GRADUATE COUNCIL MEETING
March 2, 2006
3:00pm, MU 212

Present: Koenig (chair), Filtz, Francis, Gitelman, McCandless, McLain, McMullen, Rettig, Rockey, Sanchez, Tadepalli, and Unsworth

Absent: Gupta, Harter, Proebsting

Guests: Logen Logendran, Ken Funk, Ron Adams, Ann Schauber

1. Industrial and Manufacturing Engineering (IME) Review Report

Michael Unsworth (Oceanic & Atmospheric Sciences) presented the report of the Industrial and Manufacturing Engineering Graduate Council Program Review Committee to the Graduate Council. The review took place November 3, 2005.

Unsworth began with assuring the Council that the overall conclusion was that this was a very positive review and that the Program should certainly be continued. The Department has done very well over the years in developing attractive graduate areas of specialization. It has very good laboratory facilities. The Program seems very well matched with the needs of industry and in placing their graduates. Unsworth added that like so many other OSU departments, IME has lost a significant percentage of their staff over the years and without additional support it’s hard to see how the Program can maintain its current level of productivity let alone expand both its teaching and research missions.

Unsworth presented the Council with the Review Panel’s recommendations:

1. At least one IME faculty position should be created over each of the next two years to restore faculty numbers and permit growth of the graduate program.

2. There are risks that a prospective merger with the Mechanical Engineering Department could adversely influence the Department’s ability to recruit and retain high quality IME faculty and graduate students, but there are also potential benefits in a merger. We recommend that, if a merger proceeds, steps be taken to ensure that IME can be identified as a self-contained discipline with a clear graduate curriculum and faculty career path.

3. The review committee acknowledges the increased recruitment efforts by the department and recommends that they be continued

4. To broaden the graduate curriculum, and alleviate some of the impact of faculty losses we recommend that IME consider cross-listing courses with departments with common interests. Opportunity would seem strongest with Statistics (operations research for Manufacturing Systems majors) and Mechanical Engineering (material and materials processing for Nano/Micro Fabrication majors) although other relationships might also be built with
Computer Science (Information Systems majors) and Exercise Science and Psychology (Human Systems majors). Developing these relationships would also satisfy the graduate students’ desire for a broader range of courses.

5. IME should publish a list of courses that will be offered over a two-year horizon to enable students to better plan their programs.

6. We recommend the development of a graduate seminar series. It may be useful to create this as a course for credit, and require graduate students to attend. Such a series could include speakers from OSU, both from IME and elsewhere, as well as speakers from industry. Academic speakers who require compensation for expenses could come from other universities in the region to minimize expenses, while those from farther away may be invited based on fiscal considerations. Possible sponsorship of the series by industry should also be investigated.

7. The Department, in association with College administration, should develop a flexible plan that matches graduate student numbers and teaching commitments to the number of faculty available.

8. The Department should look into areas of research collaboration, which might be led by IME faculty or otherwise, that could take advantage of the excellent infrastructure in IME and lead to more research involving cross-disciplinary integration.

9. The Department should consider mechanisms to avoid isolation of those working at ONAMI. These may involve improving transportation between ONAMI and campus, creating a student seminar series, and encouraging regular faculty interaction both professionally and socially.

10. In order to keep an identity for IME it should retain department or a similarly clearly defined status. This will be critical for the continued recruitment of highly qualified faculty and graduate students.

11. Some budget lines of IME should be kept separate from Mechanical Engineering to avoid erosion of the smaller program.

12. IME should be allowed to hire faculty to replace those that have departed. This is critical to meet the new Graduate School rules regarding graduate coursework and would be an important show of support for the program.

13. The Department should keep records of the quality of students applying and being accepted into the program, and should endeavor to compare intake quality with that of comparator departments.

14. The Department should introduce an on-going plan to keep track of former students and their career progression.
15. The Department should investigate further the possible causes of the decline in graduate applications in recent years. For example is this a national trend, or are there special factors at OSU that need to be remedied?

16. The Department should consider developing a graduate internship program in collaboration with industry.

17. The Department should keep track of national rankings of graduate programs in IME departments and endeavor to use this knowledge to improve the ranking of IME at OSU.

18. Given the climate nationally (and particularly in Oregon) for the funding of higher education, it may be necessary to increase development efforts as noted in the self-study report. This is not a short-term process and requires proper cultivation of alumni and corporations. Efforts should be made to put together a strategic plan of how to accomplish this. Other than scholarship and assistantships, IME may also wish to consider an endowed seminar series and professorships to attract top faculty or support current faculty.

Hal Koenig (College of Business) asked if the Council had any issues or requests for clarification from Unsworth. As there were none, he then asked Ron Adams (College of Engineering) if he would like to comment.

Adams thanked the Council for their efforts on the review. He then addressed the Panel’s recommendations concerning the creation of a new School in the College of Engineering by the merging of IME with Mechanical Engineering. He assured the Council that as this merger moves forward work to retain the identities of the individual departments is a high priority with the College.

Adams informed the Council that utilization of the laboratory facilities at ONAMI will rise and that he is working with the parking department to solve the transportation problems that will result with additional students and faculty traveling to Building 11.

Adams also thanked Unsworth for reminding the Council of the fact that external visitors from all over the country are repeating the same message: OSU has a group of faculty that is not the right size. Adams told the Council that faculty in the College of Engineering (on an individual basis) out-performs the national average by about 30-40% and he suspects that other colleges at OSU can show similar statistics. Adams hopes that the Council can deliver this message to Administration: OSU faculty cannot sustain this high performance without additional resources.

Ken Funk (Industrial and Manufacturing Engineering) thanked Logen Logendran for the high quality of work he produced with the IME self-study. Funk also took a moment to comment that the panel’s recommendations are very reasonable and helpful and he thinks that with the help of Dean Adams they are achievable.

Logen Logendran (Industrial and Manufacturing Engineering) was then given the opportunity to respond to the panel’s findings and recommendations (appendix II).
David McCandless entered the meeting during Logendran’s presentation and Ron Adams left.

When asked for questions or comments, the Council asked for Logendran to clarify the following issues in his statement:

- The decrease of International student applications in the nation, the Pacific Coast states and at OSU.

- The quality of IME applicants and students. (In response to questions about the GRE scores of recent students, Logendran explained that he was making a qualitative assessment of quality and argued that GRE scores are a very weak indicator of the performance of IME students.)

- The use of a departmental exit survey or an exit interview.

Funk and Logendran left the meeting.

The Council then discussed the merger of the IME and Mechanical Engineering departments. Prasad Tadepalli (Engineering) asked if the external reviewers thought the merger was a good idea. Unsworth responded that the reviewers were divided. Jim Johnson, the employer reviewer who also serves on the advisory committee to the Dean of the College of Engineering, thought the merger would bring greater collaboration between the two departments. Paul Cohen, the academic peer reviewer, claimed that many departments who had done this have suffered and have found it much harder to recruit and retain faculty. Unsworth informed the Council that he believed that this question was beyond the purview of the Panel. Tadepalli commented that ideally the Graduate Council would want a program review panel to be able to make this kind of recommendation or not make it, but he understands the difficulty and complimented Unsworth on the thoroughness of the review.

A motion to accept the report was moved and seconded. All voted in favor. Motion passed.

2. Minutes from Previous Meetings

A motion was made and seconded to approve the minutes of January 19, 2006 as amended. All voted in favor. Motion passed.

A motion was made and seconded to approve the minutes of February 2, 2006. All voted in favor. Motion passed.

A motion was made and seconded to approve the minutes of February 16, 2006. All voted in favor. Motion passed.
3. Update on the Category I Proposal to Create a Master of Science in Interdisciplinary Studies and Modify the Master of Arts in Interdisciplinary Studies

Ann Schauber (Graduate School) began by summarizing the responses she received from department heads regarding the proposed changes to the Master’s Degree in Interdisciplinary studies. She received 13 responses from 6 colleges. The feedback was split: half supported the MIS degree with no language requirement, 3 supported the MAIS degree with no language requirement and 3 responses reported no preferences.

Schauber reported that she met with the MAIS advisory committee today and that the consensus within the committee is that the true issue is maintaining a flexible interdisciplinary studies degree, the name of the degree is unimportant.

Schauber was surprised to learn that the Curriculum Committee had already reviewed the CAT I proposal and had sent her questions about it. Schauber informed Marvin Pyle that the CAT I was still in the Graduate Council and that we are currently addressing questions closely related to issues raised in discussions at the Curriculum Council.

Schauber informed the Council that if they wished to move forward with the MIS degree, a new CAT I proposal will need to be written; this process could take another year. If they wish to approve the revised MAIS (remove the CLA requirement and add the two new courses), a CAT II proposal will be needed; if approved the revised MAIS could be effective Fall 2006.

Theresa Filtz (Pharmacy) suggested going forward with the CAT II proposal to revise the MAIS degree requirements now and following that up with at CAT I proposal (for a name change) at a later date.

Discussion ensued.

A motion was made to instruct Schauber to write a CAT II proposal to revise the MAIS degree was made and seconded. All voted in favor. Motion passed.

The meeting adjourned at 4:30 pm.
IME Department Response to the Graduate Program Review Report

1. **At least one IME faculty position should be created over each of the next two years to restore faculty numbers and permit growth of the graduate program.**

   In June of 2005, the IME department lost three of its faculty members, including the former Department Head. In fall of 2005, a new assistant professor was hired to meet the needs in the Information Systems Engineering focus area. We agree that, in order to meet the current needs of the IME graduate program and to sustain growth, it would be necessary to recruit one faculty member in each of the next two years.

2. **There are risks that a prospective merger with the Mechanical Engineering Department could adversely influence the Department’s ability to recruit and retain high quality IME faculty and graduate students, but there are also potential benefits in a merger. We recommend that, if a merger proceeds, steps be taken to ensure that IME can be identified as a self-contained discipline with a clear graduate curriculum and faculty career path.**

   The efforts are currently under way to develop and submit a Category I proposal to form a school structure by merging the IME department and the Mechanical Engineering (ME) department. It is our intent to make sure that the structure and leadership proposed will ensure that the IME department continues to function as a self-contained discipline. The current Interim IME Department Head would continue to serve in the capacity as Interim IME Associate Head, reporting directly to the Head of the School of Industrial, Manufacturing, and Mechanical Engineering. The operations and budgetary issues associated with the IME department would be handled by the Interim IME Associate Head. Nevertheless, we anticipate that the direction in which the School should strategically move forward, concerning curricula, research, and other issues, would be jointly determined by the faculty of both departments and recommended by both Associate Heads, should there be one appointed for the ME department, and finally approved by the Head.

3. **The review committee acknowledges the increased recruitment efforts by the department and recommends that they be continued.**

   The increased recruitment efforts, targeting regional universities in Oregon, and those nationally and internationally, were first instituted in the fall term of 2004. We intend to offer 4-8 graduate teaching assistantships to incoming graduate students in the fall term of 2006, depending upon the budget. The information on the offer of assistantships for fall of 2006 is posted on the IME website to encourage students to apply for the IME graduate program. In addition, we are continuing our recruiting efforts this academic year by making recruiting presentations at regional universities. Four universities (Western Oregon University, University of Portland, Willamette Universities, and George Fox University) have been contacted, and four recruiting presentations to graduating seniors at these universities have been made. Several students who attended these recruiting presentations have expressed interest in pursuing graduate studies in IME. They will all be invited to attend the College wide graduate student recruiting event, scheduled to be held on Friday, March 10, 2006. The day’s events are planned to include several activities including lab tours, campus tour,
meeting with IME graduate faculty, current graduate student presentations, and a Potluck at Westminster House for invitees, current students, the IME staff, the IME graduate faculty, and their families.

4. *To broaden the graduate curriculum, and alleviate some of the impact of faculty losses we recommend that IME consider cross-listing courses with departments with common interests.* Opportunity would seem strongest with Statistics (operations research for Manufacturing Systems majors) and Mechanical Engineering (material and materials processing for Nano/Micro Fabrication majors) although other relationships might also be built with Computer Science (Information Systems majors) and Exercise Science and Psychology (Human Systems majors). Developing these relationships would also satisfy the graduate students’ desire for a broader range of courses.

The recent loss of IME faculty and our obligation to teach the required undergraduate courses to meet the needs of our undergraduate programs as well as the requirements set forth by the ABET (Accreditation Board for Engineering and Technology) have limited our ability to teach all of the required and elective IME graduate courses. For example, this academic year (2005-06), neither of the Operations Research courses (IE 521 and IE 522) is taught. These are strictly graduate courses in the Manufacturing Systems Engineering focus area. Although courses comparable to them are taught by the Statistics Department, they are all slash courses which does cause a problem in light of the 50% graduate only courses requirement. Nevertheless, the current IME graduate students have been asked to take these courses from the Statistics Department to avoid any delays in completing their graduate degree. The Nano/Micro fabrication focus area is highly interdisciplinary, and the students majoring in this are required to take courses from the School of Electrical Engineering and Computer Science, and the Departments of Mechanical Engineering and Chemical Engineering, in addition to the required and elective courses taught in the IME department. Likewise, students from these other departments take Nano/Micro Fabrication courses taught in the IME department to meet their program requirements. Similar situations exist with the courses taught in the Human Systems Engineering focus area and those taught in the Exercise Science and Psychology departments. To summarize, the opportunities for IME graduate students to take courses taught in several other departments at OSU currently exists and they do take them, although they are not cross-listed in the catalogue. With the efforts to merge the IME and ME departments currently under way, we will start with exploring the possibility of cross-listing some of the courses taught in IME with ME.

5. *IME should publish a list of courses that will be offered over a two-year horizon to enable students to better plan their programs.*

As noted in item (4) above, the uncertainties in graduate faculty availability to teach both required and elective courses in IME has hindered us from publishing a list of graduate courses for two years in advance. If course offerings are published in advance, we will need to make sure that all of the courses are taught at the right time as noted in the communiqué to the graduate students. This would be very hard to meet, given the fewer number of graduate faculty and the uncertainties associated with budgets and other factors to allow hiring faculty
to replace the ones who left last summer. We will, however, try to disseminate accurate information on course offerings in advance to the extent it is feasible.

6. **We recommend the development of a graduate seminar series. It may be useful to create this as a course for credit, and require graduate students to attend. Such a series could include speakers from OSU, both from IME and elsewhere, as well as speakers from industry. Academic speakers who require compensation for expenses could come from other universities in the region to minimize expenses, while those from farther away may be invited based on fiscal considerations. Possible sponsorship of the series by industry should also be investigated.**

With the merger of IME and ME departments, anticipated to take effect in fall of 2006, we see two options to offer a graduate seminar series. The ME department has an ongoing seminar series in which the faculty from the ME department and those from other departments in the COE have presented seminars. These seminars are attended by the ME graduate students. One option is to require the IME graduate students to attend this seminar series along with the ME graduate students. The other option is to introduce a seminar series, or even seminars from time to time as we see fit, in which the IME faculty, and subject experts from industry as well as those from other universities but budget permitting, present their work. We intend to explore these two options and decide on using one of the two or both options that suits the best for our graduate students. When implemented, the attendance in a minimum number of seminars offered in the IME department and/or ME department will be made a requirement for all IME graduate students.

7. **The Department, in association with College administration, should develop a flexible plan that matches graduate student numbers and teaching commitments to the number of faculty available.**

Currently, there are about 40 IME graduate students and 8 graduate faculty members. A couple of us have assigned service/administrative responsibilities that total up to approximately 1.0 FTE (0.6 FTE – IME Interim Department Head; and 0.3 FTE – IME Graduate Program Chair), which leaves us with only 7 FTE of graduate faculty for teaching and research. The availability of graduate faculty and their area of (research and teaching) expertise, the number of graduate students, and whether or not a course is required or elective have been critical in determining which courses to offer in an academic year. In other words, we have exercised a flexible plan in making these determinations and will continue to do so.

8. **The Department should look into areas of research collaboration, which might be led by IME faculty or otherwise, that could take advantage of the excellent infrastructure in IME and lead to more research involving cross-disciplinary integration.**

Some research collaboration exists between the IME faculty and faculty from other departments as well as those from other universities. The projects funded by HP-Foundation, UTC/RITA (University Transportation Center/U.S. Department of Transportation’s Research and Innovative Technology Administration), and those funded and pursued in Nano/Micro fabrication are a few examples of this. The imminent merger of the IME and ME departments
should create an environment that is conducive for more cross-disciplinary research collaboration.

9. *The Department should consider mechanisms to avoid isolation of those working at ONAMI. These may involve improving transportation between ONAMI and campus, creating a student seminar series, and encouraging regular faculty interaction both professionally and socially.*

The graduate students who work on projects funded by ONAMI have offices in HP-Bldg. 11. The reasons for this are many fold – better student office facilities, all or most of the equipment for running the research experiments are housed in Bldg. 11, and allows for students working on different projects to interact with each other in laboratories and offices, all in one location. While all of the issues associated with the transportation of students between OSU and HP-Bldg. 11 may not have been addressed, there was some discussion with the students about this and they were encouraged to purchase an affordable car. We will bring this to the attention of the IME faculty who work with students on these projects to help alleviate any further concerns they might have about transportation. The graduate students majoring in Nano/Multi fabrication are required to take courses that are common to all IME graduate students (IE 552, IE 563, IE 594 (for M.S. thesis/Ph.D. dissertation), and for PhD students: IE 521 or IE 522, and IE 545 or IE 570). So there are opportunities for them to interact with graduate students majoring in other focus areas (Manufacturing Systems Engineering, Information Systems Engineering, and Human Systems Engineering). A seminar series for the graduate students, as noted in (6) above, should give them opportunities for further interaction with faculty and their fellow students in other IME focus areas.

10. *In order to keep an identity for IME it should retain department or a similarly clearly defined status. This will be critical for the continued recruitment of highly qualified faculty and graduate students.*

We realize that the identity of IME as a separate unit is very important for the recruitment of high-caliber graduate students and faculty. In the merger of the two departments (IME and ME), we intend to preserve this identity as best as we could.

11. *Some budget lines of IME should be kept separate from Mechanical Engineering to avoid erosion of the smaller program.*

Although the two departments will have a few overarching common goals after the merger, each will have their own goals and objectives that best suits their need. Thus, it is important that the budget lines are kept separate for the two departments in order to channel the funds to activities that are deemed important to realize the most benefit.

12. *IME should be allowed to hire faculty to replace those that have departed. This is critical to meet the new Graduate School rules regarding graduate coursework and would be an important show of support for the program.*
We agree that it is important to hire new faculty to replace those who have left to teach strictly graduate courses to meet the 50% graduate only courses requirement implemented recently, and to sustain growth of the IME graduate program. It is our expectation that the two vacant positions would be replaced, one in each of the next two years.

13. The Department should keep records of the quality of students applying and being accepted into the program, and should endeavor to compare intake quality with that of comparator departments.

A procedure would be put in place, beginning fall of 2006, to record the quality of students that are accepted into the IME graduate program. The proposed statistics to be tracked are GPA, GRE scores, and TOEFL scores of students whose native language is not English.

14. The Department should introduce an on-going plan to keep track of former students and their career progression.

Typically, the IME faculty members stay in touch with their former PhD students, primarily as a result of their pursuit of joint publications in journals based on the students’ doctoral research. So their career progression is generally known, although currently there is no formal mechanism in place to track this. Similar collaborative activities do take place between the faculty and their former MS students, perhaps not to the same extent as those with their PhD students to know their career progression. Often there is contact between the professor and student as soon as the student graduates and takes up his/her first job, but with time, change of position, employer, and/or location the contact may not be there. We have now implemented a process to track this information, starting with students who graduated recently.

15. The Department should investigate further the possible causes of the decline in graduate applications in recent years. For example is this a national trend, or are there special factors at OSU that need to be remedied?

The IME Graduate Program Chair serves on the College of Engineering (COE) Graduate Council. In one of the recent Council meetings, some data on graduate student (US and international) enrolments at OSU and COE for the past few years was made available. Also, data on the total number of (graduate and undergraduate) international students enrolled at universities in Oregon and other States in the Pacific region for the past few years was made available. These data might help explain the reasons for the decline in applications for admission into the IME graduate program.

The total number of international students enrolled in the universities in Oregon has steadily declined from 6612 in 2000/01 to 5490 in 2004/05 (i.e., 17% drop). For the same data, the percentage change for 2004/05 from 2003/04 is -6.2%, by far the largest decrease compared to the other states in the Pacific region (Alaska +2.8%, California -2.8%, Hawaii +2.1%, and Washington -0.8%, for a Pacific region net total decrease of -2.5%). Nationally, some regions have seen a net increase (Mountain 0.7%, South 0.5%, Southwest 3.1%), while others have seen a net decrease (Midwest -2.9%, Northeast -3.0%) as did Oregon.
The number of (US and international) graduate students in the COE has decreased from 586 in 2002 to 508 in 2005 (-13.3%), while that for the COE international graduate students has decreased from 359 to 204 (-43%). For the same time period, the number of international graduate students at OSU decreased from 820 to 612 (-25.4%). As the majority of applications for graduate studies in IME come from international students, the data above may help explain the reasons for the decline in graduate applications in IME. The increased screening procedures applied to the international students at U.S. Consulates for issuance of a visa since 9/11 may also have contributed to the decline. It is important to note that the number of applications for all graduate programs in the COE decreased from 2195 in 2003/04 to 1065 in 2004/05, a 51.5% drop. For the same time period, the number of applications for graduate studies in IME also decreased by about the same percentage (51.2%; from 121 to 59).

16. The Department should keep track of national rankings of graduate programs in IME departments and endeavor to use this knowledge to improve the ranking of IME at OSU.

The U.S. News and World Report conducts a survey of all graduate programs in engineering schools in the U.S. to establish a ranking of graduate engineering programs across the country. The factors used in evaluating an overall score for ranking include peer assessment, recruiter assessment, average quantitative score, acceptance rate, Ph.D. students/faculty ratio, membership in NAE, engineering school research expenditures, research expenditures per faculty member, Ph.D.’s granted, and total graduate engineering enrollment. Conceivably, the same or similar set of factors would be used to establish the ranking of graduate programs in individual disciplines, including IME. While improving the performance/score in each factor that contributes to the evaluation of the overall score is not within our control, some are, as pointed out in the review committee’s report. As a department we will aggressively pursue efforts to recruit more high-caliber Ph.D. students in IME, increase the graduate enrollment in IME, and increase research funding.

17. Given the climate nationally (and particularly in Oregon) for the funding of higher education, it may be necessary to increase development efforts as noted in the self-study report. This is not a short-term process and requires proper cultivation of alumni and corporations. Efforts should be made to put together a strategic plan of how to accomplish this. Other than scholarship and assistantships, IME may also wish to consider an endowed seminar series and professorships to attract top faculty or support current faculty.

The number of high-caliber graduate students that we can attract is dependent upon our ability to offer competitive scholarships and assistantships. As noted in the self-study report, we realize that it is important to pursue fund raising to supplement the number of scholarships and assistantships offered from research projects and State funds. We will pursue efforts to raise funds as best as we could from Alumni and corporations.
OVERALL CONCLUSION AND RECOMMENDATION:

Recent restructuring of the graduate program in the Department of Industrial and Manufacturing Engineering has created an attractive set of specializations supported by good laboratory facilities. This program is well matched to the needs of industry. We recommend that the program be continued with the additional support of new faculty hires to replace recent losses. Other specific recommendations are contained in the report.

SUMMARY OF SPECIFIC RECOMMENDATIONS:

1. At least one IME faculty position should be created over each of the next two years to restore faculty numbers and permit growth of the graduate program.

2. There are risks that a prospective merger with the Mechanical Engineering Department could adversely influence the Department’s ability to recruit and retain high quality IME faculty and graduate students, but there are also potential benefits in a merger. We recommend that, if a merger proceeds, steps be taken to ensure that IME can be identified as a self-contained discipline with a clear graduate curriculum and faculty career path.

3. The review committee acknowledges the increased recruitment efforts by the department and recommends that they be continued.

4. To broaden the graduate curriculum, and alleviate some of the impact of faculty losses we recommend that IME consider cross-listing courses with departments with common interests. Opportunity would seem strongest with Statistics (operations research for Manufacturing Systems majors) and Mechanical Engineering (material and materials processing for Nano/Micro Fabrication majors) although other relationships might also be built with Computer Science (Information Systems majors) and Exercise Science and Psychology (Human Systems majors). Developing these relationships would also satisfy the graduate students’ desire for a broader range of courses.

5. IME should publish a list of courses that will be offered over a two-year horizon to enable students to better plan their programs.
6. We recommend the development of a graduate seminar series. It may be useful to create this as a course for credit, and require graduate students to attend. Such a series could include speakers from OSU, both from in IME and elsewhere, as well as speakers from industry. Academic speakers who require compensation for expenses could come from other universities in the region to minimize expenses, while those from farther away may be invited based on fiscal considerations. Possible sponsorship of the series by industry should also be investigated.

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17. The Department should keep track of national rankings of graduate programs in IME departments and endeavor to use this knowledge to improve the ranking of IME at OSU.

18. Given the climate nationally (and particularly in Oregon) for the funding of higher education, it may be necessary to increase development efforts as noted in the self-study report. This is not a short-term process and requires proper cultivation of alumni and corporations. Efforts should be made to put together a strategic plan of how to accomplish this. Other than scholarship and assistantships, IME may also wish to consider an endowed seminar series and professorships to attract top faculty or support current faculty.

1. **INTRODUCTION**

The Graduate Council conducted a site review of graduate programs in the Department of Industrial and Manufacturing Engineering on November 3, 2005. The review team, who all contributed to this report, consisted of:

Michael Unsworth, College of Oceanic and Atmospheric Sciences, Chair
Tracy Daugherty, Department of English
Alix Gitelman, Department of Statistics
Paul Cohen, Department of Industrial and Manufacturing Engineering, Penn State University
James Johnson, Intel Corporation, Portland

The self-study report of the program, which was provided in advance, gave a detailed description of the department and its history, strengths of the faculty, research facilities, graduate program components, assessment procedures and proposals for future developments. The review team appreciates the hard work that went into the preparation of the self-study, which greatly helped in informing the team during the review process.

The team met with Sally Francis, Dean of the Graduate School, over dinner on the evening before the site visit. This was a useful meeting for clarifying procedural issues and identifying areas of responsibility for the review team members.

In the site visit, on November 3, the team began with a series of meetings in Covell Hall with the Interim Department Chair (K. Funk), Graduate Program Chair (R.L. Logendran), Dean (R. Adams) and an Associate Dean (C. Bell) of the College of Engineering, followed by a tour of facilities in Covell. The Dean and Dr Funk both informed us of ongoing discussions concerning restructuring of the departments in the College, and these are referred to at several points in our review. A visit to the Oregon Nanosciences and Microtechnologies Institute (ONAMI) on the Hewlett Packard campus provided the review team with opportunities to see the impressive facilities being established there and to meet the Directors for discussion of the ONAMI role in graduate training. After lunch in Covell Hall, the team had sessions with the Graduate Committee, faculty, and graduate students before concluding with an exit interview with Drs Funk and Logendran.
This review includes an analysis of the Graduate Program, its mission, students, curriculum and organization, a section on the level of productivity and quality of the students and faculty, and a discussion of outcomes of the program, including the professional viability of the graduates, their satisfaction with their training, and the ranking of the program on a national scale. In this report paragraphs of comment and analysis by the Review Team are italicized, as are recommendations. The recommendations are made at the end of each section, and numbered sequentially. They are also drawn together in a summary preceding this introduction.

2. BACKGROUND

2.1 The Department, its mission, and the evolution of its Graduate Programs

The Industrial and Manufacturing Engineering (IME) Department at Oregon State University is one of the seven departments and a school within the College of Engineering. The others include Bioresource Engineering, Chemical Engineering, Civil, Construction and Environmental Engineering, Mechanical Engineering, Nuclear Engineering, and the School of Electrical Engineering and Computer Science. In terms of enrollment, the IME department is the fourth largest, with approximately 11% of the total enrollment (undergraduates and graduates) in the college.

Industrial and manufacturing engineering focuses on the use of knowledge from the mathematical, information, physical, and human sciences to design, develop, manufacture, implement, operate, and improve systems that are capable of producing and delivering high quality products and services. The MSE concentration focuses on the use of design, analysis, and technology to create efficient systems capable of producing highly reliable and economically competitive products by employing resources such as material, labor, machine tools, and computing equipment. NMF comprises the integration of silicon and non-silicon micro-fabrication techniques with more conventional macro-scale manufacturing technologies for the purposes of economical system miniaturization in conventional engineering materials. ISE uses information to combine the technologies, people, processes, and organizational mechanisms for the purpose of improving organizational performance. HSE uses engineering methods and knowledge from the physical, biological, information, social, and management sciences to develop, implement, operate, evaluate, and improve human-machine, human-human, and human-organization systems.

Working with advice from experts in industry, the department has developed a program with four areas of concentration at the graduate level: 1) Manufacturing Systems Engineering, 2) Nano/microfabrication, 3) Information Systems Engineering, and 4) Human Systems Engineering. These areas of concentration have been in place since January 2001. Prior to that, from the mid to late 1990s, the department offered a Master of Engineering degree program in Manufacturing Engineering (in collaboration with Portland State University). Initially, enrollment in this program was high but within a few years it dropped precipitously due to industry changes. The program was terminated.
in the fall of 2004. The department has also suffered a net loss of two faculty positions in
the last five years, including the departure of the department head in June 2005. This
leaves the department with an interim head and with eight graduate faculty members, two
each in the department’s four areas of concentration. While these numbers provide a
workable balance, faculty members struggle to offer enough sections of core courses.
Outside instructors are sometimes hired to cover instructional gaps.

At this time, the department offers graduate programs leading to M. Eng, M. S. (with
thesis or non-thesis options), and Ph.D. degrees in industrial engineering. Of the eight
graduate faculty members, five are Associate Professors and three are Assistant
Professors.

The department’s mission is closely allied with the College of Engineering’s Business
Plan, and prioritizes the development of work-ready engineers, the development of
collaborative research clusters, and the pursuit of diverse funding sources in order to stay
flexible in the face of industry fluctuations and changes in academic support structures.
In order to achieve these goals, the department strives to recruit top students regionally
and nationally, so that masters-level graduates are prepared to step into industry and
doctorate-level graduates are prepared to step into academia; the department strives to
collaborate with industry and government through leadership roles, so that the department
can secure more research dollars; finally, the department strives to maintain contact with
IME alumni, particularly those in key positions in industry and academia, to garner
additional financial support.

The Review Group concurs with these goals, seeing them as consistent with the mission
of the College of Engineering and as appropriate for preparing graduate students for
careers in industry and elsewhere.

Currently, because of recent faculty losses, the IME department is unable to meet the
university requirement that 50% of a graduate student’s credit hours be earned in
graduate-only courses. The department has requested a temporary exemption from the
50% rule while it drafts a plan for meeting the requirement. As part of this plan, the
department hopes to hire a new tenure-line faculty member but it is awaiting
implementation of a decision by the Dean of Engineering to merge the IME department
with Mechanical Engineering (ME) to form a new school of IME and ME. The proposed
merger has delayed the IME department’s job search, and it presents other challenges to
the department as well, testing mainly whether it can retain a distinct identity within a
larger school. While faculty members have adopted an optimistic attitude toward this
change (anticipating opportunities for new collaborative efforts and for expanding the
curriculum) they worry about recruiting new students and faculty if the department loses
its disciplinary clarity. Faculty members and graduate students felt that, under the new
school model, IME should maintain the integrity of its budget lines, curriculum, and P &
T procedures. Without assurances in these areas, they told us that morale would suffer
greatly within the IME program.
The Review Group recognizes the challenges that the loss of faculty have created, and the concern in the Department about restructuring. For IME to flourish it must maintain a viable number of faculty and be able to attract and retain high quality faculty and students.

**Recommendations:**

1. **At least one IME faculty position should be created over each of the next two years to restore faculty numbers and permit growth of the graduate program.**

2. **There are risks that a prospective merger with the Mechanical Engineering Department could adversely influence the Department’s ability to recruit and retain high quality IME faculty and graduate students, but there are also potential benefits in a merger. We recommend that, if a merger proceeds, steps be taken to ensure that IME can be identified as a self-contained discipline with a clear graduate curriculum and faculty career path.**

3. **THE GRADUATE PROGRAM**

3.1 **Graduate students**

Graduate education in the Department of Industrial and Manufacturing Engineering focuses on producing “work ready” engineers, at both the M.S. and Ph.D. levels. To this end, there is an emphasis on applications-oriented coursework and on providing students opportunities to work in industrially relevant, and in many cases, state-of-the-art laboratories. Every entering IME graduate student is expected to have taken undergraduate courses in statistics and probability, linear algebra, computer programming and engineering economy. Most M.S. graduates go on to careers in industry, while many Ph.D. graduates, who have more grounding in theory as well as application, go into academics or other research environments.

In this section, we provide observations on several aspects of graduate education in the Department: 1) student recruitment; 2) quality and retention of students; 3) student support; 4) employment of graduates; and 5) current student and alumni satisfaction with the program. These observations are based on the self-study materials supplied by the Department, including the results of three surveys (current students, Graduate School Exit Survey, alumni survey), and interviews conducted in November 2005 during our visit to the Department.

**Student Recruitment**

In the past five years the number of applicants for graduate study in IME has ranged from 59-205, with the low of 59 coming in the most recent year (2004/05). As a percentage of all applicants for graduate study in The College of Engineering, the number of applicants to IME has dropped over the period 2001-2005 from a high of almost 14% in 2001/02 to 5.5% in 2004/5. This appears to follow a national trend. Over the same five year period, the number of students admitted ranged from 30-117, although the selectivity (percent admitted out of all that applied) has hovered around 50%.
Since the summer of 2004, IME has engaged in a number of recruitment activities. First, the Department developed a one-page flier describing the graduate programs and the department’s commitment to making several assistantship offers to incoming M.S. and Ph.D. students. The flier was posted on the IME graduate program website and sent out by IME graduate faculty to their colleagues in the US and internationally, asking them to bring it to the attention of their students. We were told that this effort appears to have been rewarded by the receipt of more applications from “good to better quality students.” Second, the IME Graduate Program Chair contacted faculty member from regional universities to arrange hour-long graduate student recruiting presentations. In all, four presentations were put together—one for each of the four focus areas in IME. At the time of the self-study, 5 presentations had been made at 3 universities in all four focus areas. At these presentations, students were given interest cards to return to the IME department for future recruitment. Finally, IME participated in The College of Engineering’s graduate student recruitment event that took place in February 2005. A total of 6 prospective students who had expressed an interest in IME participated in that event.

The availability of teaching and research assistantships is also a valuable recruiting tool. IME is trying to make decisions about funding these assistantships earlier in the process so that students can consider them among competing offers. In addition, the current plan is that when a teaching assistantship is awarded, it is guaranteed for two quarters. After that, the hope is that students will get funded by a research assistantship in their focus area of interest.

**Recommendation:**

3. *The review committee acknowledges the increased recruitment efforts by the Department and recommends that they be continued.*

**Quality and Retention of Students**

In Spring 2005, there were a total of 38 graduate students in IME, and of them 26 were M.S. students. The ratio of men to women among the graduate students is roughly 3 to 1. In terms of ethnic diversity, the two most prominently represented groups are White (21 of 38) and Asian/Pacific Islander (15 of 38). Almost two thirds (24/38) of the graduate students are not US citizens. The Review Group was not given retention numbers. The department has delineated a number of steps to keep track of, and mentor, students who do not meet the requirements of a minimum of B in all courses.

Students are expected to earn a grade of B or better in each graduate course they take, and must maintain a term GPA and cumulative GPA of 3.0 or better during their academic career at OSU. Students who fall below these standards receive a warning letter from the Graduate Program Chair; if the student’s performance does not improve, a second warning letter is issued. Continued sub-par performance warrants termination from the program.
Ph.D. students are required to take a preliminary examination after they have completed the majority of their coursework. The exam, which is designed to determine whether the student has the intelligence, motivation, and creativity necessary to complete the degree, tests student creativity and ability to synthesize material via individualized questions based on a preproposal of the dissertation research. The graduate students who met with the review team felt, uniformly, that the prelims were rigorous, fair, and extremely useful, as they were individually tailored to each student’s research needs and interests.

**Student Financial Support**

Twenty-six of the 33 graduate students (79%) enrolled in 2005/05 received some assistantship. Of these, 12 were supported by a teaching assistantship, 12 by a research assistantship and 2 by fellowships. These assistantships are supported at between 0.40 and 0.45 FTE. Incoming students in Fall 2005 are supported on stipends ranging from $1500 to $1700 per month, with tuition waiver and insurance coverage (rates differ for M.S. and Ph.D.). These stipend amounts appear to be comparable to those in IME departments at comparator universities.

Students were critical about the policies for graduate teaching assistantships. Based on this feedback and discussions with the graduate program chair it would seem that the policies are a bit ad-hoc and might be improved with more structure and communication of the policy to graduate students.

**Satisfaction with the Program**

Interviews with current students, and surveys of current and exiting students, and alumni, were consistent in their praise of many aspects of the graduate program. Students and alumni generally expressed a satisfaction with the quality of teaching and advising, the hands-on preparation provided by the program, access and interactions with professors, and administration of preliminary examinations. There seems to be a genuine sense of community in the department.

Nonetheless, dissatisfaction was expressed by current students in four areas—(1) the number of 400/500 level course (the “slash” courses), (2) the lack of a research seminar series in which students can learn about applications outside of the department; (3) the awarding and availability of GTA/GRA appointments; and (4) communications. The department is actively working on a plan to reduce the number of slash courses—this is in keeping with the new Graduate School requirement that no more than 50% of course for a M.S. may be 400/500-level. The review committee had some recommendations for starting and maintaining a research seminar series—allowing it to be organized by the students, encouraging former students to return and share information about their current jobs, and asking current faculty to present their research. As for the awarding and availability of GTA/GRA appointments, we encourage the department to be as transparent as possible in these regards.

By far, the lowest marks in the survey of current students concern issues of departmental communication. By and large, respondents did not feel that department seminars are adequate to keep them “informed of developments in [the] field”; they did not feel that
the department informs them of “adequate opportunities for professional development . . . such as attendance at professional meetings”; and they did not feel that GTA assignments are “made equitably, based on established criteria.” The students who spoke with the review team echoed these sentiments.

In conversation with the review team, the Graduate Program Chair and the interim department head conceded that communication with students regarding procedural or departmental policy matters was usually “informal,” in large part because the department is small. The informality may reinforce student perceptions that departmental communication is not adequate or always transparent. The problem might be easily solved by establishing a departmental seminar series, perhaps organized by students working with faculty, and by establishing other formal mechanisms for student input into departmental policy. These recommendations are made elsewhere in this report.

3.2 Curriculum

IME offers courses in its four primary areas of graduate study: Human Systems Engineering, Information Systems Engineering, Manufacturing Systems Engineering and Nano/Micro Fabrication. One area of difficulty in the department is in the offering of graduate courses. From surveys and our discussions with students it is clear that students would like more courses offered at purely the graduate (500) level, but current staffing is inadequate to do this.

The department will clearly not be able to meet the new graduate school requirement regarding “slash” courses in 2005-06 due the loss of two faculty positions. We reiterate our earlier recommendation that the department be allowed to replace at least one position this academic year or the problem may persist longer. Additionally, with uncertainty about the transition of this program as part of the College restructuring, and with loss of faculty, it would appear that students find it difficult to plan their academic programs. A tentative listing of courses to be offered over a two-year horizon would assist students and faculty in planning. Additionally, IME should consider cross-listing courses with departments with common interests so that they can share the teaching burden.

There was also concern raised by students about the lack of a regular seminar series. Such a series would enable students to learn more about current research in the department and college, as well as hearing from visiting speakers from industry and elsewhere.

Recommendations:

4. To broaden the graduate curriculum, and alleviate some of the impact of faculty losses we recommend that IME consider cross-listing courses with departments with common interests. Opportunity would seem strongest with Statistics (operations research
for Manufacturing Systems majors) and Mechanical Engineering (material and materials processing for Nano/Micro Fabrication majors) although other relationships might also be built with Computer Science (Information Systems majors) and Exercise Science and Psychology (Human Systems majors). Developing these relationships would also satisfy the graduate students’ desire for a broader range of courses.

5. IME should publish a list of courses that will be offered over a two-year horizon to enable students to better plan their programs.

6. We recommend the development of a graduate seminar series. It may be useful to create this as a course for credit, and require graduate students to attend. Such a series could include speakers from OSU, both from in IME and elsewhere, as well as speakers from industry. Academic speakers who require compensation for expenses could come from other universities in the region to minimize expenses, while those from farther away may be invited based on fiscal considerations. Possible sponsorship of the series by industry should also be investigated.

3.3 Faculty and Other Personnel

The quality of the faculty in IME has improved dramatically with the addition of good young faculty in the various specialties of the department. Each specialty of the program has two faculty. However, this number is insufficient to offer the graduate program to meet the new graduate policy on slash courses or to advise the proposed number of 50 graduate students (6.25 students/faculty with current faculty numbers).

The other personnel of IME include two staff assistants and two technical assistants, one for computer support and one for general laboratory support. This would appear to be appropriate for the size of faculty and graduate student body.

There currently appears to be a mismatch between faculty numbers and plans to expand the graduate population in IME. If it proves impossible to expand the faculty in the current circumstances, the Department will need to reconsider its future plans for the curriculum and student numbers.

Recommendation:

7. The Department, in association with College administration, should develop a flexible plan that matches graduate student numbers and teaching commitments to the number of faculty available.

3.4 Infrastructure:

The IME department has two dedicated office areas for graduate students, with space for a total of 22 cubicles for GTAs and research assistants. In addition, the department has eight on-campus laboratories, all housed in Covell Hall and the adjoining Batcheller Hall, and one facility (ONAMI) on the Hewlett-Packard campus:
• The IME Computer Laboratory, in three separate rooms, with over 60 computers for student use.

• The Human Factors/Ergonomics Laboratory, with an FAA-approved flight simulator and a laparoscopic surgical equipment simulator.

• The Computer-Integrated Systems Laboratory, with equipment that allows students to study the principles of sensors, pneumatics, and other automated industrial components.

• The Lean Automation Laboratory, designed to give students hands-on experience with electronic manufacturing.

• The Mobile Technology Solutions Laboratory, with more than $500,000 in automatic identification and data collection equipment.

• The Electronic Vehicles Miles Traveled Revenue Collection System Project Laboratory, sponsored by the Oregon Department of Transportation for research into commercial fuel dispensers and mileage data collection.

• The Rapid Prototyping and Metrology Laboratory, used in support of research within microtechnology-based energy, chemical, and biological systems.

• The IME Machine Shop, which provides students with two engine lathes, three vertical drilling machines, a drill press, and other equipment and tools.

• The Oregon Nanoscience and Microtechnologies Institute (ONAMI) facility at Hewlett-Packard, specializing in customized prototyping, manufacturing and characterization equipment for creating devices with micro dimensions.

The laboratories are directed by the technical support staff or by individual faculty members working in the various research areas. The laboratories are well-aligned with the four areas of specialization in the Department, but there is scope for more integrative research across the laboratories and with other laboratories in the College and elsewhere. The faculty leadership teams appear to use the laboratories directly in their instruction and research. All seem proud of the work that the facilities let them accomplish. All laboratories seem to be continually refreshed with new or latest technology, whether computers, machine tools, equipment or NC/Robotics, but maintaining up-to-date laboratory equipment requires continuing efforts.

Currently, each on-campus laboratory is adequate or more than adequate for the department’s needs, and serves the students well. The Lean Automation Laboratory is particularly state-of-the-art, having undergone an extensive renovation in the summer of 2002 during which an updated electronics manufacturing surface mount assembly was installed.
The ONAMI facility on the Hewlett-Packard campus is especially impressive. It is part of a unique collaboration involving OSU, Portland State University, and the University of Oregon, as well as the Pacific Northwest National Laboratory, the Oregon Graduate Institute, the Oregon Health and Sciences University School of Dentistry, and selected researchers from industry clusters throughout Oregon and Washington. ONAMI research leads the nation in microfabricated systems for miniaturization of energy, chemical, and biomedical/biological processes, as well as in high-temperature microstructures. The equipment is state-of-the-art and provides students with unparalleled opportunities for research and manufacturing application. The physical distance of ONAMI from the IME department carries with it the risk of isolation for those students and faculty based there.

Overall, the graduate student office accommodation, class rooms and laboratory infrastructure are adequate or even above average when benchmarked anecdotally to other universities. Overall, this infrastructure is a notable strength for IME, and could be used for further collaborations with other departments in the college, elsewhere at OSU, or externally.

**Recommendations:**

8. The Department should look into areas of research collaboration, which might be led by IME faculty or otherwise, that could take advantage of the excellent infrastructure in IME and lead to more research involving cross-disciplinary integration.

9. The Department should consider mechanisms to avoid isolation of those working at ONAMI. These may involve improving transportation between ONAMI and campus, creating a student seminar series, and encouraging regular faculty interaction both professionally and socially.

3.5 Organizational Issues

**IME Department Personnel:**

Dr. R. “Logen” Logendran, an Associate Professor with sixteen years experience in the IME department, serves as the Graduate Program Chair. He is responsible for planning student recruitment, overseeing graduate admissions, and monitoring students’ academic performances. In consultation with the department head, he appoints graduate teaching assistants (GTAs). GTAs and graduate research assistants are supported by grant income brought in by the IME faculty’s research projects. The department’s grant income has averaged approximately $880,000 over the last three fiscal years. This money also helps support the purchase of computers and equipment, faculty time, and conference travel. The department aspires to support more graduate students, particularly at the Ph.D. level, but recognizes that this will require a larger faculty bringing in more research dollars.
An Office Specialist and a Business Manager within the IME department provide administrative support to the graduate program. The Office Specialist, who also serves as the Graduate Program Secretary, oversees correspondence with prospective students, the Graduate School, and the OSU Admissions Office, and compiles data regarding students’ academic performance. The Business Manager is responsible for assistantship appointments.

Technical support is managed by two staff members in the IME department, one of whom maintains and upgrades faculty computers and computers in the department’s various laboratories, while the other purchases lab machinery and equipment. Both staff members are assisted by students.

The administrative and technical support for the graduate program seems very effective and sympathetic to student issues. This undoubtedly contributes to the general level of satisfaction that the students expressed.

Restructuring plans in College of Engineering

The Review Group heard several times during the site visit, from Departmental faculty and graduate students, of concerns about the discussions that were under way to merge IME with Mechanical Engineering, thus forming a new School within the College.

This imminent reorganization places IME at a critical juncture, especially since similar mergers of mechanical and industrial engineering at other universities over the past two decades have resulted in quality decrements in industrial engineering. The College should endeavor to learn from these experiences of others. Although there are always challenges in reorganization, there can also be benefits. For example, in a merged department it might be possible to place more emphasis on research clusters and other collaborative programs. One of the major challenges will be to avoid losing the identity of the IME Department in any larger unit. In order to maintain quality in the graduate program we recommend the following be considered within any merger plan:

Recommendations:

10. In order to keep an identity for IME it should retain department or a similarly clearly defined status. This will be critical for the continued recruitment of highly qualified faculty and graduate students.

11. Some budget lines of IME should be kept separate from Mechanical Engineering to avoid erosion of the smaller program.

12. IME should be allowed to hire faculty to replace those that have departed. This is critical to meet the new Graduate School rules regarding graduate coursework and would be an important show of support for the program.
4. PRODUCTIVITY

The Review Group considered the productivity of graduate students and faculty, and the quality of the scholarly community that they form.

4.1 Level and Quality of Student Performances:

As mentioned earlier, the number of students who have applied to the IME department’s graduate programs declined from a high of 205 in 2001-02 to a low of 59 in 2004-05, and numbers admitted declined similarly. The department’s Self-Study indicates that the graduate admissions committee has become more stringent in recent years, “admitting fewer but better quality students.” It is difficult to judge whether this improved quality is, in fact, the case, or whether the smaller numbers simply reflect the overall decline in applications and student acceptances. While applications have generally increased throughout the College of Engineering, the numbers for the IME department have steadily decreased in the last three years. The Department should investigate whether this is part of a national trend, and should attempt to compare the quality of its intake with that in other comparator departments.

Other than a Graduate Alumni Survey distributed in May 2005, and a recent survey of current graduate students, the IME department only has anecdotal views of student performances. Faculty members agreed that weak students rarely make it as far as the preliminary examination, though they all recalled some students who failed the prelims the first time around. The Graduate Alumni Survey indicates that the majority of respondents (19 of 29) secured positions in business or industry after graduating from the IME department. Two more earned tenure-track faculty appointments at a college or university, and three others found work in government. Though the sample is too small to be considered anything other than anecdotal, it affirms the faculty’s overall impressions that students who complete the department’s graduate programs do rigorous, quality work, and leave OSU as highly attractive candidates for industry or academia.

We would have liked there to be more complete information about the quality of incoming students and the career progression of past graduates. We are surprised that more is not known about students leaving the Department, especially since continuing contact by the Department with its former students can be an important source of academic enrichment for both faculty and student currently enrolled in the program.

Recommendations:

13. The Department should keep records of the quality of students applying and being accepted into the program, and should endeavor to compare intake quality with that of comparator departments.

14. The Department should introduce an on-going plan to keep track of former students and their career progression.
4.2 Level and Quality of Faculty Performance

External research has averaged $110,000/faculty-year over the last three years. Additional and substantial funding in nano/microfabrication has also been realized (some via ONAMI) but was not reported to us. The department’s funding level is very good and competitive with top programs. The faculty performance in refereed publications is good in quantity and in the quality of journals.

The faculty is active professionally, publishing and presenting at conferences. Faculty also have numerous contributions of book chapters, particularly in materials processing. Three faculty serve as associate editors for four quality journals. All of these indicators are very good for faculty performance.

4.3 Quality of the Scholarly Community (including collaborative ventures).

The IME Department derives strength from being built around four main research (focus) areas—Manufacturing Systems Engineering, Nano/Microfabrication, Information Systems Engineering, and Human Systems Engineering. The review committee toured research laboratories for each of these focus areas, including the ONAMI center located on the Hewlett Packard campus in Corvallis. Many of these laboratories are equipped by industry partners or using funding from these partners. Details of the laboratories were given earlier. Each of the IME laboratories is used in both teaching and research, and we observed graduate research assistants at work in many of the laboratories.

There appears to be a real commitment among the IME faculty to the four focus areas, and there do not appear to be any tensions between faculty regarding the delineation of the focus areas and/or regarding the laboratory facilities. As a group, they seem to work together toward the common IME mission while at the same time pursuing research in their own focus areas. In addition, the faculty actively provide students with experience using state-of-the-art equipment and technology, both through classroom instruction and through graduate research assistantships. The collegial atmosphere among faculty and between faculty and students makes for a healthy and vibrant collaborative community within the Department.

Recommendation:

15. The Department should investigate further the possible causes of the decline in graduate applications in recent years. For example is this a national trend, or are there special factors at OSU that need to be remedied?
5. OUTCOMES

5.1 Professional Viability of Graduates:

Faculty believes that the Department maintains high placement rates of completed candidates in appropriate positions, but does not currently have quantitative data to support this.

The department should start tracking these data by area of specialization for PhD and Masters graduate. The Oregon industry view is that more candidates with advanced degrees are required, so there is a good alignment of goals between IME and industry. IME should make clear and aggressive goals for the number of PhD students that it plans to graduate over the next 5 years. The goals should be specific for areas of specialization.

In discussions with the Review Group the faculty felt there would be little or no interest in advance degree student internships in industry. On the other hand, students did show interest and believed that availability of internships could make IME more attractive than similar departments at other universities. Although faculty might be concerned of losing graduate students to industry during an internship, the Graduate Program should consider formalizing an internship program with industry and building mechanisms to encourage students to return for their degree (like with IME BS degrees).

5.2 Satisfaction Survey of Graduates:

Of the 29 students responding to the May 2005 Graduate Alumni Survey, 76% of respondents said they would recommend the graduate program to prospective students. 48% claimed to be “very prepared” for a career or further advanced degree after completing the graduate program, while 34% claimed to be “somewhat prepared.” Availability of resources for student research and diversity of course offerings received the lowest marks in the survey.

These responses accord with the attitudes of most current graduate students in the IME department. as evidenced by the recent survey as well as by the review team’s session with students.

5.3 Ranking of the Graduate Program

The Department did not comment in its self study on the ranking of the graduate program nationally. We believe that it should keep track of rankings (if possible) and endeavor to identify ways of improving its ranking.

The IME Department at OSU is currently not ranked in US News & World Report’s top 40 graduate rankings (the extent of the specialty rankings). The department has clearly improved with the addition of good young faculty and laboratory facilities for graduate research (including ONAMI). Their self-study report also outlines areas for future
improvement including growing the graduate program, developing additional strictly
gradient courses, pursuing funds via development, addition of new faculty, and
development of a seminar series. These improvements are all needed.

Examining the USNWR Top 40, most of the programs are significantly larger than IME.
Subjectively, the overall quality of the IME graduate program at OSU would seem to be
equal to or even better than a number of ranked programs of similar size. The areas of
improvement noted above, along with a more aggressive approach to national visibility,
can help this program to be ranked in the Top 40 in future. Additional opportunities for
visibility include:

1. Setting a specific goal for the proportion of doctoral students in the graduate
program and seeking to place these students in academe.

2. As aggressively as possible, invite top industrial and manufacturing engineering
faculty regionally and from across the US for seminars. This has the dual benefit
of better preparing graduate students and allowing others to meet the faculty and
see the facilities, gaining increased visibility.

3. Proactively work with colleagues at other universities to be invited to give
seminars, thereby increasing visibility.

4. Increase attendance and participation at key national professional society
meetings.

Recommendations:

16. The Department should consider developing a graduate internship program in
collaboration with industry.

17. The Department should keep track of national rankings of graduate programs in
IME departments and endeavor to use this knowledge to improve the ranking of IME at
OSU.

18. Given the climate nationally (and particularly in Oregon) for the funding of higher
education, it may be necessary to increase development efforts as noted in the self-study
report. This is not a short-term process and requires proper cultivation of alumni and
corporations. Efforts should be made to put together a strategic plan of how to
accomplish this. Other than scholarship and assistantships, IME may also wish to
consider an endowed seminar series and professorships to attract top faculty or support
current faculty.
Departmental Response to Graduate Council Inquiry regarding Master’s Degree in Interdisciplinary Studies

Contents:
- Original email request
- Summary of responses
- Recommendation from Director of MAIS Program
- Full Responses from Department Heads

Original Email: Request for Input on CAT I proposal to Add MSIS degree and Change the MAIS Degree

At Graduate Council meeting on February 2, the CATI MSIS/MAIS proposal was discussed. The vote was split on whether to approve the proposal as is. I was asked to solicit feedback from Department Heads across campus.

In the discussion following the vote, the consensus among the council was:

- They support an Interdisciplinary Studies Graduate degree
- They support eliminating the CLA requirement
- They support addition of 2 required courses

Their concerns were that there was not enough of a distinguishing difference between the MSIS and MAIS to launch a new degree. Currently, the MAIS degree does not have a language requirement. The language requirement for the MAIS degree was added in the CAT I proposal as the means to distinguish the difference between the MAIS and MSIS degree. MAIS would require language and the MSIS would not. This brings the degrees into consistency with other OSU MA and MS degrees.

Discussion among the council included possibilities (which assumed that the first three items that they had consensus on remained) such as

- Having one degree, calling it MIS (Master’s of Interdisciplinary Studies) and not having a language requirement
- Having one degree, call it MAIS (as it is now) with no language requirement
- Having one degree, call it MAIS with a language requirement.

Please let me know which of these three possibilities you prefer and other input into this degree by **February 17** so that I can get your feedback to the Graduate Council. Your input will help them make the final decision.

I am attaching a copy of the CAT I proposal for your reference.
Summary of Responses

There were thirteen responses representing 6 colleges:

5.5 responses - one degree, calling it MIS (Master’s of Interdisciplinary Studies) and not having a language requirement (COB, CHHS, COF, CLA, COS)

3 responses - one degree, call it MAIS (as it is now) with no language requirement (COS, CLA)

1 response – degree with a language requirement (ELI)

.5 response - one degree, call it MAIS (as it is now) with no language requirement (COS)

3 responses – no preference (CAS, CHHS)

Recommendation from Director of MAIS Program

Given the responses and the discussion in Graduate Council, the Director of the MAIS program recommends that the CAT I be revised to offer one Master’s of Interdisciplinary Science (MIS) degree at OSU, that there not be a language requirement or a CLA course requirement, and two required courses be added as listed in the current CAT I proposal.

As a separate issue, the Graduate Council might consider the issue of a language requirement for an MA degree and an equivalent “science” requirement for the MS degree at OSU. Consider the respondents who favored this idea as potential committee members to explore this issue.

Full Responses

John Drexler COB: I prefer the MIS

Kate Lajtha – COS: I agree with either #1 or #2, and not #3.
   1. Having one degree, calling it MIS (Master’s of Interdisciplinary Studies) and not having a language requirement
   2. Having one degree, call it MAIS (as it is now) with no language requirement
   3. Having one degree, call it MAIS with a language requirement.

Leslie Burns, CHHS, Design and Human Environment: Although DHE fully supported the MSIS degree as it was proposed, since we now have just the three options, we would prefer the first, MIS (Master's of Interdisciplinary Studies). From our perspective the other 2 options do not make sense, given the work that has been done since the program review.

Bob Smythe (Statistics) COS: I would favor an MSIS or MIS degree not requiring a field in CLA and not requiring a language. I favor strengthening the degree by adding 4 IST credits and a suitable admissions review.

I'm passing on a comment from a colleague, Dave Birkes, who has the most experience of any of us with the MAIS:
"This might be a good time to change a confusing sentence that up to now has been included in the description of the MAIS requirements, and also appears in the proposed MAIS/MSIS requirements, which say:

"A minimum of 9 credits in each of any three fields of study is required...
No more than 21 credits may be taken in any one field unless the total program exceeds 49 credits. Thesis or research project credits do not count toward this 21-credit requirement."

"I think this may be equivalent to saying:

"Aside from thesis or research project credits, the program must include at least 9 credits in each field of study. If exactly 9 credits are taken in one of the fields, then at least 11 credits must be taken in each of the other two fields (aside from thesis or research project credits)."

"The latter phrasing makes it easier, at least for me, to verify that a program meets the requirements."

I hope this comment is helpful.

**Tom McLain COF:** I had a department meeting recently and used the opportunity to pool my faculty. We have had the MAIS option for some time, but have never used it. There was some diversity of opinion, but in general the group:

--saw value in offering an IS option for interested students, (especially if CLA requirement is removed)
--doesn't see that they would encourage their students toward that degree especially with the dual major option being so much more attractive (almost all of our students are grant-funded), but could see that the IS degree could be useful in limited cases,
--saw no problem with 49 credits if those could be used to build a meaningful cohort (some skepticism here based on our experience in cohort building with dual majors)
--saw no need for two different degrees unless there could be a clear demarcation between MS and MA beyond the language requirement (some concern that demarcation wasn't already in place)

**Sunil Khanna, Anthropology, CLA:** (conversation summarized) Given the current situation, I favor an MIS degree with no language requirement and no CLA requirement.

**Larry Flick, COS, Science and Math Ed:** In my PhD program at Indiana University, you had an option of "tool skills", one was a year of foreign language and the other was advanced statistics.

I don't know if "tool skill" is the correct term but I favor the MAIS with a language requirement and an MSIS with its own requirement. I could imagine a parallel requirement in MSIS from the Department of History or the Department of Philosophy taking courses in history and/or philosophy of science.
Bill Lunch, CLA, Political Science: I would recommend an alternative I do not see among those you have listed (unless I mistake your intent, always a strong possibility) -- that is, to have a traditional language requirement, such as French, Japanese, Italian or whatever for the MAIS, and to have a quantitative "language" requirement for the MSIS. In that case, the students would be expected to take a certain number (perhaps three?) courses in the "language" of science, quantitative study, such as statistics, computer science, or math. Such a requirement would parallel the distinction we currently make for undergrads choosing between the Bachelor of Arts versus the Bachelor of Science degree.

Susan M. Shaw, Women Studies, CLA: I really do like the language requirement for an MAIS. I think it really does strengthen the degree tremendously. If that's the option, does that mean there will be no MSIS at all? I still support that idea with the addition of math/science requirements to further distinguish it from the MAIS.

Deborah Healey – English Language Institute: Personally, I think that everyone at OSU should have a language requirement - it's really the best way to become a globally-aware citizen, as well as to be more prepared to deal with our increasingly multilingual environment here in Oregon and the rest of the US. It would be a great shame to lose the requirement entirely.

Carolyn Aldwin, CHHS, HDFS: Thank you very much for seeking input on the proposal to add an MSIS degree and to change the MAIS degree. The graduate program in human development and family studies participates in the current MAIS degree only as a second or third area. Regardless of the outcome of this decision, we have no plans to change our level of participation.

We agree that HDFS is an appropriate support area for a number of primary areas offered on our campus. Our view is that those primary areas should have major input into this decision to change the master’s interdisciplinary studies option. We are willing to cooperate with the Graduate Council’s decision, whatever it may be, and to continue to participate in an MAIS and/or MSIS program as a support area.

Bill Krueger, CAS, Range: I have sent this out to the faculty for review. We have no preference since we rarely use the MAIS.

Greg Perry CAS AREC: AREc doesn't have strong feelings about whether there is one degree or two. We support eliminating the CLA requirement

~compiled by Ann C. Schauber, Director of MAIS Program, February 17, 2006