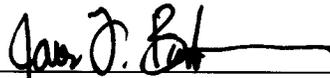


**Program Planning Summary
Clemson University**

Master of Industrial Engineering (MEngr)



James F. Barker
President
Clemson University

February 1, 2008

Master of Industrial Engineering (MEngr) PROGRAM PLANNING SUMMARY

New Graduate Program Proposal

We seek approval for a *New Program* – a Master of Engineering (MEngr) in Industrial Engineering for Clemson University. The Master of Engineering is a professional degree and requires 30 semester credit hours for completion. The program is seeking approval for delivery by asynchronous distance learning methodologies. No single location is requested since students may participate from any state or country after meeting requirements for admission. The concentration of the degree program is supply chain and logistics.

Proposed date of implementation

January 1, 2009

Justification of need for the proposed program

Since the earliest days of mass production, optimization and logistics have been cornerstones of successful industries because they form the basis for the production system control that efficiently converts raw materials into finished goods and delivers them to customers. Nearly all companies have supply chains, not just manufacturing. Supply chain logistics focuses on the technical, engineering aspects of this network. The basic foundational knowledge for addressing logistics issues lies within Industrial Engineering; hence, the proposed program is a Masters in Engineering in IE. Historically, higher efficiency of conversion translates to higher profits so there is little trouble understanding the interest that many industries place on production control, hence logistics and optimization.

The focus on supply chains is the result of dramatic advances in computing and communication technology that have precipitated significant opportunities for controlling the supply chain as a whole rather than each individual component separately as was done in the past and this is benefiting industry dramatically. Whether the “end product” is the result of classic production and distribution like tires that Michelin produce, a service like health care delivery supply chain in a hospital, or an oil refinery that Fluor would construct, improving and optimizing the supply chain is critical. Effective management of the supply chain can have a profound impact in success or failure. *Business Wire* (10/7/03) reported that a Deloitte survey of 600 companies in 22 countries revealed that only 7% effectively managed their supply chain but these 7% had 73% greater profit margins. In *Management Review* (4/99) Charles Fine of MIT found that “the design of the supply chain is the key factor that will determine whether or not a company will survive, let alone whether it will maintain a competitive advantage.” Further, in 2006, it was estimated that the costs associated with moving and storing material along the supply chain accounted for 9.9% of gross domestic product or something over \$1 trillion. Some studies suggest that for individual companies, this cost represents 10% of sales. Regardless of how it is measured, there are huge opportunities associated with improving the supply chain.

A substantially different strategy is focused on controlling the entire supply chain simultaneously to achieve global goals for a company. The task is daunting since the supply chain is commonly understood to include the chain of interrelated activities responsible for the flow of materials from the points of supply of raw materials to the delivery of finished goods to the consumers. As such, designing, implementing, and maintaining these systems are multidimensional undertakings that require a true interdisciplinary approach. Through the Clemson Institute for Supply Chain Optimization and Logistics (CISCOL) faculty have been able to develop an environment where interdisciplinary teams work together to successfully resolve these complex, integrated types of problems.

This need for this professional master’s degree was articulated by Fluor Corporation’s Chairman and CEO Alan Boeckmann when he presented a \$2 million gift to Clemson University that matches a state gift of \$2 million to form a Center of Economic Excellence in Fluor Endowed Chair of Supply Chain and Logistics at Clemson within the Department of Industrial Engineering. Boeckmann said that “as the globe continues to shrink and economies become more integrated, procurement, supply chain and logistics skills have become the lifeblood of the engineering and construction industry’s ability to execute projects at home and abroad. By supporting this endowed chair at Clemson, we are ensuring that the next generation of engineers and procurement specialists are equipped with the knowledge to excel in our industry.”

This Master's program is targeted at providing practicing engineers the necessary foundational and supply chain specific tools to identify opportunities for improving their supply chains and to effectively executing projects to take advantage of those opportunities. There is a huge need for this type of asynchronous program that allows engineers the flexibility of continuing their careers but adding these incredibly important skills. This proposed program is targeted at just this audience.

Anticipated program demand and productivity

Since that announcement, Fluor and Clemson have been working together to develop a general outline of knowledge that would be desirable in this MEng degree and the potential market. The results have been quite positive.

- Consistent with the cash flow analysis that is presented later in this document, Fluor believes that they can easily supply 20 new students a year to this program.
- Within days of the announcement of the Center for Economic Development, Bill Ferrell (IE faculty member at Clemson) and Jim Scotti (VP and Chief Procurement Officer at Fluor) received several e-mails from Fluor employees around the world asking if this program was to include a distance learning master's program.
- Jim Scotti was invited to speak to a meeting of very senior procurement executives in the construction industry. He mentioned that this program was being contemplated and before leaving that meeting, he had requests from several other construction companies who indicated interest.
- During a recent meeting at SPAWAR-Charleston, Bill Ferrell briefly discussed the planning effort for this program to the senior military and civilian executives who immediately requested that additional information be sent as soon as it was available.

Clearly, the above is anecdotal evidence, but we submit that it is a very strong endorsement to move forward. In each encounter, we have not only mentioned the delivery mechanism and goals but also the expected costs that are reflected in the cash flow analysis. Hence, we submit that the interest expressed from very senior executives with full knowledge of costs is an excellent indicator that this program is addressing a well-acknowledged need in industry. The program has been designed to be profitable with 20 new students each year and an attrition rate of 3% per semester.

Assessment of extent to which the proposed program duplicates existing programs in the state

We are not aware of any programs in the state that are similar in any way to this one. First, Clemson has the only Industrial Engineering program in the state that offers graduate degrees. Many universities have a course or two that address the supply chain within a business or management program; none offer an entire program in supply chain and logistics.

Relationship of the proposed program to existing programs at the proposing institution

The Department of Industrial Engineering at Clemson has established expertise with two existing supply chain and logistics programs in addition to the Center of Economic Excellence: 1) the Clemson Research Site of the Center for Engineering Logistics and Distribution (CELDi) and 2) the Clemson Institute for Supply Chain Optimization and Logistics (CISCOL).

CELDi is a prestigious National Science Foundation sponsored Industry/University Cooperative Research that brings industry and academia together for the improvement of supply chain logistics. CELDi currently has nine university and over thirty industry members. In 2006, research within CELDi totaled over \$3M.

CISCOL is an interdisciplinary institute that provides tangible products and services that support economic development within the state of South Carolina. Approved by the Commission on Higher Education in October 2005, the institute focuses on theoretical and applied research on integrated production planning, inventory control, scheduling, distribution, and logistics within the supply chain.

The Master of Engineering degree recognizes the Department of Industrial Engineering at Clemson as a world-class center of knowledge on the supply chain. It is synergistic with existing, acknowledged research expertise and adds an important educational dimension to the portfolio.

Relationship of the proposed program to other institutions via inter-institutional cooperation

Since the proposed program is a professional degree that is designed to be self-pay on a credit hour basis, we submit that a more important comparison is to programs in targeting roughly the same audience. An extensive search found the following:

School	Program Title	Emphasis	Distance Learning	Requirements (# 3 hour classes)	Estimated Program Price
MIT	MEngr in Logistics	Logistics and supply chain management	No	<10	>\$50,000
Penn State	Master of Professional Studies in Supply Chain Management	Supply chain management	Yes (90%)	<10	\$21,900
Texas A&M	Master of Industrial Distribution	Executive	Yes (80%)	10	\$42,000
U of San Diego	MS in Supply Chain Management	Executive	Yes (80%)	12	\$36,000
Michigan State	MS in Supply Chain Management	Logistics, Ops Mgt, Procurement	Yes (33%)	12	
Arizona State	MBA in Supply Chain Management	Executive	Yes	15	
Clarkson	MS in Engineering and Global Operations Management with Supply Chain Track	Executive	Yes (80%)	10	\$28,800

Within this landscape, the proposed program is unique and competitive. First, only one of these programs is delivered entirely in a distance learning format which we believe is critical for a professional degree targeted at today’s very mobile employees. Second, the only program with a similar focus is Michigan State and their procurement angle is different from ours and the rest of the program is quite different. Finally, our projected price will be <\$30K so we are positioned near the middle of the group.

Total new costs associated with implementing the proposed program (general estimates only)

A complete cash flow analysis has been performed and the program has been shown to break even after fall 2009 with the cost covered by tuition. A full detail will be provided in the full proposal.