

College of Engineering Manufacturing Research Institute (MRI)

Director

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Introduction

The demand for manufacturing engineers in design, manufacturing and R&D in the state of Florida is increasing and is expected to grow as shown in Table 1. Our customer group comprises primarily of local metal cutting, electronic, plastics and a large number of medical device industries. To name a few, the Cordis Corporation - a Johnson and Johnson company; Beckman Coulter Corporation; Symbiosis Corp.; Motorola Corporation; Mark Two Engineering, Southern Gear and Machine Corporation and Gables Engineering Corporation. The growth of the medical device industries has expanded well into the “Biomedical Corridor” in Miami – Dade county; This area of South Florida continues to attract a number of medical device manufacturing companies and their subsidiaries.

The academic and research activities of our manufacturing programs are closely coupled to other departments in the College of Engineering at the University of Miami.

Objectives

The primary objective of the Design and Manufacturing Research Institute is to train students using real industrial projects and environments in collaboration with industry personnel in order to provide the required pool of engineers for local and regional manufacturing companies.

The second objective is to assist technology - based companies to increase their competitiveness and acquire new technological and management skills.

The third objective is to provide the “seed technical resources” essential to the needs of newly - founded companies by aiding them to develop their products and processes and establish their manufacturing operations.

Competency Gaps Addressed

The proposed institute is designed to address the core requirements of the Society of Manufacturing Engineers (SME) education plan; closing the competency gaps among newly graduated engineers and technologists. It is a mechanism to respond to the expressed needs of industry.

The specific competency gaps addressed are:

- Business Knowledge / Skills
- Problem solving
- Project Management
- Teamwork
- Manufacturing process control
- Manufacturing processes
- Product/ Process design
- Quality

Structure

The Manufacturing Research Institute comprises of eight primary facilities essential to satisfying the objectives stated. Figure 1 depicts the Design and Manufacturing Research Institute structure.

Other resources available to the Institute include:

- A multimedia conference room
- A reference library
- A university wide library

Existing facilities

The following facilities are all used to support manufacturing student’s courses:

a) Material Science Laboratory

The material science laboratory is equipped to train students on a number of mechanical instruments including hardness testing, heat treatment and material properties.

b) Computer Integrated Manufacturing Laboratory

The laboratory is equipped to provide students with knowledge and skills in manufacturing automation. Major equipment includes: four industrial assembly robots, a material handling system, a CNC Bridgeport milling machine and feeding systems.

c) Fabrication and Electronic laboratory

This facility is equipped for general machining and forming, welding, woodworking and some electronic fabrication and repair. Major equipment includes: two Bridgeport mills, three lathes, two grinders, a cold cutting saw, one glass blasting machine and a heliarc welder.

d) Instrumentation Laboratory

This facility is equipped with a number of technologies to perform circuit design and testing, acoustic measurements, and spectral analysis. It is an essential resource to train students to be proficient in manufacturing process monitoring and control.

e) Ergonomics and Biomechanics laboratory

This facility comprises of a number of computing and hardware technologies to design tasks and medical hardware including orthotic devices and biomedical implants.

f) College of Engineering Computer Laboratory

This laboratory is equipped with 25 personal computers, connected by a network served by the college of engineering server. This supporting facility allows students to have access to a number of software's to support their projects as well as access to a large number of databases and relevant information through the internet.

Technical Leadership

The Manufacturing Research Institute technical collaborative group comprises of specialists from Manufacturing, Mechanical, Environmental, Biomedical, Electrical and Computer Engineering and management programs from within the University of Miami, and engineering staff from industry. (Please refer to Appendix A).

Management Plan

While the home department of the Manufacturing Research Institute will be the department of Industrial Engineering, faculty and students with compatible interests from throughout the college of engineering, the business school or other entities such as the medical school will participate. The organizational structure of the institute consists of 1) a manufacturing faculty

member as Director (Dr. Shihab Asfour), who oversees all functions and serves as industrial liaison, 2) a manufacturing faculty member as Associate Director (Dr. Francesco Travascio), who assists in technical, administrative and fund raising activities, 3) a manufacturing advisory council that reviews the activities of the , reviews the manufacturing programs and provides guidance, 4) an administrative assistant who perform daily administrative activities of the institute and 5) technical and managerial teams that include faculty and industry consultants.