

# M.S. in Engineering Management with Packaging Concentration

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**Abstract** – Christian Brothers University (CBU) has offered a successful Master in Engineering Management (MEM) graduate program since 1989. In 2005, the university started online course development for distance education to reach out to more students. This culminated in 2007 with the introduction of a fully online degree, M.S. in Engineering Management (MSEM) with electives focused on information technology. A spring 2007 study on the Memphis-area packaging industry revealed a need for graduates with business skills and packaging background. As a result, CBU introduced two new programs in fall 2007, B.S. in Engineering Management and MSEM, both with a packaging concentration. This paper describes the details of the MSEM with Packaging Concentration program. Students take engineering management courses from CBU and three packaging courses from Michigan State University. All classes are taken online. The paper also discusses the distance education technology employed by CBU.

*Keywords:* Engineering management, packaging engineering, distance education, collaboration, niche market

## INTRODUCTION

Christian Brothers University (CBU), a private Catholic higher education institution, was founded in Memphis in 1871 by the Brothers of the Christian Schools based on the Lasallian tradition. CBU offers various undergraduate degrees in four schools: the School of Arts, School of Business, School of Engineering, and School of Sciences. It also offers master's degree programs in engineering management, business administration, education, and executive leadership.

The Master in Engineering Management (MEM) degree program was established in 1989. The purpose of the program is to prepare individuals to successfully address supervisory and managerial needs in a technical environment. The program has served local engineering managers well over the years, with graduate students coming from FedEx, International Paper, Medtronic, Smith & Nephew, U.S. Army Corps of Engineers, EnSafe, Thomas & Betts, and others.

In 2005, CBU started online course development for distance education to reach out to more students. This culminated in 2007 with the introduction of a fully online degree, M.S. in Engineering Management (MSEM). Electives for both the traditional MEM and the new MSEM have focused on information technology, which is important to the modern corporate environment. Agreements have been made with several Lasallian universities (those run by Christian Brothers) to promote the online program, including La Salle Universitat Ramon Llull

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(Barcelona, Spain), Universidad de La Salle Bajio (Leon, Mexico), St. Mary's University of Minnesota (Minneapolis, MN), Lewis University (Romeoville, IL), and Universidad La Salle (Mexico City, Mexico).

Recently, CBU has developed its packaging engineering program. Although packaging is a large industry, there are only 12 academic packaging programs in the United States. Since Memphis is one of the major distribution centers in the U.S., it has a very strong packaging market. CBU started an undergraduate packaging engineering certificate in 2002 based on the industry need for packaging professionals. Currently, in addition to the packaging certificate, CBU offers packaging concentrations for the B.S. in Engineering Management and M.S. in Engineering Management degrees. More information about packaging engineering at CBU can be found in [Malasri, 1].

### **M.S. IN ENGINEERING MANAGEMENT (PACKAGING CONCENTRATION)**

In spring 2007 the first author met with many packaging professionals in an attempt to survey the market needs on packaging education. Most said they would like to see graduates with business skills and packaging background. This has led CBU to establish the aforementioned two new programs, a B.S. in Engineering Management (Packaging Concentration) and an M.S. in Engineering Management (Packaging Concentration).

The M.S. program is a collaboration between Christian Brothers University and Michigan State University (MSU). The course requirements are:

#### Engineering Management Courses (CBU)

- ENGM 600 Engineering Management Theory (3 crs.)
- ENGM 602 Engineering Accounting (3 crs.)
- ENGM 603 Engineering Finance (3 crs.)
- ENGM 604 Social/Legal/Ethical Considerations for Engineering Managers (3 crs.)
- ENGM 605 Quality Assurance (3 crs.)
- ENGM 607 Operations Research (3 crs.)
- ENGM 695 Research Methods in Engineering Management (3 credits)
- ENGM 606 Thesis (3 crs.)

#### Packaging Courses (MSU)

For those without an undergraduate degree in packaging:

- PKG 801 Packaging Materials (4 crs.)
- PKG 802 Packaging Machinery, Distribution, and Dynamics (4 crs.)
- One additional course from List A below (3 crs.)

Note: Students who complete this program receive the MSEM degree from CBU and a Certificate of Technical Accomplishment in Packaging from MSU.

For those with an undergraduate degree in packaging:

- Three courses from List A below (9 crs.)

Note: Students who complete this program receive the MSEM degree from CBU and a Certificate of Professional Accomplishment in Packaging from MSU.

List A:

- PKG 805 Advanced Packaging Dynamics (3 crs.)
- PKG 815 Permeability and Shelf Life (3 crs.)
- PKG 827 Polymeric Packaging Materials (3 crs.)
- PKG 828 Processing and Applications of Packaging Plastics (3 crs.)
- PKG 875 Stability & Recyclability of Packaging Materials (3 crs.)
- PKG 891 Special Topics: Value Relationships in Packaging (3 crs.)

This collaboration between two established programs allows a full spectrum of degree offerings, as shown in Figure 1. Offerings A and D are existing programs at CBU and MSU, respectively. Offerings B and C result from the cooperation between the two institutions; offering B is the focus of this article. Please note that CBU also offers an

Engineering Management Certificate to MSU packaging graduate students who take three courses from ENGM 600, 602, 603, 604, 605, and 607 as listed above.

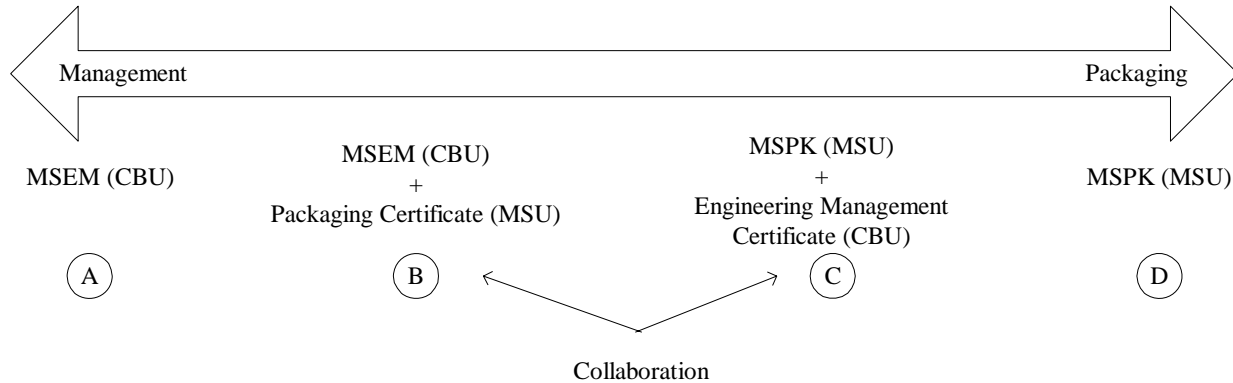


Figure 1. Full Spectrum of Degree Offerings between CBU and MSU

The collaboration also takes advantages of the strengths of the two institutions:

The School of Packaging at Michigan State University established its packaging program in 1952. It has conferred over 5,000 undergraduate and more than 200 graduate degrees. It is one of the oldest, largest, and best known packaging programs in the world. It also houses the Center for Food & Pharmaceutical Packaging Research (CFPPR) and Consortium for Distribution Research (CDPR).

The Engineering Management Graduate Program at Christian Brothers University is well established in the Mid-South. With the distance education initiative, it now has the potential to reach out to 43 higher education institutions around the world run by Christian Brothers. These Lasallian institutions are located in 15 countries: Australia, Belgium, Brazil, Colombia, Cote d'Ivoire, Costa Rica, France, Malaysia, Mexico, Palestine, Panama, the Philippines, Singapore, Spain, and the United States. Institutions in the U.S. are Christian Brothers University (Memphis, TN), College of Santa Fe (Santa Fe, NM), La Salle University (Philadelphia, PA), Lewis University (Romeoville, IL), Manhattan College (New York City, NY), St. Mary's College (Moraga, CA), and St. Mary's University (Winona, MN).

### DISTANCE EDUCATION TECHNOLOGY

The collaboration between CBU and MSU is made possible with distance education technology. Classes from both institutions in the MSEM (Packaging) program mentioned above are available in distance education format. In this section, only the distance education technology employed by CBU is presented.

CBU offers two parallel Master's programs in engineering management: the traditional face-to-face Master in Engineering Management (MEM) and the distance-education Master of Science in Engineering Management (MSEM). When a course is delivered to live students in the MEM program, it is recorded for use in the MSEM program. This means the distance-education courses are updated on a regular basis.

As mentioned in a recent paper [Jackson, 2], the distance education production system at CBU requires a relatively small investment of resources and people. Two classrooms are equipped with video and audio equipment allowing the recording of ten courses per semester or about four hundred hours of lectures.

During a recording session the instructor uses a laptop tablet computer to deliver his/her lectures. A screen recording software package is used to capture presentation slides, while a microphone records voice and a video camera captures body movement. The tablet computer allows the instructor to write on its monitor, which is projected onto a screen via a data projector for live students. A recording technician is present in the session to operate hardware and software, so the instructor only needs to concentrate on the delivery of class materials. After the recording session, a technician combines all media components (audio, video, and presentation materials).

At the end of the semester, all lectures (20-30 hours) are compressed into one DVD, and the course is ready for distance-education students. It was decided not to deliver the materials online, as the target audience (Lasallian colleges/universities) are located in a variety of places around the world, some of which may have bandwidth issues. It was also decided not to synchronously deliver the course materials due to the time differences among these countries. Instead, the course DVDs are mailed to partner institutions for distribution to students. Once media player software is installed on a student's computer, the student can view the lectures directly from a DVD drive. The quality of the recording is excellent. Figure 2 shows a sample of a lecture screen.

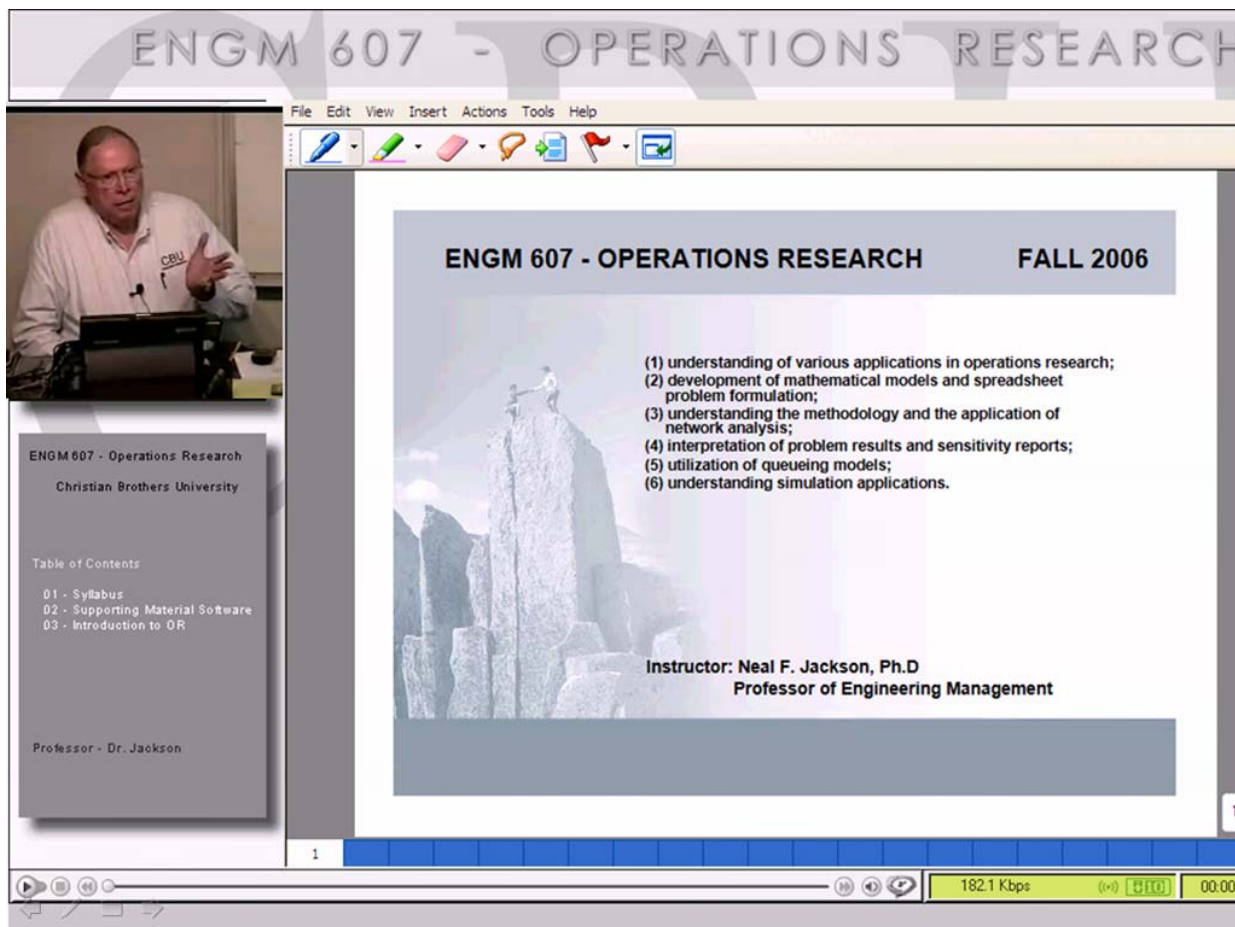


Figure 2. A Sample of Lecture Screen

## CONCLUSIONS

The collaboration between CBU and MSU is made possible by distance education technologies. By focusing on their respective strengths, the two institutions have developed a new concentration of an existing program. This idea can be applied towards future collaborations as well. The MSEM program presented in this paper focuses on packaging, but in the future CBU may work with another institution for a different concentration such as construction management. Additional resources required are minimal since there are no new courses offered by either side.

It is too early to report enrollment of the M.S.E.M (Packaging Concentration) at this time since the program has been announced only recently. There have been several inquiries about the program and it is expected that some will start the program in the fall of 2008. However, the on-line M.S.E.M. (Information Technology Concentration) started in the summer of 2007 with eleven students in Mexico. In spring of 2008 the enrollment in Mexico has increased to 31 students. In addition, the on-line program has two more students in Spain and eight other students in the U.S.

Rapid change is a fact of life in this century; new niche areas can arise quickly, while old areas may disappear. Universities must be flexible in offering educational programs that meet the changing needs of the market. Hence, collaborations among institutions, such as the one presented in this paper, benefit the institutions themselves as well as the industry.

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Dr. Malasri is a Professor of Civil and Environmental Engineering at Christian Brothers University. He received his Ph.D. from Texas A&M University. His background includes construction management, structural engineering, solid mechanics, material testing, artificial intelligence, and optimization. He was instrumental to the establishment of the packaging engineering program at CBU during his term as engineering dean from 1999-2005. Currently, he serves as packaging activities coordinator. He has served on editorial boards for the *International Journal of Engineering Education* and *Journal of Professional Issues in Engineering Education and Practice*. His recognitions include Outstanding Engineer of the Year (Tennessee Society of Professional Engineers), Award of Excellence (Memphis-Area Joint Engineers Council), Distinguished Lasallian Educator (CBU), and Douglass J. Thomas Chair in Engineering (CBU).

**Neal Jackson, Ph.D.**

Dr. Jackson is a Professor of Engineering Management and Director of the Graduate Engineering Programs at Christian Brothers University. He received his Ph.D. in Production and Operations Management from the University of Mississippi. In his academic career of twenty-three years, he has held both administrative and teaching positions. Dr. Jackson also has twelve years of experience in manufacturing and production management. He was a production supervisor in machining at the International Harvester Company – Memphis Plant, a production manager for Quartrol Corporation in Birmingham, AL, and a quality assurance manager for Layne and Bowler, Inc., in Memphis.

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Dr. Olabe received his Ph.D. in telecommunications engineering from the Universidad Politécnica de Madrid, where his doctoral dissertation received the 1983 Best Doctoral Dissertation award. In 1986 he joined the faculty of Christian Brothers University. He is a Professor of Electrical Engineering and has served as Chairman of the Department. He teaches courses in digital design, digital signal processing, digital communications, and computer network design. His research interests include implementation of logic systems using EPLD technology, speech processing, computer network design, and implementation of multimedia applications in broadband networks. Dr. Olabe currently oversees and coordinates online educational programs at CBU.