scientific community.

Through interdisciplinary education, the MSPS program is designed to promote the professional development of the student. This program is a partnership among the College of Basic and Applied Sciences, College of Behavioral and Health Sciences, and the Jennings A. Jones College of Business. Courses such as Probabilistic and Statistical Reasoning, Business Law, Accounting, Leadership and Management, and Managerial Communications make up the set of business core courses required of the MSPS students, and provide highly valuable skills admired by the industry.

The final requirement of the MSPS program is an internship which allows students to obtain real-world experience and polishes the student’s professional development. Students must complete 250 hours in an industry setting of his or her chosen field of study. Through the internship, students gain valuable experience through hands-on assignments provided by the employer. The internship gives students a chance to use the knowledge they gained during their classroom career. At the conclusion of the internship students compile a portfolio and deliver a professional presentation of their internship experience. Seventy-five percent of students receive employment from their place of internship.

The success of the Master of Science in Professional Science program at MTSU has brought recognition from the local and national level. In 2010, the Tennessee Board of Regents (TBR) awarded the MSPS program with the Academic Excellence Award [1]. Furthermore, the Council of Graduate Schools in Washington, D.C. uses MTSU’s MSPS program as a model for traditional PSM programs. The program currently has a retention and graduation rate of 95 percent [2].

Engineering Management

One of the most recent additions to the Master of Science in Professional Science program is the Engineering Management concentration. The goal of the Engineering Management program is to create individuals with a heart of a scientist and a mind for business. This degree provides students with skills highly valued by industry. The Engineering Management degree at MTSU creates a new type of scientist desired by future employers and stands as the future of Engineering Technology.

The Engineering Management degree is available to Engineering Systems and Manufacturing undergraduate students and also to those with a similar STEM degree. In addition to the core
business courses required of all MSPS students, Engineering Management students take courses focusing on project management, safety planning, research methods, and technology trends.

Through the Engineering Management coursework, students are prepared for future careers in the management of technology and engineering in occupations such as: Technology Managers for Manufacturing Operations in assembly and fabrication, Healthcare, Food Production, and Governmental research initiatives. Also, students could have potential jobs as Project Managers for the Concrete and Construction Industries, Process Control Companies, and Automotive Industries [3].

Certifications

Through the coursework students gain credit towards their Project Management Institute (PMI), and also have the ability to gain full certification in both Lean and Six-Sigma methodologies. These certifications are highly advantageous and desired in today’s competitive job market.

A Green Belt certification is awarded to students after completion of a business/industry Green Belt project. Through the Green Belt project, students gain hands on experience in an industry/business. With business becoming increasingly complex, the demand for executives, managers, and other professionals who have the skills to eliminate waste, reduce defects, shrink inventory, and make other critical business process improvements has increased dramatically. Individuals who obtain a Six Sigma certification are a very attractive asset to companies seeking employees.

An additional certification gained through the Engineering Management coursework is a certification in Lean Manufacturing. Having a Lean Certification benefits both the student and his or her future employers. Lean certification is becoming a pre-requisite for employees and organizations. With a Lean Manufacturing Certificate, future employees are able to help companies develop lean standards, learn techniques for improving processes and they develop the abilities that are highly portable and internationally recognized. By having this certification, the student’s career prospects and earning potential are enhanced.

Partnerships

The Master of Science in Professional Science program was created upon the collaboration of three colleges and over thirty faculty members. The College of Basic and Applied Sciences, College of Behavioral and Health Sciences, and the Jennings A. Jones College of Business partnered together to build this interdisciplinary program.

In order to ensure the program would create highly trained and desirable graduates, an advisory board containing members of academic society and local industry within a 200 mile radius was set up. The board meets to discuss how to form the curriculum in order to meet the needs of both the students and industry. The advisory board currently holds meetings once or twice a year to mold the current curriculum in order to produce the most viable graduates for the demanding workforce. By educating new graduates in science and business, industries can form new

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partnerships and better trades can be made. This degree establishes a knowledge base that propels the scientific and business industries into the future.

Conclusion

The Master of Science in Professional Science program at Middle Tennessee State University offers students advanced scientific training in Actuarial Science, Biostatistics, Biotechnology, Healthcare Informatics, Geoscience, and Engineering Management while simultaneously teaching highly sought after business skills. Because this program partners with the industry in order to ensure the success of its graduates, a new type of scientist that is well trained and highly desired by the industry is created. The Engineering Management degree teaches students the interpersonal, leadership, management, and engineering skills needed for success in manufacturing, industry, and business.

Bibliography


Biography

Dr. Saeed Foroudastan is the Associate Dean for the College of Basic and Applied Sciences (CBAS). The CBAS oversees 10 departments at Middle Tennessee State University. He is also the current Director for the Masters of Science in Professional Science program and a professor of engineering technology at MTSU. Foroudastan received his B.S. in civil engineering, his M.S. in civil engineering, and his Ph.D. in mechanical engineering from Tennessee Technological University. Additionally, he has six years of industrial experience as a Senior Engineer and 17 years of academic experience as a professor, Associate Professor, and Assistant Professor. Foroudastan’s academic experience includes teaching at Tennessee Technological University and Middle Tennessee State University in the areas of civil engineering, mechanical engineering, and engineering technology. He has actively advised undergraduate and graduate students, alumni, and minority students in academics and career guidance. Foroudastan has also served as Faculty Advisor for SAE, Mechanical Engineering Technology, Pre-engineering, ASME, Experimental Vehicles Program (EVP), and Tau Alpha Pi Honors Society. In addition to Foroudastan’s teaching experience, he also has performed extensive research and published

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numerous technical papers. He has secured more than $1 million in the form of both internal and external grants and research funding. Foroudastan is the faculty advisor, coordinator, and primary fundraiser for EVP teams entering national research project competitions such as the Formula SAE Collegiate Competition, the Baja SAE Race, the SolarBike Rayce, the Great Moonbuggy Race, and the Solar Boat Collegiate Competition. For his concern for and dedication to his students, Foroudastan received MTSU awards such as the 2002-03 Outstanding Teaching Award, the 2005-06 Outstanding Public Service Award, and the 2007 Faculty Advisor of the Year Award. He received the Excellence in Engineering Education Award and Faculty Advisor Award from the Society of Automotive Engineers (SAE). He was also nominated for the MTSU 2005 and 2009-11 Outstanding Research Award. He received two Academic Excellence awards from the Tennessee Board of Region in 2010-11. Foroudastan has also won many College of Basic and Applied Science awards. In addition to this, Foroudastan also reviews papers for journals and conference proceedings of ASEE, ASEE-SE, and ASME, and he has been a session moderator for several professional conferences.

Ms. Dianna J. Prince is obtaining a Master of Science in Professional Science degree with a concentration in Biotechnology from Middle Tennessee State University. Prince is completing her graduate assistantship with the Director of the Master of Science in Professional Science program and Associate Dean of the College of Basic and Applied Sciences, Dr. Saeed Foroudastan. Prince assists with the preparation and submission of grants and publications among other duties. Prince is also a highly active officer of the Master of Science in Professional Science club, having served as Secretary and currently Vice President.