March 23, 1998

MEMORANDUM

TO: Senior Vice President David J. Ward
University of Wisconsin System

FROM: John D. Wiley, Provost

SUBJ: Final Implementation of the Master of Engineering Degree

As required by ACIS-1, I am writing to notify you that UW-Madison is implementing the Master of Engineering degree as of summer session 1998. As you know, the program has been under active development and is ready to proceed. Our thanks to you, Sharon James, Fran Garb, and others for facilitating approval of this program so quickly.

xc: Dean John Bollinger
Dean Virginia Hinshaw
Associate Dean Michael Corradini
Interim Registrar Tom Johnson
Martha Casey, Academic Planning
Bruce Beck, CDR Liaison
April 3, 1998

TO: John D. Wiley, Provost and Vice Chancellor
UW-Madison

FROM: David J. Ward, Senior Vice President
Office of Academic Affairs

RE: Implementation of Master of Engineering program

The Board of Regents authorized UW-Madison to implement a Master of Engineering program at their March 5, 1998 meeting. Your memo of March 23, 1998 indicates your intention to implement the new program in Summer 1998. In accordance with the provisions of ACIS-1, this program will be the subject of joint program review during the 2003-2004 academic year. At that time, it is our intention that staff from this office will work in concert with those from UW-Madison to prepare a report to me with recommendations that include the possibility of program continuation, transformation, elimination, etc. The results will be included in the annual report on Program Review and Planning in the UW System, an information report prepared for the Board of Regents each December.

The UW System Office of Policy Analysis and Research (OPAR) will contact you regarding establishment or modification of major, CIP and CAC codes related to the implementation of this program.

cc: Sharon L. James, Associate Vice President
Frank Goldberg, Associate Vice President, OPAR
Evan Norris, Academic Planner
Kris McGrew, Director, HELP
March 12, 1998

Chancellor David Ward  
UW - Madison  
161 Bascom Hall  
Madison WI 53706

Dear Chancellor Ward:

At its meeting on Friday, March 6th, the Board of Regents adopted the following resolutions:

That, upon recommendation of the Chancellor of the University of Wisconsin-Madison and the President of the University of Wisconsin System, the Chancellor be authorized to recruit for an Academic Program Director, with faculty back-up, Center for Neuroscience, Medical School, at a salary that may exceed the Executive Salary Group Six maximum.

That, upon recommendation of the Chancellor of the University of Wisconsin-Madison and the President of the University of Wisconsin System, the Chancellor be authorized to implement the Master of Engineering program.

Sincerely,

[Signature]

Audith A. Temby  
Secretary

Resolutions:  I.1.c.(2); I.1.d.(1)

cc:Senior Vice President David Ward  
Gary Alexander, Academic Planner

mar98resltr
NEW PROGRAM AUTHORIZATION
MASTER OF ENGINEERING PROGRAM (MEngr)
UW-MADISON
(INITIAL READING)

EXECUTIVE SUMMARY

BACKGROUND

The UW-Madison College of Engineering proposes to initiate a Master of Engineering (MEngr) program. This initiative will add a Master of Engineering degree to each existing major in the College, including the newly renamed Engineering major (formerly Engineering without designation). Hence this program will involve all departments in the College, either acting on their own or in conjunction with other departments in the case of interdisciplinary degrees. In some instances, other Colleges will also participate.

The College of Engineering has offered Master of Science degrees for decades. These have historically been research-oriented degrees, typically requiring a thesis. Increasingly, though, the Master of Engineering is becoming an entry level degree for students interested in preserving the widest possible options throughout their engineering careers. Employers desire students with focused study in specialized areas. It is difficult to supply students with those skills at the Bachelor's level, given other important needs, such as maintaining breadth in the Liberal Arts and to thoroughly cover the fundamentals in math, computer science, chemistry, and physics. Hence, the College of Engineering would serve both students and employers well by providing specific programs focused on practice-oriented Master's degrees. In addition, "high tech" companies are finding that their employees require continuing education to keep up with the latest technology and maintain their competitiveness. To serve these needs, we are proposing to implement a series of Master of Engineering degrees, which will be specialized terminal degrees, following a Bachelor's degree in one of our traditional majors. The topics emphasized by these programs are expected to shift fairly rapidly as the relevant industrial practices evolve.

This proposed degree program fits well with UW-Madison's plans for the future. In his recently published "A Vision for the Future," Chancellor David Ward states that we must update the Wisconsin Idea by viewing the university as a partner with industry.

REQUESTED ACTION

This item is presented for initial review. No action is requested at this time.
DISCUSSION AND RECOMMENDATIONS

Program Need

Planning for this program began as a result of desires expressed by Wisconsin industries and is an attempt to offer programs consistent with their needs and with our goals for academic excellence. In particular, technical industries within Wisconsin and in neighboring states have expressed a need for more advanced, practice-oriented training for engineers in order to maintain the technical competence of their work force. We propose to meet this need by creating a terminal graduate degree in engineering with a series of options available for advanced specialization that will prepare our students to work in this challenging environment. This degree is designed to meet the needs of this changing environment with options focused on specific areas and with the ability to shift focus as industrial needs change. We currently have three proposals in hand for options under this program and faculty in the College have expressed an interest in approximately six other areas.

Demand for these programs will vary. Each option under the Master of Engineering program will have a different audience and, thus, the class sizes will differ. Typical programs will likely have somewhere between 10-30 students in a graduating class, but this does not preclude the creation of larger programs. Some programs will consist largely of students who begin graduate study immediately after completing their undergraduate work, while others will consist largely of practicing engineers who study part time and work full time as practicing engineers. The focus of the various programs is expected to shift fairly rapidly as technologies and engineering practices evolve.

Comparable Programs

We are unaware of comparable programs elsewhere in Wisconsin. There are Master of Science programs in Engineering at UW-Milwaukee (UWM) and Marquette University. There are Bachelor of Science programs at UW-Platteville, UW-Madison, and UW-Stout. No Wisconsin university or college offers a Master of Engineering degree.

Outside of Wisconsin, there are practice-oriented Master of Engineering programs at the University of Michigan, Massachusetts Institute of Technology (MIT), the University of Minnesota, Rensselaer Polytechnic Institute (RPI), North Carolina State University, and elsewhere. These are all terminal degrees leading to professional practice of the discipline. The programs at RPI and NC State are given both on campus and at a distance. The others are strictly on-campus degrees.

For comparison, the parallel program at the University of Michigan offers Master of Engineering degrees in 12 areas and these programs had an enrollment of 142 students in 1997. At that time, the largest program (Manufacturing) had 49 students and the smallest (Optical Engineering and Ultrafast Technology) had none. The total enrollment in these programs has increased each year, with 85 students enrolled in 1995, 108 in 1996, and 142 in 1997.
Program Description and Evaluation

The College proposes to add a Master of Engineering degree to all of its majors, including Engineering (formerly Engineering without designation). Initial proposals already prepared are for Master of Engineering degrees in Professional Practice, Technical Japanese, and Polymer Engineering and Science. Each option designed for this program will be customized for the discipline, but they must conform to a template created by the College. The proposed guidelines for all Master of Engineering degrees are outlined below.

A Graduate Program Committee within the College will review proposals for new options and will administer the programs of the graduating students. The Graduate School will approve options as they are proposed by the College. The College will then be allowed to admit students directly to that program and students will not have to file individual programs with the Graduate School. Transcripts will reflect the degree designation, including the option. The diploma will reflect only the degree designation. These degrees should have a separate entry in the Graduate Catalog, alongside the other Engineering degrees.

The template for the Master of Engineering degrees is outlined below. This template establishes minimum requirements; individual programs may be more restrictive but not less restrictive.

- Degree requirements and admissions will be consistent with those in place for the MS degree.
- Students must take a minimum of 24 credits, with at least 12 taken in the College of Engineering.
- No more than 12 credits can be transferred from other universities or colleges.
- At least nine credits must be 500-level or above.
- Students lacking appropriate work experience in their chosen field must include at least six credits of engineering professional practice. The form of this requirement will vary from program to program, but will typically consist of projects carried out in conjunction with Wisconsin industry. The Graduate Program Committee will ensure the consistency of this requirement in collaboration with the program faculty.

Students typically will be expected to complete their course requirements within two semesters of equivalent full-time study. Professional practice requirements often will be completed during the summer months, so a typical degree program will be completed in approximately one calendar year.

Faculty will carry out ongoing assessment of student learning using a variety of written and performance measures. Regular feedback will be solicited from students, graduates and employers to assist the faculty in assessing the overall success of the program.
Below is a sample curriculum taken from the soon-to-be-proposed Master of Engineering in Polymer Engineering and Science:

- Twenty four credits of Approved Polymer Engineering and Science Courses are required beyond the BS degree.
- At least 18 credits must be Formal Lecture or Laboratory Courses.
- At least six credits must be Formal Lecture or Laboratory Courses numbered 600 or higher.
- At least three credits must be Formal Lecture or Laboratory Courses numbered 700 or higher.
- No more than six credits of Independent Study and no more than two credits of Seminar are allowed.
- No transfer credits are allowed.

Personnel

Many faculty members will be involved in each of these programs. No new faculty positions are being requested and few new courses would be developed. It is expected that courses will be modified to reflect current practices as different Master of Engineering degree programs are developed. The College will create a Graduate Program Committee to oversee the creation and management of each of the Master of Engineering programs. No new academic or classified positions will be necessary. An office already administering M.S. degrees in the College will administer each program.

Academic Support Services

In general, no additional load will be placed on the library, computing, laboratory or audio-visual infrastructures already in place in the College. In some cases, programs provided via distance education will require assistance with the delivery technologies and with funding the delivery mechanisms. Those programs will have to procure such funding before they will be approved.

Facilities and Equipment

Again, no significant equipment will be required for these courses. Proposed programs having such requirements must procure funding before the Graduate Program Committee will approve the program.

Finance

No funding is requested for these new programs. For on-campus Master of Engineering degrees, we do not plan to create any new courses. Thus, there are no additional costs incurred as a result of the creation of the Master of Engineering degrees. We will have an increased enrollment in these courses, but the cost will be offset by the increased tuition.

For the options offered primarily at a distance, we do expect to incur costs associated with course development and delivery. In these cases, proposals for new programs will have to develop business plans and show mechanisms for supporting these costs before the program will be approved by the College Graduate Program Committee.
RECOMMENDATION

No action is requested at this time.

RELATED REGENT POLICIES

University of Wisconsin System Academic Planning and Program Review (November 10, 1995), Academic Informational Series #1 (ACIS-1.revised).
January 30, 1998

MEMORANDUM

TO:        David J. Ward  
            Senior Vice President, UW System

FROM:      John D. Wiley, Provost

SUBJECT:   Authorization to Implement the Master of Engineering Degree Program

I am attaching the proposal for authorization to implement the Master of Engineering degree program. Also included are supporting materials, specifically the report of the Program Review Committee, and letters of recommendation from three outside evaluators. The new degree program proposal has been reviewed and recommended by the University Academic Planning Council and the Graduate Faculty Executive Committee.

The development of this degree program has received enthusiastic support from all groups who have reviewed it. We are particularly pleased that it can be scheduled for consideration by the Regents in February, and move toward final implementation.

Attachments

xc:        Dean John Bollinger (all w/o atts)
          Dean Virginia Hinshaw
          Associate Dean Michael Corradini
          Professor Jake Blanchard
          Martha Casey, Academic Planning
          Laura Wright, Academic Planning
PROPOSAL FOR AUTHORIZATION TO IMPLEMENT
A NEW ACADEMIC PROGRAM

1. PROGRAM IDENTIFICATION

In this document the College of Engineering at the University of Wisconsin-Madison proposes to initiate a Master of Engineering (MEngr) program. This initiative will add a Master of Engineering degree to each existing major in the College, including the newly renamed Engineering major (formerly Engineering without designation). Hence this program will involve all departments in the College, either acting on their own or in conjunction with other departments in the case of interdisciplinary degrees. In some instances, other Colleges will also participate.

Because we seek approval of a structure for a series of degrees and options, rather than the degrees themselves, this document does not have all the detail of a typical “Format B.” In particular, funding, curriculum, and expected enrollment will vary from degree to degree, so we have not included details on these areas. We have received some information regarding enrollment in similar programs outside of Wisconsin and will discuss that in a later section. To facilitate the discussion, we will include information for one of the options (Polymer Engineering and Science) which we expect to begin soon, pending approval of this overall structure.

II. CONTEXT

The College of Engineering has offered Master's of Science degrees for decades. These have historically been research-oriented degrees, typically requiring a thesis. Increasingly, though, the Master's Degree in Engineering is becoming an entry level degree for students interested in preserving the widest possible options throughout their engineering careers. Employers desire students with focused study in specialized areas and it is difficult to supply students with those skills at the Bachelor's level, given other important needs such as to maintain breadth in the Liberal Arts and to thoroughly cover the fundamentals in math, computer science, chemistry, and physics. Hence, the College of Engineering would serve both students and employers well by providing specific programs focused on practice-oriented Master's degrees. In addition, "high tech" companies are finding that their employees require continuing education to keep up with the latest technology and maintain their competitiveness. To serve these needs, we are proposing to implement a series of Master's of Engineering degrees, which will be intended as specialized terminal degrees, following a Bachelor's degree in one of our traditional majors. The topics emphasized by these programs are expected to shift fairly rapidly as the relevant industrial practices evolve.
This program fits well with the University's plans for the future. In his recently published "A Vision for the Future," Chancellor Ward states that we must update the Wisconsin Idea by viewing the university as a partner with industry.

*To do this, we must listen to and learn from the state's citizens, their elected officials, our alumni, and other friends. The communication revolution places us in the midst of a worldwide learning community. The challenge is to find new ways to originate, adapt, and transfer expertise from this global environment to the people of Wisconsin.*

Planning for this program began as a result of desires expressed by Wisconsin industries and thus is an attempt to offer programs consistent with their needs and with our goals for academic excellence.

### III. NEED

We are not aware of any comparable programs elsewhere in Wisconsin. There are Master's of Science programs in Engineering at UW-Milwaukee (UWM) and Marquette, and there are Bachelor's of Science programs at UW-Platteville, UWM and UW-Stout. No Wisconsin universities or colleges offer a Master's of Engineering.

Outside of Wisconsin, there are practice-oriented Master's of Engineering programs at the University of Michigan, Massachusetts Institute of Technology (MIT), Minnesota, Renssalear Polytechnic Institute (RPI), North Carolina State, and elsewhere. These are all terminal degrees leading to professional practice of the discipline. The programs at RPI and NC State are given both on campus and at a distance. The others are strictly on campus degrees.

As mentioned above, technical industries within Wisconsin and in neighboring states have expressed a need for more advanced, practice-oriented training for engineers in order to maintain the technical competence of their work force. We propose to meet this need by creating a terminal graduate degree in engineering with a series of options available for advanced specialization that will prepare our students to work in this challenging environment. This degree program is designed to meet the needs of this changing environment with options focused on specific areas and with the ability to shift focus as industrial needs change. We currently have 3 proposals in hand for options under this program and faculty in the College have expressed an interest in approximately 6 other areas.

Demand for these programs will vary. Each option under the Master of Engineering program will have a different audience and thus the class sizes will differ. Typical programs will likely have on the order of 10-30 students in a graduating class, but this does not preclude the creation of larger programs. Some programs will consist largely of students who begin graduate study immediately after completing their undergraduate work, while others will consist largely of practicing engineers who study part time and work full time as practicing engineers. The focus of the various programs is expected to shift fairly rapidly as technologies and engineering practices evolve.
For comparison, the parallel program at the University of Michigan offers Master of Engineering degrees in 12 areas and these programs currently had an enrollment of 142 students in 1997. At that time, the largest program (Manufacturing) had 49 students and the smallest (Optical Engineering and Ultrafast Technology) had none. The program started in 1993 with 20 students and enrollment has increased each year, 48 students in 1994, 85 students in 1995, 108 in 1996, and 142 in the fall of 1997.

IV PROGRAM DESCRIPTION AND EVALUATION

The College proposes to add a Master of Engineering degree to all of its majors, including Engineering (formerly Engineering without designation). Initial proposals already prepared are for Master of Engineering degrees in Professional Practice, Technical Japanese, and Polymer Engineering and Science. Each option designed for this program will be customized for the discipline, but they must conform to a template created by the College. The proposed guidelines for all Master of Engineering degrees are:

- A Graduate Program Committee within the College will review proposals for new options and will administer the programs of the graduating students.
- The Graduate School will approve options as they are proposed by the College. The College will then be allowed to admit students directly to that program and students will not have to file individual programs with the Graduate School.
- Transcripts will reflect the degree designation, including the option. The diploma will reflect only the degree designation.
- These degrees should have a separate entry in the Graduate Catalog, alongside the other Engineering degrees.

The template for the MEngr degrees would be as follows:

- Degree requirements and admissions will be consistent with those in place for the MS degree.
- Students must take a minimum of 24 credits, with at least 12 taken in the College of Engineering.
- No more than 12 credits can be transferred from other universities or colleges.
- At least 9 credits must be 500-level or above.
- Students who do not have appropriate work experience in their chosen field must include at least 6 credits of engineering professional practice. The form of this requirement will vary from program to program, but will typically consist of projects carried out in conjunction with Wisconsin industry. The Graduate Program Committee will ensure the consistency of this requirement in collaboration with the program faculty.

A sample curriculum, taken from the soon-to-be-proposed Master of Engineering in Polymer Engineering and Science degree and option, is included as an attachment.

Students typically will be expected to complete their course requirements within two semesters of equivalent full-time study. Professional practice requirements often will be completed during the summer months, so a typical degree program will be completed in approximately 1 calendar year.
Faculty will carry out ongoing assessment of student learning using a variety of written and performance measures. Regular feedback will be solicited from students, graduates and employers to assist the faculty in assessing the overall success of the program.

V. PERSONNEL

Many faculty members will be involved in each of these programs. No new faculty positions are being requested and few new courses would be developed. It is expected that courses will be modified to reflect current practices as different Master of Engineering degree programs are developed. The College will create a Graduate Program Committee to oversee the creation and management of each of the Master of Engineering programs. No new academic or classified positions will be necessary. An office already administering MS degrees in the College will administer each program.

VI. ACADEMIC SUPPORT SERVICES

In general, no additional load will be placed on the library, computing, laboratory or audio-visual infrastructures already in place in the College. In some cases, programs provided via distance education will require assistance with the delivery technologies and with funding the delivery mechanisms. Those programs will have to procure such funding before they will be approved.

VII. FACILITIES – EQUIPMENT

Again, no significant equipment will be required for these courses. Proposed programs having such requirements must procure funding before the Graduate Program Committee will approve the program.

VIII. FINANCE

No funding is requested for these new programs. For on-campus MEngr degrees, we do not plan to create any new courses. Thus, there are no additional costs incurred as a result of the creation of the MEngr programs. We will have an increased enrollment in these courses, but the cost will be offset by the increased tuition.

For the options offered primarily at a distance, we do expect to incur costs associated with course development and delivery. In these cases, proposals for new programs will have to develop business plans and show mechanisms for supporting these costs before the program will be approved by the College Graduate Program Committee.

SUMMARY OF ESTIMATED ADDITIONAL AND TOTAL COSTS FOR PROPOSED PROGRAM

Estimated and additional cost tables for the proposed Master of Engineering Degree program are not included. As stated in section I, we are seeking approval of a structure for a series of degrees and options, rather than the degrees themselves. The unique structure
Master of Engineering in Polymer Engineering and Science

Degree Requirements

1. Twenty four credits of Approved Polymer Engineering and Science Courses are required beyond the BS degree.
2. At least eighteen credits must be Formal Lecture or Laboratory Courses.
3. At least six credits must be Formal Lecture or Laboratory Courses numbered 600 or higher.
4. At least three credits must be Formal Lecture or Laboratory Courses numbered 700 or higher.
5. No more than six credits of Independent Study and no more than two (2) credits of Seminar are allowed.
6. No transfer credits are allowed.

Approved Polymer Engineering and Science Courses

<table>
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<tr>
<th>Chemical Engineering</th>
<th>Engineering Mechanics and Astronautics</th>
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<tr>
<td>Macromolecular Hydrodynamics</td>
<td>Intro to Finite Elements</td>
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<tr>
<td>Polymer Science and Technology</td>
<td>Composite Materials</td>
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<tr>
<td>Introduction to Colloid Science</td>
<td>Mechanics of Continua</td>
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<tr>
<td>Polymerization Reaction Engineering</td>
<td>Independent Reading</td>
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<tr>
<td>Food Process Engineering</td>
<td>Linear Viscoelasticity and Plasticity</td>
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<tr>
<td>Intermediate Transport Phenomena</td>
<td>Advanced Topics in Finite Elements</td>
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<tr>
<td>Intermediate Problems in Chemical Engineering</td>
<td>Advanced Composite Materials</td>
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<tr>
<td>Advanced Chemical Engineering Thermodynamics</td>
<td>Intro. to Polymer Rheology</td>
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<tr>
<td>Physico-chemical Hydrodynamics</td>
<td>Structural Theories of Fluid Dynamics</td>
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<td>Structural Theories of Fluid Dynamics</td>
<td>Advanced Mechanics of Continua</td>
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<td>Solid State of Macromolecules</td>
<td>Molecular Network Theories for Polymeric Materials</td>
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<td>Advanced Problems in Chemical Engineering</td>
<td>General Tensor Analysis and Rheology</td>
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<td>Seminar on Advances in Transport Phenomena</td>
<td>Rheology Research Seminar</td>
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<td>Rheology Research Seminar</td>
<td>Independent Work</td>
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<td>Polymer Materials Science Seminar</td>
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<td>Advanced Independent Studies</td>
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<tr>
<th>Chemistry</th>
<th>Mechanical Engineering</th>
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<tr>
<td>Chemical Instrumentation: Design and Control Applications</td>
<td>Intro. to Polymer Processing</td>
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<tr>
<td>Selected Topics in Polymer Characterization</td>
<td>Engineering Design with Polymers</td>
</tr>
<tr>
<td>Intro. to Macromolecular Chemistry</td>
<td>Composite Materials</td>
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<tr>
<td>Directed Study</td>
<td>Advanced Independent Study</td>
</tr>
<tr>
<td>Structural Theories of Fluid Dynamics</td>
<td>Advanced Composite Materials</td>
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<tr>
<td>Rheology of Macromolecules</td>
<td>Advanced Polymer Processing</td>
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<tr>
<td>Rheology Research Seminar</td>
<td>Modeling &amp; Simulation in Polymer Processing</td>
</tr>
<tr>
<td>Seminar: Macromolecular Chemistry</td>
<td>Intro. to Polymer Rheology</td>
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<tr>
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<td></td>
<td>Advanced Independent Study</td>
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Students typically will be expected to complete their course requirements within two semesters of equivalent full-time study. Professional practice requirements often will be completed during the summer months, so a typical degree program will be completed in approximately 1 calendar year.
of this degree program, in which future degree options define the specifics of the curricula (as in the included example of the Polymer Engineering and Science degree option), means that the options developed will also determine additional and total costs. As described above in sections V through VIII, any options that do need additional resources will be required to be self-supporting and the College of Engineering is developing the committee structure necessary to oversee this requirement. Consistent with the requirement that options be self-supporting, the College of Engineering is not requesting any new funds, or the reallocation of any existing funds, to implement the Master of Engineering degree program.
January 22nd, 1998

To:         Dr. John D. Wiley, Provost

From:      James P. Blanchard  Michael L. Corradini  Frances C. Garb

Subject: Program Committee Review of UW-Madison Master of Engineering

We have reviewed the proposal to implement the UW-Madison Master of Engineering degree program. We have also examined the external reviews of this program provided by Associate Dean William Martin, College of Engineering, University of Michigan, by Professor William Jennings, Chair of Electrical Engineering, Rensselaer Polytechnic Institute, and by Dr. Mohamed Ghausi, Dean, Emeritus, College of Engineering, University of California, Davis.

It is the committee's view that this program is forward-looking and an appropriate addition to the curriculum in the College of Engineering at UW-Madison. It is also responsive to the needs of industry and has the potential for great benefits for the State of Wisconsin. It is in concert with Chancellor Ward's "A Vision for the Future" as it updates the Wisconsin idea by providing an educational program in partnership with industry. A particular strength is the flexibility in offering degrees in specific technical areas in a timely manner.

Our committee recommends that this program be implemented at the UW-Madison.
January 19, 1998

Professor Michael Corradini  
Assoc. Dean of Engineering  
College of Engineering  
University of Wisconsin-Madison  
Madison, WI 53706-1380

Dear Dean Corradini:

I apologize for the delay in sending this brief review. As you know, I have retired as of December 31, 1997 and took an overdue vacation for one month from December 15 to January 15. During my absence, I had arranged that my office and files be transferred from University Outreach to the College of Engineering. As you can imagine things are in disarray and it will take some time to get organized.

I have read your proposed Master of Engineering Degree at University of Wisconsin-Madison. The proposal is very sound and much needed for the professional community. There is demand and need for this degree, especially from prestigious universities across the country. The proposed curriculum is appropriate, however, I don’t think the professional degrees are needed in all majors in engineering. Currently there is a huge demand for Computer Science, Electrical and Computer Engineering, Engineering Management and biotechnology. I do understand that you seek approval from the Regents for a series of options to be added and refocused as the needs of industry change. This will allow you to respond to shifts in rapidly changing technologies without delays in the approval process.

During the month of November, I have examined part-time professional programs at a few institutions in order to help in the decision-making process concerning the feasibility and implementation of such programs at UC Davis. I visited three schools: University of Colorado, University of Michigan and University of Wisconsin. You are familiar with the Professional Part-Time Degree programs at the University of Colorado-
Boulder and the University of Michigan – Ann Arbor. These schools have well
developed programs and you can get further information directly from them.

With the encouragement of the Office of the President, several campuses at the
University of California are looking into the possibility of offering Part-Time Masters of
Engineering degree. I will briefly describe the situations at UCLA and UCSD, who are
currently seeking to launch such programs.

**UNIVERSITY OF CALIFORNIA, LOS ANGELES:** UCLA is in the process of
proposing a Master of Engineering in Computer Science. Originally the idea was to
make the existing courses available to industry. After a marketing survey of 10,000
people by the University Extension office, they found out that there is a strong interest in
Computer Science. The needs of the community are different. They just don’t want the
same old courses. They want practical relevant courses either on a regular time or part-
time basis. The courses can be designed around the nine existing core courses. In other
words, five or six existing courses and another three or four to be planned with the help
of Extension. Extension has a vast experience and has offered around 350 to 400 courses
in Computer & Information Systems. Currently there are two part-time professional
degrees: one is the Executive MBA, the other MBA is for locally employed people.

**UC SAN DIEGO:** UCSD is in the process of submitting a proposal for a program
of Graduate Studies in Electrical and Computer Engineering for the Master of
Engineering (M.Eng.) Degree. The purpose of this new degree is to train design
engineers for the electronics industry. The current B.S. degree is not sufficient for a
career in design and design is mostly done by Ph.D’s. However, most electronic
industries feel that an M.S. in EE is adequate, but would prefer a more practical terminal
degree such as M.Eng. based on a sound knowledge of fundamentals. This degree will be
different from an M.S. degree, which is usually preparation for the Ph.D. program. The
program will be flexible, course intensive, and can be completed in one year of full-time,
or two years of half-time work.

The course requirements for this program requires 48 quarter units (12 courses)
similar to the M.S. degree, the difference being that M.Eng. students are encouraged to
take the twelve (12) general elective courses outside of engineering. They are also not
allowed to choose eight (8) units of research as required by the M.S. degree.
The M.Eng. program is a terminal degree and is designed for maximum flexibility. There is no requirement of a thesis or a comprehensive exam. Of the required 48-quarter units, at least 36 must be at the graduate level. All M.Eng. students will be assigned a faculty adviser to ensure focus and breadth.

At UC Davis, we are in the process of initiating M.Eng. Degrees in Computer Science, Electrical and Computer Engineering, and Technology Management. At this time, it is too early to detail the requirements.

I hope the above comments are of help in your evaluation of establishing a new Master of Engineering degree.

Sincerely,

M. S. Ghausi,
Dean, Emeritus, College of Engineering
University of California, Davis
December 30, 1997

John D. Wiley, Provost
University of Wisconsin - Madison
500 Lincoln Drive
Madison, WI 53706-1380

Dear Provost Wiley:

This is in response to your request to review the proposed Master of Engineering (MEng) degree that the UW College of Engineering wishes to establish. As you may be aware, and certainly the authors of the proposal are, the University of Michigan (UM) College of Engineering has had MEng degrees in place for about five years and our experience has been quite positive, and most of my remarks are based on this generally favorable experience.

Regarding the specific questions that you posed, I have the following thoughts:

1. The demand and expected enrollment levels are very dependent on the specific program. The most successful of our programs is the MEng in Manufacturing, with an enrollment this year of almost 50 students. There are two others with enrollments in the 20-30 range, and several others with a fewer number of students. I have included a table listing our degree programs and enrollments for your information. Altogether, the UM College enrolls approximately 150 students in its MEng programs, but it took several years to get to this number.

2. I feel strongly that this new degree program represents a broad area of interest to potential students as well as potential employers, and Engineering schools need to be responsive to these interests. The research-oriented MS degree programs are useful stepping stones to the PhD degree, and prospective doctoral students are encouraged to "get their feet wet" in research by pursuing a MS degree with a thesis, but a large number of students want the specialized knowledge that comes with a fifth year in school but don't want to commit to, and actually have little interest in pursuing, a course of study leading to the PhD. The MEng degree program provides this balance between research and practice, as well as offering the student an opportunity to broaden his or her knowledge in related areas such as business or economics. The UM College of Engineering National Advisory Committee, our visiting committee of high level industry and government executives, has endorsed these degree programs as being responsive to the needs of industry and have enthusiastically supported them from the beginning.
2. I believe the demand for Professional Master's programs will continue to grow, albeit slowly, over the next decade, and that enrollments in such programs will eventually surpass enrollments in more traditional, research-focused Master's programs. I expect that universities will continue to provide traditional Master of Science programs, but these programs will be smaller, and will serve primarily as a training ground for PhD students.

3. The College of Engineering at the University of Wisconsin-Madison is, in my opinion, well-structured and well-positioned to mount a very successful Professional Master's program. The College enjoys an excellent academic reputation, has many outstanding faculty, and is located in a geographic area which has a significant number of high technology industries. The proposed Master of Engineering program can be developed to directly match these local needs. These Wisconsin industries can also provide a source of part-time students and a source of professional practice opportunities.

4. Many universities with strong engineering programs have either recently developed Professional Master's programs, are working on establishing them, or have plans to establish them in the near future. A very small number (Cornell, for example) has been providing such programs for decades. If UW-Madison decides to not establish such a program, you can be assured that competitors will soon move to meet the needs of Wisconsin industries.

5. I applaud the concept of establishing a Master of Engineering program across the College of Engineering by identifying a common template, and then leaving the details of particular programs to individual departments. This is exactly the same approach that we used here at Rensselaer.

II. Specific Comments

1. I am a bit confused by the statement in the proposed template that Degree requirements and admissions will be consistent with those in place for the MS degree. Clarification is needed as to what consistent means. I would expect that the audience for the Master of Engineering degree is at least somewhat different than that for the MS, and that the requirements and admissions would reflect that difference. While I thoroughly agree that some degree of consistency is desired, I believe it is also wise to differentiate the two programs so that students and employers are not confused.
January 14, 1998

Dr. John D. Wiley
Office of the Provost and Vice Chancellor of Academic Affairs
Bascom Hall
University of Wisconsin - Madison
500 Lincoln Drive
Madison, Wisconsin

Dear Dr. Wiley:

Thank you for the opportunity to provide a review of the proposal by the College of Engineering at the University of Wisconsin-Madison to establish a new Master of Engineering degree program.

The School of Engineering at Rensselaer established a somewhat similar Professional Master's program two years ago, with exactly the same name (Master of Engineering). This was actually not a new degree program, but a revision of a degree program that was first established in the mid-60's. My department, Electrical, Computer and Systems Engineering, was actively involved with this revision and has been working diligently to develop our version of this program into a viable academic and economic venture.

I have organized my review into two sections; General Comments, concerning the concept of establishing a Professional Master's program and Specific Comments, concerning the details of the specific proposal developed by the College of Engineering at UW-Madison. I hope you find these comments of some value in your decision-making process.

I. General Comments

1. I strongly favor of the development of Professional Master's programs in Engineering. The rapid explosion in technology (and information in general) has meant that the 4 years devoted to an undergraduate degree must increasingly be used to establish a strong foundation in science, technology and the liberal arts, on which students can build for the length of their careers. This means that they usually receive only introductory courses in modern technological areas. A Professional Master's program which allows them to broaden their exposure, deepen their knowledge in a selected area of concentration, and practice their profession in realistic applications is an excellent preparation for professional practice.
2. The total number of credits required for the proposed degree, the minimum number that must be taken in the College of Engineering and the minimum number of credits that must be at the graduate level seem to be a bit low to me, as compared with other programs. Similarly, the number of credits that can be transferred from other universities is a bit high, in comparison with other programs. I assume, however, that these are consistent with current UW-Madison MS programs and, hence, not major factors in the current decision process.

3. The proposed engineering professional practice requirement for students who do not have appropriate work experience is very well stated. I believe this is exactly the right approach to take.

4. The nominal timeframe for completion of the proposed program, 1 calendar year, is very appropriate. It is extremely important, in my opinion, that students be able to complete Professional Master's programs in a relatively short timeframe so that the delay in entering the workforce is not viewed as overly long. This is usually a clear differentiation from traditional MS programs.

5. There is no specific requirement in this template concerning the breadth and depth of the individual programs that will be developed by the departments. We took a similar approach here at Rensselaer. However, I personally would favor a general requirement that each program must demonstrate both depth in an area of technical concentration and breadth across several areas.

6. A statement which appears to be missing, perhaps by design, is one which states that the College of Engineering template establishes MINIMUM requirements, and that individual programs can be MORE RESTRICTIVE, but not LESS RESTRICTIVE. This is fairly standard practice and perhaps is assumed. For example, our department requires that 18 credits out of the 30 required for our Master of Engineering degree be at the graduate level, whereas the School of Engineering and Graduate School templates require only 15 out of 30.

7. The College of Engineering template specifically states that no more than 12 credits can be transferred from other universities or colleges. The attached Master of Engineering in Polymer Engineering and Science program, however, states that no transfer credits are allowed. This is a bit confusing. While I support the right of departments to be MORE RESTRICTIVE that the minimum requirements (see above), I am surprised that a consistent approach to transfer credits is not established. Perhaps I am misunderstanding something.
8. Programs like the one being proposed typically try to make significant use of practicing engineers as Adjunct faculty, particularly in applications-oriented courses. I was surprised to see no mention of this in the section labeled PERSONNEL.

9. Professional Master's programs certainly place a much lower load on academic support services than traditional programs, but I would be hesitant to say that no additional load would be placed. Certainly the students in the proposed program would be expected to visit the library and use computers.

10. I agree that there should be no significant need for new equipment for the proposed program. This is one of the attractions of these programs.

11. No new funding is requested, and this is exactly the same approach we took at Rensselaer. We are developing new courses, however, although we are doing so within normal academic budgets. I personally believe that successful Professional Master's programs need to develop new courses, specifically courses that focus more on applications. Most universities with traditional MS/PhD programs have a proliferation of very theoretical courses.

12. No mention is made of financial aid for students. We, again, took a similar approach in our program. My belief, however, is that Professional Master's programs will not be very successful in attracting large numbers of full time students unless some form of financial aid is provided which reduces the full tuition burden (this is a much worse problem, of course, in private universities such as Rensselaer). I do not advocate full Teaching or Research Assistantships as is common in MS/PhD programs, but some form of Tuition Scholarship program would be very helpful.

Please feel free to contact me if there is any further information that I could provide.

Sincerely,

[Signature]

William C. Jennings