The Faculty Senate

June 13, 1996

Dr. Ray M. Bowen
President
Texas A&M University

Dear President Bowen:

At its regular meeting held June 10, 1996 the Faculty Senate considered and approved a proposal from the Graduate Council from the College of Engineering requesting a reduction in the coursework requirements of the Life Cycle Engineering Program from 45 hours to 36 hours.

Enclosed is the document considered by the Senate. Please advise me of your decision on this recommendation.

Sincerely yours,

[Signature]

Steven M. Oberhelman
Speaker, 1996-97

pc: Dr. Ronald G. Douglas, Executive Vice President & Provost
    Dr. Dan H. Robertson, Chair, Graduate Council

APPROVED DATE

[Signature] 4/24/96
May 17, 1996

Dr. Pierce E. Cantrell  
Chair, Executive Committee  
Faculty Senate  
Texas A&M University  
M. S. 1225

Dear Pierce:

At the May 9, 1996, meeting, the Graduate Council voted unanimously to approve the College of Engineering's proposal requesting a reduction in the coursework requirements of the Life Cycle Engineering Program from 45 hours to 36 hours.

Sincerely,

[Signature]

Dan H. Robertson, Chair  
Graduate Council

attachment

cc:  C. Roland Haden  
Richard Feldman
April 26, 1996

MEMORANDUM

TO: Graduate Council
    Graduate Instruction Committee

FROM: C. Roland Haden
      Vice Chancellor and Dean of Engineering

SUBJECT: Degree Program Change

Attached is a proposal which requests a reduction in the coursework requirements of the LCE-OM program. The program was designed to provide continuing educational opportunities and professional development for rising industrial managers. The current program requires 45 hours of coursework. Many companies simply cannot afford to have their employees on leave for this long of a period. The proposed reduction to 36 hours will better accommodate their schedules. In addition, our research of other programs shows that many of them require only 33-36 hours of work.

Please advise if additional information is needed as you consider our request.

c: Benton Cocalougher

mp/share/lceom reduction
Nonsubstantive Degree Program Proposal

NAME OF INSTITUTION:  Texas A&M University

NAME OF PROPOSED PROGRAM:  Life Cycle Engineering-Operations Management

Display how proposed program(s) would appear on the Coordinating Board program inventory; include Texas CIP code designation(s).

Life Cycle Engineering-Operations Management, Texas CIP code: 14.1701.00

How would name(s) of program(s) appear on student diplomas?

Master of Science, Life Cycle Engineering-Operations Management

Administrative unit(s) responsible for the program(s):

The administrative units jointly responsible for the program are the Offices of the Dean of the College of Engineering, and the Dean of the College of Business Administration and Graduate School of Business.

Proposed date for implementation of program:  September 1996

Person to be contacted for further information about proposed program(s):

Dr. Raymond Flumerfelt  
(409) 845-1463

Associate Dean, College of Engineering  
(409) 845-8986

Signatures:

__________________________________________  ________________________________
Campus Chief Executive Officer  Date

__________________________________________  ________________________________
System Chief Executive Officer (As appropriate)  Date

Governing Board approval date: ______________________________________
II.1 Program Goals

LCE-OM is a new program jointly administered and taught by the College of Engineering and the College of Business Administration and Graduate School of Business at Texas A&M University. The primary objectives of this program are as follows:

- Prepare technically trained individuals for fast-track industrial leadership in the management of a manufacturing life cycle,
- Provide graduates with state-of-the-art knowledge relevant to the managerial, technical, and product control of a life cycle artifact,
- Create and sustain an instructional environment that brings together engineering skills, business administration, and industrial perspectives in the joint pursuit of quality management and life cycle engineering of complex manufactured products,
- Provide a unique and timely educational experience in life cycle issues as they relate to integrated manufacturing systems.

The original goals of this program will not change due to the request to decrease the required hours for completion of the degree.

II.2 Entrance Requirements

Applicants must meet minimum entrance requirements as set by the Office of Graduate Studies, Texas A&M University. Applicants must also satisfy minimum Life Cycle Engineering Operations Management degree program requirements as jointly established by the College of Engineering and the College of Business Administration & Graduate School of Business.

- Applicants must take the General Portion of the Graduate Record Exam (GRE) or the Graduate Management Admissions Test (GMAT).

  -- Minimum entrance criteria for the GRE will be:
  
  400 Verbal
  600 Quantitative
  500 Analytical

  -- Minimum entrance criteria for the GMAT will be:
  
  50th percentile Verbal
  50th percentile Quantitative

- Minimum Grade Point Ratio
  
  - 3.0 GPR over BS program and
  - 3.2 GPR over last 30 hours
Satisfying the minimum criteria does not guarantee admission to the LCE-OM Program. Admission procedures will consider all criteria, with final approval by the LCE-OM Admissions Approval Committee.

Applicants to the LCE-OM program must have either a BS degree in an engineering discipline, mathematics, or physical sciences. An applicant may have a business degree from an accredited University if he/she satisfies minimum requirements including demonstrated competency in Introductory Probability and Statistics, Linear Algebra, Differential and Integral Calculus, and Numerical Analysis. These entrance requirements will not change due to the request to decrease the required hours for completion of the degree.

II.3 Coursework Requirements

Current coursework requirements are shown in Table I. Current 45-Hour Curriculum in Life Cycle Engineering-Operations Management.

Table I. Current 45-Hour Curriculum in Life Cycle Engineering-Operations Management

<table>
<thead>
<tr>
<th>1st Year Fall Semester</th>
<th>Credit</th>
<th>1st Year Spring Semester</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEEN 669 Design for Mfg. &amp; Assembly</td>
<td>3</td>
<td>ENGR 644 Life Cycle Product Analysis</td>
<td>3</td>
</tr>
<tr>
<td>BANA 660 Introduction to Contemporary Manufacturing Management</td>
<td>3</td>
<td>BANA 667 Logistics &amp; Distribution Mgt.</td>
<td>3</td>
</tr>
<tr>
<td>Elective(s)</td>
<td>6</td>
<td>INEN 654 Computer Integrate Mfg.</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>12</td>
<td><strong>TOTAL</strong></td>
<td>12</td>
</tr>
</tbody>
</table>

First Year – Summer

| BANA/ENGR 684 Internship        | 3      |
| **TOTAL SUMMER CREDITS**        | 3      |

Second Year Fall Semester         | Credit |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>INEN 659 Modeling and Analysis of Manufacturing Systems</td>
<td>3</td>
</tr>
<tr>
<td>BANA 638 Information Systems in Manufacturing</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>9</td>
</tr>
<tr>
<td><strong>TOTAL PROGRAM HOURS</strong></td>
<td>45</td>
</tr>
</tbody>
</table>

Second Year Spring Semester       | Credit |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>BANA 673 Manufacturing Strategy</td>
<td>3</td>
</tr>
<tr>
<td>BANA 669/INEN 669 Manufacturing Seminar</td>
<td>3</td>
</tr>
<tr>
<td>BANA 662 Total Quality Management</td>
<td>3</td>
</tr>
<tr>
<td>SYEN 602</td>
<td>3</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>9</td>
</tr>
</tbody>
</table>
The curriculum would be reduced by 9 hours if the request to reduce the required hours for completion of the degree is approved (see Section III).

III. RELATIONSHIP TO EXISTING AUTHORIZED PROGRAMS
A. Demonstrate the relationship between the proposed program and existing authorized programs.

The proposed changed program would reduce the total hours to 36 hours of formal coursework, as compared to the existing program requirement of 45 hours. The request is to remove 9 hours of electives from the program. The revised curriculum is shown in Table II. Proposed 36-hour Curriculum in Life Cycle Engineering-Operations Management.

<table>
<thead>
<tr>
<th>1st Year Fall Semester</th>
<th>Credit</th>
<th>1st Year Spring Semester</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>INEN 659</td>
<td>Modeling and Analysis of Manufacturing Systems</td>
<td>3</td>
<td>ENGR 644</td>
</tr>
<tr>
<td>BANA 660</td>
<td>Introduction to Contemporary Manufacturing Management</td>
<td>3</td>
<td>BANA 662</td>
</tr>
<tr>
<td>BANA 638</td>
<td>Information Systems in Mfg.</td>
<td>3</td>
<td>SYEN 602</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>9</td>
<td>BANA 669/INEN 669</td>
<td>3</td>
</tr>
<tr>
<td><strong>First Year – Summer</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BANA/ENGR 684 Internship</td>
<td>3</td>
<td>BANA 669/INEN 669</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL SUMMER CREDITS</strong></td>
<td>6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Second Year Fall Semester</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEEN 669</td>
<td>Design for Manufacture &amp; Assembly</td>
</tr>
<tr>
<td>BANA 673</td>
<td>Manufacturing Strategy</td>
</tr>
<tr>
<td>BANA 667</td>
<td>Logistics and Distribution Mgt.</td>
</tr>
<tr>
<td>INEN 654</td>
<td>Computer Integrated Manufacturing</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>12</td>
</tr>
<tr>
<td><strong>TOTAL PROGRAM HOURS</strong></td>
<td>36</td>
</tr>
</tbody>
</table>
B. Describe how the proposed program would affect existing programs, including the potential effects on enrollment (e.g., the need for additional sections or increased class sizes, faculty, and library resources).

The proposed change would affect the current LCE-OM program structure in the following ways:

1. Deletion of 9 hours of free electives would tighten up the program and allow for better coordination and control.
2. Enrollment should significantly increase due to the consistent and competitive requirement of 36 hours of formal coursework.
3. No additional classrooms or space allocations are required.
4. The core faculty teaching loads from both the participating Engineering and Business Administration units would not change.

The "status quo" impact of this request on classroom space, core (Engineering and Business Administration) faculty and related teaching resources required are based upon the assumption that the only change requested is to delete free electives.

IV. EXPECTED ENROLLMENT

A. Estimate the cumulative headcount and full time equivalent (FTE) enrollment for each of the first 5 years (majors only, considering expected attrition and graduation) and indicate the number expected to be new to the institution each year.

The following are conservative estimates of enrollment: (Enrollment will be held to approximately 40 degree candidates.)

<table>
<thead>
<tr>
<th></th>
<th>1st Year</th>
<th>2nd Year</th>
<th>3rd Year</th>
<th>4th year</th>
<th>5th Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- First Year</td>
<td>15</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Program</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Second Year</td>
<td>0</td>
<td>12</td>
<td>18</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>TOTALS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>32</td>
<td>38</td>
<td>40</td>
<td>40</td>
</tr>
</tbody>
</table>

Estimates are based upon limitations of assistantship/fellowship support, availability of summer internships, and faculty resources. The number of students matriculating will be controlled by the Program Coordinating Committee to ensure adequate resources.

Estimate for each of the first five years the percentage of head count enrollment of majors that will be new to the institution.

The following are majors estimated to be new FTE students to the institution:
<table>
<thead>
<tr>
<th>Number of Students New to the Institution</th>
<th>1st Year</th>
<th>2nd Year</th>
<th>3rd Year</th>
<th>4th Year</th>
<th>5th Year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>15</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
</tbody>
</table>

V. RESOURCES
A. Provide descriptions of courses that have been implemented and new courses needed.

1. List and describe course implemented within the last three years that would be included in the new program curriculum.

   Included below are 10 new courses (*), with a total of three courses designed to be team taught by faculty from the Departments of Mechanical, Industrial, and Civil Engineering (ENGR) and Business Analysis and Research (BANA). All new courses have been approved through the appropriate internal institutional committees and councils and the Texas Higher Education Coordinating Board. Course change requests reflecting the cross-listing of these courses have been approved through all administrative channels. See Appendix A for course descriptions.

   INEN 659* Modeling and Analysis of Manufacturing Systems 3 cr hr
   ENGR 644* Life Cycle Product Analysis 3 cr hr
   BANA 660* Introduction to Contemporary Manufacturing Management 3 cr hr
   BANA 662*/SYEN 602 Total Quality Management 3 cr hr
   BANA/ENGR 684 Internship 3 cr hr
   BANA 669*/INEN 669* Manufacturing Seminar 3 cr hr
   MEEN 669* Design for Manufacture & Assembly 3 cr hr
   BANA 673* Manufacturing Strategy 3 cr hr
   BANA 638* Information Systems in Manufacturing 3 cr hr
   INEN 654 Computer Integrated Manufacturing 3 cr hr
   BANA 667* Logistics and Distribution Management 3 cr hr

2. List and describe new courses not yet implemented for the program.

   None

B. Describe faculty resources and faculty requirements, if any.

1. List current faculty members, indicating highest earned degree/institution, field of study, current teaching and research assignments, dates of appointment, and anticipated contribution to the program. Specify course(s) each faculty member would teach.

Business Analysis Faculty
Dr. Frank P. Buffa

<table>
<thead>
<tr>
<th>Highest earned degree:</th>
<th>Ph.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degree source:</td>
<td>Louisiana State University</td>
</tr>
<tr>
<td>Field:</td>
<td>Quantitative Methods and Statistics</td>
</tr>
<tr>
<td>Current teaching interest:</td>
<td>Statistics, Stochastic methods, Logistics</td>
</tr>
<tr>
<td>Research interest:</td>
<td>Inventory Control, Logistics</td>
</tr>
<tr>
<td>Program contribution:</td>
<td>Logistics and Operations Management</td>
</tr>
</tbody>
</table>
Dr. Robert A. Davis
Highest earned degree: Ph.D.
Degree source: University of South Carolina
Field: Operations Management
Current teaching interest: JIT, Operations Management
Research interest: JIT, Quality Management
Program contribution: Total Quality Management

Dr. Benito E. Flores
Highest earned degree: Ph.D.
Degree source: University of Houston
Field: Operations Management
Current teaching interest: Operations Strategy, Inventory Management, Forecasting
Research interest: Planning and Forecasting
Program contribution: Manufacturing Strategy

Dr. Antonio Arreola-Risa
Highest earned degree: Ph.D.
Degree source: Stanford University
Field: Operations Management
Current teaching interest: Operations Management, Production Technology
Research interest: Production Scheduling, Processes & Queueing Systems
Program contribution: Contemporary Manufacturing Management

Dr. E. Powell Robinson, Jr.
Highest earned degree: Ph.D.
Degree source: University of Texas
Field: Operations Management
Current teaching interest: Operations Management, Logistics
Research interest: Distribution, Logistics
Program contribution: Logistics, Manufacturing Information Systems

Dr. Anthony D. Ross
Highest earned degree: Ph.D.
Degree source: Indiana University
Field: Operations Management
Current teaching interest: Operations Management, Logistics
Program Contribution: Logistics and Operations Management
Industrial Engineering Faculty

Dr. Andrew Boyd
Highest earned degree: Ph.D.
Degree source: Massachusetts Institute of Technology
Field: Discrete Optimization
Current teaching interest: Mathematical Optimization
Date of Appointment: August 1993
Program Contribution: Discrete Optimization

Dr. Guy L. Curry
Highest earned degree: Ph.D.
Degree source: University of Arkansas
Field: Operations Research
Current teaching interest: Optimization & Production Systems
Research interest: Analytical & Simulation Tools
Date of Appointment: August 1970
Program contribution: Simulation Tools

Dr. Bryan L. Deuemeyer
Highest earned degree: Ph.D.
Degree source: Northwestern University
Field: Operations Research
Current teaching interest: Mathematical Programming, Operations Research
Research interest: Operations Research
Date of Appointment: September 1978
Program contribution: Operations Research

Dr. Ralph L. Disney
Highest earned degree: Ph.D.
Degree source: Johns Hopkins University
Field: Applied Probability & Random Processes
Current teaching interest: Applied Probability & Queueing
Research interest: Probability
Date of Appointment: September 1988
Program contribution: Applied Probability
<table>
<thead>
<tr>
<th>Dr. Richard M. Feldman</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highest earned degree: Ph.D.</td>
</tr>
<tr>
<td>Degree source: Northwestern University</td>
</tr>
<tr>
<td>Field: Applied Probability, Stochastic Processes, Simulation</td>
</tr>
<tr>
<td>Current teaching interest: Operations Research</td>
</tr>
<tr>
<td>Research interest: Operations Research</td>
</tr>
<tr>
<td>Date of Appointment: September 1975</td>
</tr>
<tr>
<td>Program contribution: Operations Research</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dr. Joseph W. Foster</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highest earned degree: D.E.</td>
</tr>
<tr>
<td>Degree source: University of Oklahoma</td>
</tr>
<tr>
<td>Field: Operations Management</td>
</tr>
<tr>
<td>Current teaching interest: Assurance Sciences &amp; Manufacturing Systems</td>
</tr>
<tr>
<td>Research interest: Assurance Science Technology</td>
</tr>
<tr>
<td>Date of Appointment: June 1968</td>
</tr>
<tr>
<td>Program contribution: Operations Management</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dr. Alberto Garcia-Diaz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highest earned degree: Ph.D.</td>
</tr>
<tr>
<td>Degree source: University of Illinois at Urbana Champaign</td>
</tr>
<tr>
<td>Field: Transportation Planning, Network Analysis</td>
</tr>
<tr>
<td>Current teaching interest: Network Optimization</td>
</tr>
<tr>
<td>Research interest: Network Optimization</td>
</tr>
<tr>
<td>Date of Appointment: September 1978</td>
</tr>
<tr>
<td>Program contribution: Network Optimization</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dr. Way Kuo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highest earned degree: Ph.D.</td>
</tr>
<tr>
<td>Degree source: Kansas State University</td>
</tr>
<tr>
<td>Field: Systems Modeling</td>
</tr>
<tr>
<td>Current teaching interest: Systems Modeling</td>
</tr>
<tr>
<td>Date of Appointment: August 1993</td>
</tr>
<tr>
<td>Program Contribution: Systems Modeling</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dr. V. Jorge Leon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highest earned degree: Ph.D.</td>
</tr>
<tr>
<td>Degree source: Lehigh University</td>
</tr>
<tr>
<td>Field: Manufacturing Systems</td>
</tr>
<tr>
<td>Current teaching interest: Manufacturing Systems</td>
</tr>
<tr>
<td>Date of Appointment: August 1993</td>
</tr>
<tr>
<td>Program Contribution: Manufacturing Systems</td>
</tr>
<tr>
<td>Name</td>
</tr>
<tr>
<td>-----------------------------</td>
</tr>
</tbody>
</table>
Dr. Tep Sastri  
Highest earned degree: Ph.D.  
Degree source: Ohio State University  
Field: Manufacturing System Planning & Control  
Current teaching interest: Operations Research  
Research interest: Operations Research  
Date of Appointment: September 1983  
Program contribution: Operations Research

Dr. Robert E. Shannon  
Highest earned degree: Ph.D.  
Degree source: Oklahoma State University  
Field: Simulation, Operations Research  
Current teaching interest: Operations Research, Simulation  
Research interest: Operations Research, Engineering Management  
Date of Appointment: September 1982  
Program contribution: Engineering Management, Operations Research

Dr. Donald R. Smith  
Highest earned degree: Ph.D.  
Degree source: University of Arkansas  
Field: Engineering Economics  
Current teaching interest: Engineering Economics  
Research interest: Systems Simulation  
Date of Appointment: September 1975  
Program contribution: Engineering Economics

Dr. Jeff Smith  
Highest earned degree: Ph.D.  
Degree source: Pennsylvania State University  
Field: Manufacturing Systems  
Current teaching interest: Production Control, Simulation  
Research interest: Manufacturing Systems  
Date of Appointment: August 1992  
Program contribution: Manufacturing Systems

Dr. Wilbert E. Wilhelm  
Highest earned degree: Ph.D.  
Degree source: Virginia Polytechnic Institute & State University  
Field: Production & Inventory Control  
Current teaching interest: Linear Programming  
Research interest: Operation of Assembly Systems  
Date of Appointment: September 1988
Dr. Martin A. Wortman
Highest earned degree: Ph.D.
Degree source: Virginia Polytechnic Institute & State University
Field: Applied Probability, Queueing Theory
Current teaching interest: Applied Probability
Research interest: Applied Probability
Date of Appointment: September 1988
Program contribution: Applied Probability

Mechanical Engineering Faculty
Dr. Christian P. Burger
Highest earned degree: Ph.D.
Degree source: University of Cape Town
Field: Design, Design Methodology
Current teaching interest: Design, Design Methodology
Research interest: Design Methodology

Dr. Clarence Hough
Highest earned degree: Ph.D.
Degree source: Texas A&M University
Field: Manufacturing, Machining Experimentation
Current teaching interest: Manufacturing
Research interest: Manufacturing

Dr. Reza Langari
Highest earned degree: Ph.D.
Degree source: University of California - Berkeley
Field: Control & Dynamic Systems
Current teaching interest: Control & Dynamic Systems
Research interest: Control & Dynamic Systems

Civil Engineering Faculty
Dr. Charles Samson
Highest earned degree: Ph.D.
Degree source: University of Missouri
Field: Civil Engineering, Structural Engineering

Computer Science Faculty
Dr. Richard Volz
Highest earned degree: Ph.D.
Degree source: Northwestern University
Field: Real Time Embedded Computing, Robotics
2. If current faculty would be teaching new courses, how would their teaching assignments change, and how would their current assignments be accommodated?

This proposal will not introduce new faculty requirements nor any new courses. It will reduce program coursework requirements from 45 hours to 36 hours by eliminating 9 hours of free electives.

3. List all new positions (faculty, graduate assistants, clerical/support, etc.) required during the first five years of the program and indicate whether the positions would be additions or reassignments. If reassignment, indicate the source.

No new faculty resources will be required. The LCE-OM program is being managed by Dr. Raymond Flumerfelt, Program Director, Dr. Robert A. Davis, Business Program Coordinator, Dr. Don T. Phillips, Engineering Program Coordinator, and Ms. Letty Benning, Program Manager.

C. Describe status of facilities with regard to this request.

1. Itemize expenditures during each of the last 3 years for equipment and supplies specifically for the proposed program.

None other than normal program support (files, paper, software, etc.)

D. Describe status of facilities with regard to this request. Include any alternations or renovations of exiting facilities made during that three years that would be used for the new program.

No additional facilities will be necessary to support the program. All faculty associated with the program already have full-time appointments. Existing educational facilities are viewed as adequate to operate the program.

E. Provide library staff's assessment of library resources necessary for the proposed program, if applicable.

The current library holdings are viewed as adequate by the Program Director to support the program.
MEMORANDUM

TO: Ad Hoc Group to Review the Life-cycle Engineering Operations-Management Degree Proposal to be Offered via Distance Education

SUBJECT: Thank You for Your Time and Effort

I want to thank each one of you for taking time on short notice to meet and review the Life-cycle Engineering Operations-Management degree proposal to offer the program via distance education. I believe the process worked very well. As a result of your suggestions and recommendations, the final document was much better.

Drs. Don Phillips, Bob Davis and Ms. Letty Benning have devoted a lot of time and effort into this project. Your taking the time to bring the project to closure by having a group on campus conduct a review of the proposal is greatly appreciated.

Texas A&M University’s request to offer the M.S. in Life-cycle Engineering Operations-Management at Fort Hood will be considered at the 17-18 July 1996 Coordinating Board meeting. Consideration for the program being offered at North Harris/Montgomery County’s University Center and East Texas State-Texarkana will be considered by the Coordinating Board at a later meeting.

Ronald G. Douglas
Executive Vice President
and Provost

RGD:kky

Attachment

cc: Dr. Ray M. Bowen
Ad Hoc Group to Review the
Life-cycle Engineering Operation-Management
Degree Proposal to Offer Via Distance Education

* Tuesday, 28 May 1996
  Conference Room
  8th Floor Rudder Tower

Ms. Letty Benning
Dr. Frank Buffa
Dr. John Dinkel
Dr. Ray Flumerfelt

Dr. Don Hellriegel - Graduate Council Member -- Business Administration

* Dr. Cesar Malave - Faculty Senator

* Dr. Steve Oberhelman - Speaker, The Faculty Senate

Dr. Linda Parrish - Graduate Council Member
Ms. Jeanette Phariss
Dr. Don Phillips

* Dr. Malcolm Richards - The Faculty Senate

Dr. Dan Robertson

* Professor John L. Stansell - Faculty Senator

Dr. Sallie Sheppard
Professor Ward Wells - Graduate Council Member -- Agriculture
June 6, 1996

MEMORANDUM

TO: Members, Ad Hoc Group to Review the Life-cycle Engineering Operations-management (LCEOM) Degree Program

SUBJECT: Revised Proposal to Teach the LCEOM Program Via Distance Education

Attached is the revised proposal for your review and comments. We have made changes which reflect the concerns and issues that were discussed at the May 28th meeting. Dr. John Dinkel and Dr. Don Phillips met on June 3 and have reviewed both the budget page and the enclosed document. You should note, in particular, the revised budget page which more clearly reflects the total cost involved with this program. If you have any other comments or questions, please contact us.

Ms. Jeanette Pharis is out of the office this week and has asked that we keep moving on this effort to meet the deadlines imposed by the Texas Higher Education Coordinating Board. Thank you for your time and prompt response.

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Engineering Program Coordinator
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Bob Davis, Ph.D.
Business Program Coordinator
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Letty Benning
Program Manager
845-2923; L-Benning@tamu.edu
PROPOSAL

Approval
for
Texas A&M University
to offer the
Master of Science, Life-cycle Engineering Operations-management
via Distance Education
(Instructional Telecommunication)
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6/4/96
PROPOSAL

Approval
for
Texas A&M University
to offer the
Master of Science, Life-cycle Engineering Operations-management
via Distance Education
(Instructional Telecommunication)

June 1996

Introduction

This proposal presents a request for expansion of authority to offer Texas A&M University’s interdisciplinary Life-cycle Engineering Operations-management (LCEOM) Master’s of Science degree program through televideo communication using the existing Trans Texas Video Network (TTVN) and video taping. The primary objective of distance delivery of courses will be to enable engineers and managers in the workplace who could not come to the campus for classes to continue their education while employed.

History

Authority for interactive video and televideo transmission of instructional courses was approved by the Texas Higher Education Coordinating Board for the Texas A&M University System in July 1991.

Authority for offering the LCEOM degree program on the Texas A&M University campus was approved by the Texas Higher Education Coordinating Board in April 1994.

Texas A&M University is authorized to utilize distance learning technology for instructional telecommunications courses in conformance with the Texas Higher Education Coordinating Board Rules and Regulations.

Therefore, expansion of authority is requested for TAMU to offer the LCEOM Master of Science degree program over TTVN to the following locations: North Harris/Montgomery County’s University Center, East Texas State University - Texarkana, and Fort Hood.

Degree Program

Life-cycle Engineering Operations-management is the art and science of designing, implementing, and controlling integrated systems of people, machines, and resources to support the manufacturing life cycle from inception to retirement. It primarily draws upon the specialized skills of industrial engineering and business administration, with particular emphasis on modeling and analysis of life cycle artifacts. LCEOM involves researching and developing manufacturing tools, processes, machines and equipment, and integrating the facilities and systems necessary to produce quality products at minimum expenditures.
Program Goals
LCEOM is an interdisciplinary program jointly administered and taught by the Dwight Look College of Engineering and the College of Business Administration and Graduate School of Business at Texas A&M University. The primary objectives of this program are as follows:

- prepare technically trained individuals for fast-track industrial leadership in the management of a manufacturing life cycle,
- provide graduates with state-of-the art knowledge relevant to the managerial, technical, and product control of a life cycle artifact,
- create and sustain an instructional environment that brings together engineering skills, business administration, and industrial perspectives in the joint pursuit of quality management and life cycle engineering of complex manufactured products, and
- provide a unique and timely educational experience in life cycle issues as they relate to integrated manufacturing systems.

Entrance Requirements
Applicants must meet minimum entrance requirements as set by Texas A&M University. Applicants must also satisfy minimum LCEOM degree program requirements as jointly established by the Dwight Look College of Engineering and the College of Business Administration & Graduate School of Business.

♦ Applicants must take the General Portion of the Graduate Record Exam (GRE) or the Graduate Management Admissions Test (GMAT).

-- Minimum entrance criteria for the GRE will be:
  400 Verbal
  600 Quantitative
  500 Analytical

--Minimum entrance criteria for the GMAT will be:
  50th percentile Verbal
  50th percentile Quantitative

♦ Minimum Grade Point Ratio
  --3.0 GPR over BS program and
  --3.2 GPR over last 30 hours

Satisfying the minimum criteria does not guarantee admission to the LCEOM Program. Admission procedures will consider all criteria, with final approval by the LCEOM Admissions Approval Committee.

Applicants to the LCEOM program must have either a BS degree in an engineering discipline, mathematics, or physical sciences. An applicant may have a business degree from an
accredited university if he/she satisfies minimum requirements including demonstrated competency in Introductory Probability and Statistics, Linear Algebra, Differential and Integral Calculus, and Numerical Analysis.

Coursework Requirements

Coursework requirements are shown in Table I. which presents the 45-Hour Curriculum in Life-cycle Engineering Operations-management.

Table I. 45-Hour Curriculum in Life-cycle Engineering Operations-management

<table>
<thead>
<tr>
<th>1st Year Fall Semester</th>
<th>Credit</th>
<th>1st Year Spring Semester</th>
<th>Credit</th>
</tr>
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<tbody>
<tr>
<td>MEEN 669</td>
<td>3</td>
<td>ENGR 644</td>
<td>3</td>
</tr>
<tr>
<td>BANA 660</td>
<td>3</td>
<td>BANA 667</td>
<td>3</td>
</tr>
<tr>
<td>Elective(s)</td>
<td>6</td>
<td>INEN 654</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Elective</td>
<td>3</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>12</strong></td>
<td><strong>TOTAL</strong></td>
<td><strong>12</strong></td>
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</tbody>
</table>

First Year — Summer

| BANA/ENGR 684 Internship | 3 |

**TOTAL SUMMER CREDITS** 3

<table>
<thead>
<tr>
<th>Second Year Fall Semester</th>
<th>Credit</th>
<th>Second Year Spring Semester</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>INEN 659</td>
<td>3</td>
<td>BANA 673</td>
<td>3</td>
</tr>
<tr>
<td>BANA 638</td>
<td>3</td>
<td>BANA 669/INEN 669</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>3</td>
<td>BANA 662/SYEN 602</td>
<td>3</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>9</strong></td>
<td><strong>TOTAL</strong></td>
<td><strong>9</strong></td>
</tr>
</tbody>
</table>

TOTAL PROGRAM HOURS 45

Examination Procedures

Course examinations

The LCEOM courses will all require standard examinations both during the semester offered and a final exam. These examinations will be submitted either by traditional mail delivery
or via a secured WEB page on the Internet. In either case, the participating students will be monitored and supervised at a designated site/classroom location, and all examinations will be graded by the Graduate Faculty responsible for teaching each course. The uniformity and content of all examinations will be the same for students or off campus.

**Final Degree Program Examination**

After completing all program requirements, all LCEOM students will be required to complete a final examination. The announcement for the final examination must be submitted to the Office of Graduate Studies at TAMU at least ten working days in advance of the scheduled date. A student shall be given only one opportunity to repeat the final examination for the Master's degree and that shall be within a time period that does not extend beyond the end of the next regular semester (summer terms are excluded). No examination may be held prior to the midpoint of the semester or summer term in which a student will complete all remaining courses on the degree program.

**Request to Deliver Complete Master Degree Program via Instructional Telecommunication**

**Delivery Systems:**

New advances in technology make it possible to offer academic courses and programs to a geographically diverse population. The basic delivery system being requested are the VTEL and NTEL televideo communication methodologies. This delivery system currently exists at Texas A&M University and will utilize the TTVN state network system.

In order to provide the quality instruction expected of a TAMUS institutional and to address the unique needs of remote students, several instructional media will be utilized.

**Televideo Instruction:**

Currently enrolled students at both local and remote sites will participate in live two-way televideo instruction. In addition to traditional televideo instruction, the Internet and World Wide Web will be used to augment live course delivery for students enrolled in regular classes at TAMU and at remote delivery sites. Other electronic media such as electronic mail and facsimiles will be utilized as appropriate. This mixed media will allow total educational interaction between the instructor and students.

**Videotaping:**

Videotapes will be used only as a backup to standard classroom lectures to facilitate student learning for missed class work. The production and distribution of tapes will be in cooperation with agencies and resources within the scope of course delivery and will maintain the academic integrity and technical quality necessary to meet the Texas Higher Education Coordinating Board's requirements and those of Texas A&M University. The videotapes will be
available for local and remote students at any delivery site during the semester each course is taught.

**Geographical Areas Served:**

This request to deliver the LCEOM graduate program to remote sites includes the following locations: North Harris/Montgomery County’s University Center, East Texas State University - Texarkana, and Fort Hood. Feedback from industry representatives throughout the state indicates wide interest in this academic program. Additional requests for approval to utilize other sites not linked to the TTVN network will be made in advance to the Commissioner of the Texas Higher Education Coordinating Board as the need arises. Concurrence of affected institutions will be obtained.

**Compliance:**

There is currently no interdisciplinary Master of Science degree between engineering and business offered to the proposed delivery sites. Participation in the North Harris Montgomery County Community College’s University Center and at Ft. Hood will follow procedures adopted by the Texas Higher Education Coordinating Board. East Texas State University supports this effort (Appendix A) and has obtained compliance from that area.

**Course Inventory:**

All courses offered are applicable to the established LCEOM campus-based degree program and are included in Texas A&M University’s current course inventory.

CBM-OOY Forms will be filed for any new course offerings by Texas A&M University. The university will follow established procedures for maintaining a current course inventory with the Texas Higher Education Coordinating Board.

**Evaluation Plan:**

*Remote Learning/televideo Instruction:*

Courses being taught by televideo/remote learning instruction at TAMU will be evaluated by comparing the grade distributions and tests results of remote students to those of the students actually in the delivery classroom on the TAMU campus. The different modes of instruction (e.g., two-way televideo, Internet, World Wide Web, etc.) will be evaluated as to their effectiveness by a survey instrument provided to participating students in order to monitor the effectiveness of the instruction. Students will be asked to comment on methods to improve the instructional method.

**Arrangements to Meet Unique Needs of Distance Learners:**

Every effort will be made to insure that distance learners have equal access to resources related to the program. Of particular concern are library and computer resources. The LCEOM program student enrollment fees currently include a library use fee which is standard to all Texas A&M students. LCEOM students can access TAMU library/support resources either by Internet, electronic document search/review, or in person. It is likely that remote students would
spend some time on the main campus with the same privileges and rights as in-residence students.

The academic program will not be made available to remote sites unless required resources are available. Another key need of distance learners is a convenient means of communication between students and with the instructor. Electronic mail, telephone, and facsimiles will be the most effective forms of communication for the students and faculty.

**Relationships With Other Institutions:**

Academic institutions within the TAMU System interested in receiving the program will be asked to participate in several ways. In addition to providing classroom space and other resources required for LCEOM program student support, these institutions will be asked to teach non-credit, prerequisite courses (foundation courses) for students in their geographical area if possible. Texas A&M University (LCEOM) will teach all required courses shown in Table I. Remote institutions will also be asked to help administer and participate in the required professional internship for their students, if appropriate, under LCEOM program supervision.

**Student Financial Aid:**

LCEOM distance learning graduate students needing financial assistance can access the application process by submitting the Free Application for Federal Student Aid (FAFSA) to the Central Processor in Iowa City, Iowa and having the results sent to Texas A&M. Texas A&M University participates in several federal and state programs including: Federal Stafford Loans, Federal Perkins Loans, College Access Loans, the Texas Public Education Grants, State Student Incentive Grants, and College Work-Study. Short-term Loans also are available to assist students with unexpected expenses. A student must be enrolled at least half-time to receive the Federal Stafford Loan or a College Access Loan. Students are required to be enrolled full-time to participate in all of the other loan and grant programs.

**Quality Control:**

The LCEOM program is committed to providing a level of quality for off-campus students equivalent to that of on-campus resident credit instruction. All standards required of regularly enrolled on-campus students will be required of the students who utilize remote learning instruction. This includes the utilization of regularly employed faculty members, the same faculty contact hour requirements, courses being taught only by graduate faculty, availability of faculty support services, access to library facilities with library privileges, and standard evaluation procedures.
Request for Approval to Offer Complete MS Degree Program via Instructional Telecommunications:

Courses offered via instructional telecommunication follow all Texas Higher Education Coordinating Board guidelines for off-campus and for instructional telecommunication courses. These courses are determined and scheduled by the appropriate academic departments; are taught by regular faculty; require identical work of students; and are structured and evaluated according to identical criteria as the on-campus sections. These courses differ only in the fact that they are delivered via distance learning technology.

Professionals who enter the Life-cycle Engineering Operations-management program cannot currently complete their degrees when required to leave their place of employment to participate in on-campus classes. Companies, community groups, and economic development councils in the State rely on Texas A&M University as a source for this program.

Approval is requested for offering the complete degree via instructional telecommunication beginning Fall 1996.
INSTRUCTIONAL TELECOMMUNICATIONS COSTS ESTIMATE FORM

Costs and income associated with this request.

I. COSTS

<table>
<thead>
<tr>
<th>Category</th>
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<tbody>
<tr>
<td>Acquisition Costs</td>
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<tr>
<td>Personnel (b)</td>
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<tr>
<td>Faculty</td>
<td>160,000</td>
</tr>
<tr>
<td>Administrative</td>
<td>60,000</td>
</tr>
<tr>
<td>Support (Secretarial, etc.)</td>
<td>24,000</td>
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<tr>
<td>Distribution Costs (a)</td>
<td>9,000</td>
</tr>
<tr>
<td>Student Support Services (c)</td>
<td>24,000</td>
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<tr>
<td>Equipment and Facilities (d)</td>
<td>10,000</td>
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<tr>
<td>Maintenance &amp; Operations</td>
<td>7,100</td>
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<tr>
<td>Supplies and Materials</td>
<td>5,000</td>
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<tr>
<td>Other</td>
<td>5,000</td>
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<tr>
<td><strong>TOTAL</strong></td>
<td>304,100</td>
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II. INCOME

<table>
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<tr>
<th>Category</th>
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<tr>
<td>State Appropriations+</td>
<td>200,000</td>
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<tr>
<td>Local Funds</td>
<td>0</td>
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<tr>
<td>Other State Funding*</td>
<td>55,000</td>
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<tr>
<td>Reallocation of Existing Funds**</td>
<td>50,000</td>
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<tr>
<td>Federal Funds</td>
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<td>Other Funding</td>
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<td><strong>TOTAL</strong></td>
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Annual Costs
(a) 4 courses/semester at $50.00/hr on TTVN network
(b) Based upon 4 courses/semester twice a year
(c) 2 graduate students/year
(d) ($1120 per codec + $980.00 software) + $5,000
* Direct allocation from College of Engineering & College of Business Administration
  + Subvention based upon 8 courses/year X 30 students
** Shared funds from Industrial Engineering & Business Analysis Departments

1 Personnel figures reflect information contained in the original degree program request to the Texas Higher Education Coordinating Board, October 1993
2 Based on using the existing TTVN system
3 Affiliation fee for membership into the TTVN system
APPENDIX A
Letters of Support
MEMORANDUM

TO: Letty Benning  
Program Manager, Life Cycle Engineering  
and Operations Management  
Department of Industrial Engineering  
Texas A & M University

FROM: Keith D. McFarland  
Dean for Graduate Studies and Research

DATE: May 7, 1996

SUBJECT: Concurrence with Course Offerings in Texarkana

This is to inform you that East Texas State University--Commerce has no problems with Texas A & M University offering engineering courses via TTVN to the campus of East Texas State University--Texarkana. If there are any questions about our concurrence with plans to offer engineering courses in this geographical area, please contact me at (903) 886-5159.

Is
To: Dr. Don T. Phillips  
Life Cycle Engineering and Operations Management Program  
Industrial Engineering Department  
Zachary Engineering Center  
Texas A&M University  
College Station, Texas 77843

From: Donna Arlton, Vice President  
for Academic Affairs

Re: Life Cycle Engineering and Operations  
Management Master of Science Degree

Date: May 13, 1996

I understand from our telephone conversation, discussion with Vice President John Anderson (ETSU-Texarkana), and other information from your office, that you plan to deliver a Master of Science degree program in Life Cycle Engineering and Operations Management at ETSU-Texarkana. I have conferred with those concerned on this campus and we have no problems with this plan. We will be happy to collaborate in any way possible. Thank you for requesting our input.

C: Deans Council
MEMORANDUM FOR THE RECORD

FROM: Fred M. Heath
Dean, Evans Library

The Sterling C. Evans Library has strong collections to support the Life-cycle Engineering Operations-management Program at the Master of Science level. The engineering, computer science, and business management collections are notably outstanding in both monographs and journals. Also of note are the electronic databases which are available within the Evans and West Campus Libraries. Many of the databases are available now or are in the process of being placed on Local Area Networks (LANS) which make them accessible throughout the campus. Databases of particular interest to this program are the Institute of Electrical and Electronic Engineers (IEEE) full-text journals and conference proceedings, INSPEC covering the worldwide literature in physics, electronics and electrical engineering, computers and control, and information technology; Compendex Plus, the electronic edition of Engineering Index; NTIS which includes bibliographic citations and abstracts to unrestricted technical reports from both U.S. and non-U.S. sponsored research and serves as an index to the extensive holdings of the library's print and microfiche collections; and Science Citation Index which is a major indexing service to all areas of science and engineering. The library maintains major collections of U.S. patents and industry and military standards.

An analysis of the Computer Science (CPSC), Electrical Engineering (ELEN), Industrial Engineering (INEN), Mechanical Engineering (MEEN), Business Analysis and Research (BANA), and Management (MGMT) collections of the Sterling C. Evans Library indicates that the library has strong collections to support the Life-cycle Engineering Operations-management Program at the Master of Science level.

<table>
<thead>
<tr>
<th>DEPARTMENT</th>
<th>MONOGRAPHS</th>
<th>SERIALS</th>
<th>DATABASES*</th>
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</thead>
<tbody>
<tr>
<td>CPSC &amp; ELEN</td>
<td>58,377</td>
<td>176</td>
<td>8 (Engineering)</td>
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<tr>
<td>INEN</td>
<td>58,702</td>
<td>75</td>
<td></td>
</tr>
<tr>
<td>MEEN</td>
<td>38,977</td>
<td>142</td>
<td></td>
</tr>
<tr>
<td>BANA</td>
<td>64,409</td>
<td>28</td>
<td>33 (Business)</td>
</tr>
<tr>
<td>MGMT</td>
<td>47,502</td>
<td>156</td>
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</tr>
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Source: State of the Collection at the Evans Library, October 1995

* Subscribed databases and CD-ROMS by Evans Library, May 1996