



MEMORANDUM

To: Edward T. Foote II, President

From: Steven Green  
Chair, Faculty Senate

Date: 29 March 2001

Subject: Faculty Senate Legislation #2000-19(B) - Approval of the University of Miami College of Engineering Industrial Assessment Center

4/5  
5/5  
Approve approve,  
Thanks.  
527

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The Faculty Senate, at its 28 March 2001 meeting, voted to approve the name of a sponsored center, the University of Miami College of Engineering Industrial Assessment Center, for the period of time of continuous funding and any extensions thereafter.

This legislation is now forwarded to you for your action.

SG/kl

cc: Luis Glaser, Provost  
M. Lewis Temares, Dean of the College of Engineering  
Shahib Asfour, Professor and Chairman, Department of Engineering

CAPSULE: Faculty Senate Legislation #2000-19(B) - Approval of the University of Miami  
College of Engineering Industrial Assessment Center

RESPONSE BY THE PRESIDENT: Approved DATE: 4/5/21

OFFICE OR INDIVIDUAL TO IMPLEMENT: Provost

APPROVED: \_\_\_\_\_

EFFECTIVE DATE OF LEGISLATION: \_\_\_\_\_

NOT APPROVED AND REFERRED TO: \_\_\_\_\_

REMARKS (IF NOT APPROVED): \_\_\_\_\_

# **The University of Miami College of Engineering Industrial Assessment Center**

## **Introduction**

The objective is to establish an industrial assessment center at the University of Miami. The center will be located in the Department of Industrial Engineering. The objectives of the center are:

- a) Assist small and medium size local manufacturers better manage energy requirements, reduce waste and increase productivity associated with manufacturing processes, materials, facilities and support functions (i.e. planning and logistics).
- b) Provide engineering students hands-on training and experience in energy waste and productivity management.

## **Demographics of Service Area**

Companies falling within a 150-mile radius of the center at the University of Miami will be served.

## **Justification of Center at UM**

There is a dire need for an assessment center at the University of Miami for the following reasons:

1. There exist a high density of small and medium size industries in South Florida. This density is higher than that of other counties in the state of Florida. About 46 % of establishments in Florida are located in the 16 counties to be served by the University of Miami Center, the remaining 54 % of the establishments are dispersed in all remaining 50 counties.

2. There is no similar energy conservation organization that provides the required services to satisfy these manufacturers needs.

3. A significantly large number of these manufacturers in South Florida lack in-house professional expertise in energy use and conservation. A preliminary analysis of Miami-Dade County alone shows that:

- a) 3571 establishments represent agricultural, mining and manufacturing sectors.
- b) Over 99 % of these establishments have less than 500 employees.

If one assumes that only 10 % of these companies qualify as establishments to receive assessments using the criteria outlined for qualification, 357 companies would qualify in Dade County alone.

4. South Florida is attracting a large number of small to medium size industries in a number of sectors including forest and agricultural products, chemicals and a variety of metal and plastic products. The growth of the medical device industries has expanded well into the "Biomedical Corridor" in the west of Miami-Dade county, which continues to attract a large number of medical device manufacturing companies and their subsidiaries to the area.

5. The University of Miami is a minority, global and well-established university with an excellent track record of cooperation with local industry in a number of areas and programs including engineering field projects.

6. Relevant experience and expertise of the management team of the proposed center (director and assistant director).

7. A student population that is diverse and well trained.

## **Institutional Qualifications**

### **Introduction**

The University of Miami is a minority, well-established education and research institution composed of 14 colleges and schools. The college of engineering comprises of five departments: Department of Industrial Engineering, Department of Mechanical Engineering, Department of Electrical and Computer Engineering, Department of Biomedical Engineering and Department of Civil, Architecture and Environmental Engineering. All the five departments are fully established granting Bachelor of science (B.S), Masters of science (M.S) and Doctor of Philosophy (Ph.D.) degrees in their respective areas.

The Department of Industrial Engineering grants two EAC/ABET accredited undergraduate programs (Industrial Engineering) and Manufacturing Engineering. The University of Miami is the only institution of higher education in the state of Florida that has an established and accredited undergraduate manufacturing engineering program. According to the Gourman report, it is ranked fifth 'In the United States, It is one of only seventeen ABET accredited programs in the United States. This program presents a special strength in the armor of Florida education to keep up with the fast pace of technological development and to be able to support its industrial growth in a globally competitive marketplace. The state subsidy grant program for Florida residents allows a large number (approximately 35 Students per year) of talented students to be enrolled in this program at the University of Miami. All of the subsidized students pay the State equivalent tuition amount only. The cooperation of local industry with our department and programs is very strong. Our students conduct internships and projects at a variety of local companies forming, casting and foundry projects are conducted at Security Plastics Inc., U.S. Foundry Inc., Metal form Inc., Stainless Inc. and Florida Castings Inc.; metal removal and finishing projects are conducted at Florida Fine Blanking Inc., Southern Gear and Machine Inc., Certified Metal Finishing Inc. and Chemical Packaging Inc.; medical and electronic product manufacturing projects are conducted at Cordis Corp., Beckman Coulter Inc. and Vital Care Group; a number of productivity projects are conducted at Florida Power and Light Inc. The Department of Industrial Engineering has developed a number of graduate programs that are offered at various company sites throughout the State of Florida. More than 20 companies have enrolled students in these M.S and Ph.D. granting programs so far.

### **Resources and Environment**

The proposed center for industrial assessment will have access to an impressive array of resources for the conduct of this project and dissemination of center information including a strong multidisciplinary student population from the college of engineering, a strong and committed management team, excellent supporting facilities and liaisons with industry. The major physical resources available to the center will be described in this section.

### **Department of Industrial Engineering Laboratory Facilities.**

The following laboratories are all well equipped with state of the art computing facilities, instruments and machinery. They are available to the center to perform required analyses. These laboratories support a number of related student courses and projects.

- a) Material science laboratory
- b) Design and prototyping laboratory
- c) Computer Integrated manufacturing laboratory
- d) Fabrication and Electronic laboratory
- e) Electrical machine laboratory
- f) Environmental laboratory

- g) Industrial hygiene laboratory
- h) College of engineering computer laboratory

### **Office Location, Space and Resources**

The University of Miami Industrial Assessment Center (UMIAC) will be located in the Industrial Engineering Department. It will occupy a dedicated furnished office (Room#288), equipped with four Pentium PC's, a laser printer, a fax machine, a dedicated phone line, desks and filing cabinets. This facility is provided to allow the administrative assistant, students working for the center and potential industry personnel to perform their work and activities separately from other events of the department of industrial engineering.

Other resources available for the operation of the UMIAC include:

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

The following are relevant technologies that are available and will be used by the center in conducting the assessment projects.

2 laptop computers, a power transducer, a video camera, a digital camera, stopwatches, clip boards, vernier calipers, micrometers, surface gages, a sound level meter, a octave band analyzer, ear protectors, a dry bulb monitor, a wet bulb monitor, an illumination level meter, a radiation meter, a sound level calibrator, an integrating vibration meter, a Botsball thermometer, an Alnor-Velometer, an exhaust air velocity meter, an air flow monitor, a combustible gas detector., a heat stress monitor, a portable oxygen indicator, a carbon dioxide detector, a personal monitoring system and a calibration station/ multi-gas monitor.

### **The Assessment Team**

The assessment team consists of the director (Dr. Shihab Asfour): a full time tenured professor and chairman of the Department of Industrial Engineering; the assistant director (Dr. Nourredine Boubekri), a full time tenured associate professor of manufacturing engineering who is also the director of the Design and Manufacturing Research Institute at the University of Miami; and 10 students (2 graduate and eight undergraduate students) pursuing degrees in the College of Engineering. All of the students will be paid through the grant for their work in this program. Graduate students will be encouraged to conduct their masters projects at one of the selected companies. Senior level students will be encouraged to participate in this program to conduct all or a module of their senior design projects in one of the selected companies and present the results of their findings as part of the capstone design projects.

Undergraduate juniors will be encouraged to participate internship programs that will be established with some of the companies selected in this program. Students will be encouraged to participate in a number of national competitions and forums related to energy, waste and productivity management.

## **Management Plan**

### **Organizational Structure**

1) Director: Dr. Shihab Asfour will a) oversee all functions of the center, b) be responsible for its operations, c) train students from different engineering disciplines in energy, waste and productivity management, d) conduct weekly meetings with the teams, e) lead assessment visits,

- f) lead the effort in generating formal assessment reports, g) serve as industrial liaison, h) communicate with the field manager's program staff and i) meet yearly with other LAC directors
- 2) Assistant Director: Dr. Nouredine Boubekri will: a) assist the director in conducting the functions of the center, b) train students working for the center, c) lead assessment visits, d) collaborate in generating the formal assessment reports and e) assist the director in identifying and contacting companies that can utilize the center's services
- 3) Administrative Assistant: This individual will be responsible for all secretarial activities such as answering the phone, typing reports, setting up appointments, filing, maintaining a database of the companies visited as well as companies to be potentially visited.
- 4) Engineering Students: Two graduate students and eight undergraduate students will be hired to work in this center. Their main job will be to collaborate with the director and the assistant director in performing the industrial assessments and in generating the formal assessment reports

### **Student Selection and Participation**

Two graduate students will be recruited for this program for a period of 2 years each, in order to maintain stability. Eight undergraduate students (four juniors and four seniors) will be recruited from the following programs: Industrial, Manufacturing, Mechanical, Environmental and Electrical Engineering.

Undergraduate students will be recruited for a period of two academic semesters. Four new undergraduate students will be recruited every semester (except the first year). This process ensures that 16 undergraduate students participate in this program every year (except the first year) and that new students will work with already experienced ones. An assessment team composed of the director or the assistant director, 1 graduate student, 2 undergraduate juniors and 2 undergraduate seniors will conduct each assessment, perform the required analyses and generate the formal report.

### **Identification of Potential Companies**

The UMIAC will periodically advertise the center and its activities in south Florida business journals and newspapers. A number of sources are available to identify companies. These include: the South Florida Manufacturers Association, the different chambers of commerce member's directories and different county's directories.

An initial phone contact with a company representative (i.e. a plant manager, a vice president, a chief of operations) followed by e-mails are planned as mechanisms to introduce the center and its activities and determine whether a company qualifies and is willing to use the services of the industrial assessment center.

A survey instrument will be developed and sent to each qualified company in order to collect data to prepare for a site visit. The survey instrument will include information related to:

- 1) Products manufactured at the plant
- 2) Major equipment used
- 3) Material use and waste generation
- 4) Different types of energy used in the plant
- 5) Energy and waste data collection methods currently used
- 6) A brief description of the facility
- 7) Utility costs
- 8) Potential dates for a site visit

### **Site Visit Scheduling and Preparation**

Based on the information collected through the survey instrument and the other instruments (i.e. e-mail, phone conversations), areas of focus are determined. Examples of focus areas may include high utility bills, high cost of in-process inventory etc. The director or assistant director presents the relevant findings to the team at the weekly meetings. A schedule for a visit is determined. A strategy is mapped to outline the resources (instrumentation, software etc.) needed in order to collect the required data during the site visit. Each team member's broad responsibility is determined at this stage.

### **Conducting the Site Visit**

At the site, a typical visit will begin by a brief meeting of the team and company representatives to outline a strategy for conducting the assessment, assign the company personnel that will guide the team, determine the specific tasks to be accomplished (based on the areas of focus) and who will accomplish them.

Example of areas, equipment and processes to be investigated include: furnaces, motor pumps, lighting systems, chillers, materials, flow of materials, manual tasks and others. At the end of the day, a debriefing of the company representatives is conducted. This meeting is lead by the director or assistant director. The next step of the process are explained to the company, namely: the generation of a formal report that will be sent to them and a follow up communication to learn whether the opportunities identified and recommended have been implemented or scheduled for implementation and what the benefits realized and costs are or are expected to be.

### **Generation of Formal Reports**

A formal report based on the data acquired before, during and following the assessment visit will be generated following each assessment visit.

Key data will be transferred electronically to the main program database. A copy of the report is sent to the field manager, as well as to the company client. The report is generated with the collaboration of each team member that conducted the visit (i.e., Director or Assistant director and students).

## **Management Team Qualifications, Experience and Related Projects**

### ***Dr. Shihab Asfour, Center Director***

Dr. Shihab Asfour is Professor and Chairman of Industrial Engineering at the University of Miami. He has served as the Associate Chairman of that department for 11 years. In 1980 he received his Ph.D. in Industrial Engineering from Texas Tech University, Lubbock, Texas. Dr. Asfour has served as a consultant to industrial, service, and educational organizations for over 27 years.

Dr. Asfour is the recipient of the Alexander Orr excellence in teaching Award offered by the College of Engineering in 1988. Dr. Asfour received the M.M. Ayoub Award for the Society of Work Science of Institute of Industrial Engineers in 1998. The award is the foremost recognition for those involved in this field of Industrial Engineering. Dr. Asfour was inducted in the Academy of Industrial Engineering at Texas Tech University in 1999. This honor is bestowed by Texas Tech University on individuals who have a distinguished record of professional activities in Industrial Engineering.

Dr. Asfour has been active in the Institute of Industrial Engineers (IIE) for the last 25 years. He is a senior member of the Institute. In 1985, Dr. Asfour served as President of the IIE Miami Chapter. This position helped him develop strong ties with local manufacturers. Dr. Asfour is also a member of the Society of Manufacturing Engineers.

Dr. Asfour's has conducted projects in the areas of manufacturing Engineering, business process reengineering, systems design, productivity and quality engineering and safety engineering, Dr. Asfour developed and implemented a large scale Productivity Program at Florida Power & Light Company (FPL), one of the largest utility companies in the world. This effort started in 1988 and was funded by FPL for six years to the tune of \$500,000. This work led to a major reduction of injuries and waste at FPL and contributed to FPL being the first US company to win the Deming Prize of quality. As a result of that work, Dr. Asfour was invited by Pacific Gas & Electric (PG&E) in California to lead a three-day workshop to assist PG&E in setting up a similar program. Over the past several years, Dr. Asfour has conducted several workshops in this field.

Dr. Asfour is currently leading a large-scale productivity and energy conservation study at the Physical Plant of the University of Miami. This project has been on going for the last four years. The labor productivity was almost doubled during those years. Dr. Asfour is also collaborating with Dr. Boubekri on a project at Renard Manufacturing.

Dr. Asfour has published about 170 articles in national and international journals, proceedings and books. Dr. Asfour has served as the Principal or Co-Principal investigator of more than 45 research grants from different funding agencies. The total research funds allocated to these grants exceed 3 million dollars.

### ***Dr. Nourredine Boubekri, Center Associate Director***

Dr. Nourredine Boubekri is a tenured associate professor in the department of Industrial Engineering. He received his Ph.D. in 1983 from the University of Nebraska in Industrial/Manufacturing engineering. Dr. Boubekri has led the manufacturing engineering program through two successful accreditation visits. He has established a number of manufacturing laboratories including the computer integrated manufacturing laboratory. Dr.



Boubekri has secured more than \$ 600,000 in grants and contracts as principal investigator over the past 8 years. He has published more than 75 articles in refereed and technical journals. Dr. Nourredine Boubekri has more than 10 years experience conducting projects at a variety of manufacturing establishments. Some of the related projects include 1) Design evaluation of an automated sand casting system for manhole covers (U.S. Foundry, 1995), 2) Efficient process of recycling sand (Florida Casting Inc., 1996), 3) Feasibility study for using EDM or ECM processes to machine material X (United technologies, 1997-1998), 4) Cutting fluid use, minimization and recycling (Southern Gear and Machine Inc; 1999-present) and 5) Productivity assessment of an electronic product manufacturing facility (Renard manufacturing Inc., Jan 2000-present). All of the above projects required a total design approach to better manage energy and waste and increase productivity. A formal report was generated and presented for each project.

**Business Plan:**

Funding for the University of Miami Industrial Assessment Center is provided by a research grant from the Department of Energy. The total funding for this center is one million dollars over the next five years.