To: Peter D Spear, Provost

From: Stephen Robinson, Professor of Industrial and Systems Engineering
        Joint Review Committee Chair

        Fran Garb, Senior Academic Planner, UW System
        Wayne Pferdehirt, Director Engineering Distance Degree Programs
        John Strikwerda, Professor of Computer Sciences

Subject: Joint Review for the Master of Engineering

This is the report of the Joint Review Committee appointed by your letter of September 3, 2004 and charged to review the Master of Engineering (ME) program and to report by December 15, 2004. In late November 2004 we notified you that because of complicating factors in the program the review could not be completed by December 15 but should be completed early in 2005.

Background

The committee met to discuss this unique program on November 9, 2004. Prior to that meeting, committee members reviewed the program self-study, a memo from the dean of the College of Engineering, the original program proposal and the executive summary of that document, and letters from two outside reviewers. During the meeting, the members of the committee reviewed the documents and clarified their charge. It became clear that we did not have sufficient information to address the issues included in your September 3, 2004 memo. The committee chair then requested additional information from Associate Dean Patrick V. Farrell of the College of Engineering, who provided this information in a memo dated December 17, 2004. The members of the committee reconvened on January 6, 2005 to discuss that additional information and to determine the substance of this report.

This program is more complex than most because of its unique structure. The Board of Regents authorized the College of Engineering to implement “a structure for a series of degrees and options, rather than the degrees and options themselves.” Degree and options would all conform to a template but could be customized for the discipline. Central to the program was the creation of “a Graduate Program Committee to oversee the creation and management of each of the Master of Engineering programs.” There are currently several
degree programs in various stages of implementation. We reviewed these degree options, and our comments on them follow. However, the Graduate Program Committee has not been formed and so it was not possible for us to review the structure of the program.

Findings

The self-study and external reviewers’ comments indicate that in the five years since initial approval of the ME degree, the College of Engineering has made commendable progress in developing new, “practice-focused interdisciplinary degrees,” each with a designated area of focus.

The three ME programs that are most advanced in their development are the ME in Professional Practice (MEPP), ME in Technical Japanese (METJ) and ME in Engine Systems (MEES). The current operations of these programs indicate that the College is meeting the goal of serving new student populations through its development of ME degrees. Students in these programs are mid-career professionals, who would be unlikely to interrupt their careers to move to Madison or any other UW campus. The practice-oriented curricula and the convenient distance format are enabling UW to effectively deliver innovative graduate education to new groups of adult students. The other two programs listed as “current options” in the self-study are the ME in Polymer Engineering and Science (MEPES) and ME in Energy Systems (MEEnergyS), but these had been operating for less than one year as of the date of the self-study, and in our view neither of them had enough of an operational record to support the level of evaluation intended in a five-year degree review.

With one exception, the review committee has no serious concerns about the individual degree programs. The MEPP program is the most mature program developed thus far under the Master of Engineering umbrella. MEPP has achieved a strong record of academic excellence, evidenced by several major national and international awards for the program. In so doing, MEPP provides strong evidence that the ME degree can be and is being used to strategically advance the College’s and University’s role in delivering world-class education to adult students learning at a distance.

Most of the comments provided by external reviewers Dr. Frank Burris and Dr. Stuart Walesh focused on MEPP, the degree program with which reviewers were most familiar. Dr. Burris concluded: “There is little question in my mind that UW-Madison has made a creative contribution to the profession with MEPP. Its national standing in engineering will only be enhanced by the continued growth and success of MEPP and similar Master of Engineering programs.”

Our one area of concern with individual programs has to do with the vulnerability of the METJ program. This program is staffed by only one faculty member. A one-person faculty leaves the program and students’ studies inordinately susceptible to interruption. Also, the sole-faculty model substantially limits the program’s ability to expose students to a broad range of perspectives in their studies. Attention to this issue would strengthen the current and future viability of this program.
A second general area of concern is assessment. The assessment methods used by the individual degree programs need systematic review by the College to ensure thoroughness of assessment practices and an integration of lessons learned within and across all ME degree programs. The Committee reviewed assessment practices used by the MEPP program to assess courses, the overall program, and impacts on graduates’ careers. These practices appear thorough, and data that were provided showed how assessments are being used to improve the program. We understand that these practices are being adapted and applied to MEES as that program continues to develop. The Committee has not received sufficient information to review the effectiveness of evaluation practices employed in the METJ, MEPES and MEEnergyS degree programs, especially the portions of these programs that serve off-campus students. The nature of the programs and the charter under which they were developed indicates that they should be assessed more completely than is possible using only the standard course evaluation forms of the College of Engineering. In particular, there should be an overall assessment of the programs’ learning outcomes that is more than the sum of the individual course evaluations. The Committee has been provided no evidence that this is presently occurring.

Members of the review committee determined that the individual programs created under the ME umbrella, that have been operating for long enough to be evaluated, are for the most part doing well. However, the committee has a serious concern about the umbrella structure itself, which we explain next. Because of that concern, we recommend that final approval of this program be delayed.

The proposal to authorize the Master of Engineering program states that the approval is for “a structure for a series of degrees and options, rather than the degrees themselves.” It adds, “A Graduate Program Committee within the College will review proposals for new options and will administer the programs of the graduating students.” No such structure has been established: in particular, there is no Graduate Program Committee. Proposals for new degrees in the ME program have been reviewed by the College of Engineering Academic Planning Council, as they should be. The APC is, however, not an adequate management structure for the ME programs. Thus, without a structure to evaluate, the review committee was unable to fulfill its charge.

The proposal for the ME program states that “the topics emphasized by these programs are expected to shift fairly rapidly as the relevant industrial practices evolve.” If the ME program is to respond to the shifts whose existence motivated its establishment, it is imperative that there be some program oversight to assess which new degrees should be offered, which should be modified as conditions change, and which should be discontinued.

Because the existing ME degree programs are laudable, the review committee recommends that the program continue but that a final recommendation be delayed for three years. In the interim, the College needs to systematically review processes used to assess and improve all ME degrees to ensure appropriateness, thoroughness and effectiveness of those practices. In addition, the College of Engineering should use this
time to establish the management structure described in the authorization, including the Graduate Program Committee. This committee will oversee the several degree programs so that the ME program can fulfill its intended role. The College must establish this management structure quickly enough so that there is a record of program operation that can be evaluated three years from now (see below).

Our second recommendation is that this review be reactivated in the fall semester of 2007 to reexamine the management of the Master of Engineering program. The emphasis of that review should be on the management structure of the program and on how effectively that structure is working, rather than on the details of individual programs. We suggest that the review in Fall of 2007 should focus on the following questions.

1. What structure has been established to “oversee the creation and management of each of the Master of Engineering programs” per the authorization of the ME degree? What evidence has been provided to show that this structure is actively ensuring quality within and across all ME offerings?
2. What are the assessment criteria for the degree programs? Assessment should address practices for evaluating and continuously improving: (1) individual courses with each program; and (2) the curriculum, instructional design, and student support of each degree program.
3. What are the criteria for determining whether a degree program needs to be modified in light of changes in the instructional staff and external environment?
4. What are the criteria for determining whether to approve additional Master of Engineering degree programs or to discontinue a current ME program?
5. What are the criteria to detect whether a degree program has slipped or shifted from its intended purpose?
6. What has been done about the vulnerability of the METJ program?

**Summary of recommendations**

The review committee recommends:

1. That the established degree options within the ME program continue pending final approval following the 2007 review. Program-level assessment in the on-campus programs should be strengthened.
2. That the College of Engineering establish a management structure for the ME program, including the Graduate Program Committee described in the program authorization documents.
3. That this review be reactivated in the Fall semester of 2007 to reexamine the management of the ME program, focusing on the six questions stated in the previous paragraph.