

University of Wyoming
Dept. of Mechanical Engineering
External Advisory Board (EAB)

Spring 2011 Meeting – April 29-30, 2011
DRAFT: to be approved at April 2012 Meeting

Attending: Maureen Hand (Chair), Annette Lynch (Vice Chair), Bob Ballard, Emily Beagle (ESE Student Representative), Pat Burns, Peter Davis, Amy DiRienzo (ME Student Representative), William Dolling, Barbara Dorr, Mark Hynes, Ken Jensen, Rowland Linford, Greg Sanford, Don Slaughterbeck, Paul Dellenback (ME Head and ex-officio), and Gale Bandsma (ME Admin-secretary).

Not Present: Dan Kohlhaas and Jean Vaniman

ME Faculty Presenters/Guests: Associate Dean Steven Barrett, Dr. Dennis Coon, Dr. Carl Frick, Dr. Yuan Zheng, Dr. Jay Sitaraman, Dr. Nancy Peck, and Dr. David Walrath.

Friday April 29th Session convened at 8:30 by Chair Maureen Hand. (Appendix A - 2011 Meeting Agenda).

Welcome - The Chair welcomed the members and turned introduction of new members over to Dr. Paul Dellenback. Dr. Dellenback introduced Emily Beagle as an ESE/ME major who is the newest board member. The members then introduced themselves and each gave brief comments on their professional work history. Dr. Dellenback thanked the members of the board for their continued presence and support of the Mechanical Engineering Department and their attendance at the EAB meetings.

Review of Agenda and Misc. Items -

Maureen Hand reviewed the agenda.

She also requested that members complete the short biographical form (Appendix B – Biographical Form) prepared by Dr. Dellenback. The information gathered will be included on the Advisory Board web page and in future external reviews.

The Chair commented on member term limits as stated in the Advisory Board's By-laws and indicated that there were terms expiring this year. Those mentioned were Greg Sanford, Barbara Dorr and Bill Dolling. She indicated that it is not the member's responsibility to find their replacement and that they should contact Dr. Dellenback if they are interested in being replaced.

It was moved by Pat Burns and seconded by Bob Ballard to approve the minutes with the noted corrections. The minutes from the previous meeting were approved.

State of the Department – (Appendix C – PowerPoint presentation)

Dr. Dellenback reviewed the overall Department status, including Fall 2010 Enrollments, Faculty Status and News, Department Achievements, ME acquisition of additional space for graduate students, New Course Offerings, the Energy Systems Engineering Program (upcoming ABET accreditation, graduates and enrollments, employment status of graduates, and reviewed predictions from 2009. Notable was the incorrect prediction that faculty size would increase by 2-3 position to assist with the additional students and course load).

He then reviewed ME metrics in response to the expected goals of the 2009-2014 Academic Plan.

	<u>02-03 avg</u>	<u>06-07 avg</u>	<u>2014 Goal</u>	<u>Currently</u>
UG majors	244	260 (+7%)	300 (+15%)	323
MS enrollment	14.5	16 (+10%)	28 (+75%)	27
PhD enrollment	6.5	13 (+100%)	17 (+30%)	17
Total faculty + APs	13.0	11.5 (-11%)	16 (+40%)	15.5
**Total students/faculty	20.4	25.1 (+23%)	21.5 (-15%)	23.7
Research Expenditures	\$660K	1.1 M (+72%)	1.6 M (+40%)	??

**Why is Student/Faculty number relevant? According to the available numbers the next highest student/faculty ratio in CEAS is 18.8 (for ME student/faculty ratio to be equitable the ME program would need 4 NEW positions to reduce its ratio to 18.8). The impact of the student/faculty ratio is that ME JR/SR classes are 46% larger the average of the other four CEAS departments having undergraduate programs; faculty are spending a larger percentage of their time on student advising and student visits; and their grading load, are higher. As a result of this workload there is less time available for faculty for research.

Dr. Dellenback then reviewed the FE exam results and ME student performance compared to the national averages for the previous exams (1996 – present). ME students continue to be highly successful on the FE exam relative to ME students nationwide.

He then reviewed his concerns for the future of the Department. They are the High student/faculty ratio with its associated impact on classroom learning, limiting growth of the ESE program, reducing available time for faculty research, and possible decrease in faculty morale; Limited faculty expertise in key courses including Design I and II, Mechatronics, and Intro to Nuclear Engineering; and Leadership within the Department-currently only half of the faculty are tenured and the untenured faculty will need mentoring which is an additional time commitment from the tenured faculty members.

Dr. Dellenback concluded with a review of the Central Personnel Management (CPM) process and the positions he will be requesting from the Dean for replacement. They include replacements for Dr. O.A. Plumb (Heat Transfer) and Dr. Doug Smith (Fluid Mechanics), and two new positions (one-thermal science/fluid faculty position and a new technician position to support undergraduate labs and experimental research).

(due to time constraints – Rowland Linford is presentation was moved to the Friday afternoon session)

(Morning Break)

Update on Accreditation Activities (Appendix D - PowerPoint presentation)

Dr. Dennis Coon, Undergraduate Program Coordinator, reviewed the final ME accreditation report and actions taken by the Department from the 2009 visit. The Mechanical Engineering program was accredited through September 2016. We will have the Next General Review (NGR) scheduled for Fall 2015. The visit originally resulted in one weakness and one concern for the Department, which were addressed and cleared in Due Process. The weakness on Program Outcomes has resulted in a

review and revision of the program assessment process. This has resulted in realigning information collected to match more closely the ABET outcomes A-K, as a result data elements have decreased from 154 to 57. The concern on the curriculum was resolved before the ABET visit ended.

Dr. Coon then discussed the ESE program accreditation process. Once it was identified that a program could be accredited retroactively, the Department requested a Fall 2011 visit. Dr. Coon has been working on formulating the ESE ABET plan since Fall of 2010. The ESE ABET plan is a modified ME ABET plan.

- Data collection has been ongoing since May
- The General Self-study is expected to be complete by June 30, 2011 (with information also being provided by the Dean's Office on the ESE program
- Finalization of the accreditation visit is expected in early August.

The ESE Assessment Plan includes student work (ESE courses 2020, 2160, 3360, 4070 and external courses ENR 4900, PHIL 2330/2345), External Entities (FE exam, Sr. Design Symposium evaluation), and Self-Assessment (Graduating Senior Survey, ESE 3360 preparedness assessment, and ESE 4070 Self/Peer Teamwork Assessment). Dr. Coon reviewed the ESE ABET A-K criteria and program outcomes.

He continued with a review of the ABET long-range plans which include the training period for his replacement. Upcoming dates of interest include AY 2011 – ESE Self-Study, Accreditation Visit and Due Process Response, AY 2013 (if necessary) – ESE Interim Report, AY 2015 - ME and ESE Self-Studies and bringing in a replacement for orientation/training, AY 2016 - Accreditation Visit and Due Process Response, AY 2021 - ME and ESE Self-Studies, and AY 2022 - Accreditation Visit and Due Process Response and his possible retirement.

The modified ABET Objectives were reviewed. These were the Objectives recommended by the Advisory Board at the April 2010 meeting. The Objectives are measureable and separate from the outcomes.

He moved on to the Graduate and Alumni Surveys and reminded the Advisory Board of the survey procedure and break down of questions. Examples were given in the presentation of the appearance and questions on the actual surveys. All surveys are administered electronically by the Dean's Office. The Graduating Senior Survey has an 85% reply rate and is given to graduating seniors every semester. The Alumni Survey is sent out once a year to those alumni at 3 and 6 years post graduation. Reply rate for the Alumni Survey is < 20%. The Alumni Survey addresses ME ABET Educational Outcomes. The survey has been expanded to provide more information to help with quantification of meeting the ABET outcomes.

The last topic covered by Dr. Coon was in response to the Advisory Board request to develop a "life skills" course for undergraduate students and to evaluate it. The first course was offered in Fall 2010. Dr. Coon described the course content, enrollment and schedule. He particularly thanked the Advisory Board members who presented seminars (William Dolling, R. Linford, D. Slaughterbeck, and Mark Hynes). Students were asked to evaluate the course and the summary of the comments from the students

reflected a desire for more time on the topics and on certain topics more time with specific examples/case studies. The Advisory Board asked if there were any topics that could be improved. Dr. Coon indicated the student suggested a panel to discuss engineering careers from those 5, 10, 15 years post graduation and topics specific to engineering perspective. The Advisory Board wondered what could be done to increase attendance. Several ideas were proposed including holding the seminars at the same time as the student ASME section meetings.

(Lunch break)

State of the College– (Appendix E –Handouts from the Dean)

Dean Robert Ettema echoed welcoming comments and appreciation for the support the Advisory Board provides to the Department and College.

He began with discussion of the College enrollment (1320 undergraduate students and 260 graduate students). The College enrollments have been increasing along with the national engineering enrollments.

The Dean also mentioned an improving job market for graduates. He gave examples of a possible Verizon Data Center possibly coming to Laramie and the increasingly strong Wyoming job market. The Wyoming market is being helped by an “energy boom” (i.e., opening of the Niobrara basin) which will benefit Chem/Pete and ME majors.

He moved on to research awards in the College ~ 16M in each of the previous two years. This total is second highest at UW just behind A&S, and first at UW on per faculty member basis. He expected Engineering to soon become first in research as well.

The Dean has begun looking at “peer colleges” trying to determine their “Areas of Distinction”. If “Areas of Distinction” could be identified in the college the Dean could then use them when explaining to groups (legislative and industry) about the importance of the Engineering College. Hopefully, this would improve the College relationships (financial) with the Legislature and engineering firms. He would like to establish more relationships with engineering firms, perhaps the major oil or energy companies working in Wyoming. He gave examples from other regional colleges where this has been very beneficial to them.

Developments in the College were then discussed.

- GE is proposing a wind field test site (5 wind turbines) near the Hanson Arena on HWY 230. Dr. Naughton and the Dean are working on the white paper for this potential collaboration.
- The Dean has prepared a white paper on Nuclear Energy Education and Research (included in Appendix E). Additionally, a state senate committee is reviewing unconventional energy including the future of Nuclear Energy for the state. Rowland Linford provided input at a recent nuclear task force hearing.
- The Dean is working on defining the benefits SER II funds may have for the college.

- The College is also looking at a possibility of a joint BS/MBA program with the College of Business.
- The Chinese University of Petroleum has recently sent several students (undergraduate/graduate) to Wyoming. CUP would like to send more students to UW. These students come with supplemental fees that are given to their academic department.
- The Dean is establishing the Recent Alumni Group. This new board's (<10 years post graduation) purpose is to strengthen the college connection with alumni, develop this philanthropic base, and create new employer contacts for graduates.
- Facilities Upgrade Project (Building for Excellence) was reviewed by the Dean. The Level I – Capital Planning Report is on the UW Capital Assessment Plan. The college has to provide their recommendations by August 2011. Level I focus is on replacement of the “sawtooth” building a new college core and new laboratory facilities. Level II will be the contracting of an outside consulting firm to do an in-depth evaluation including design drawings. Level III will be the actual construction. State funding and donations are expected to help with the cost of this project. Also, the Dean has identified the need for an Associate Dean for Facilities Planning to help manage this process.

The Dean then opened the floor up for questions:

Pat Burns asked the Dean how he would describe the ME Department. The Dean replied that ME has a strong undergraduate academic program; ESE needs more faculty; graduate student education and research could be strengthened. Pat then asked the Dean what he sees for 5-10 years in the way of engineering needs. Ettema replied the College has to be proactive and responsive to demands through the CPM process. Personnel need to go to the departments with the greatest need. The college has eight undergraduate degree programs and the job demand is expected to remain strong.

Annette Lynch asked for more information on the China University of Petroleum and if the Department should look into it. Dr. Dellenback indicated it functioned only as a money maker and would not enhance student education or research. Annette Lynch questioned if the Department should be preparing a proposal/plan for the GE wind test site to help the Department position themselves to draw more ESE students, industrial scholarships, and faculty research opportunities?

Pat Burns asked for the Dean's assessment of the ABET visit. The Dean replied that the college did reasonably well. He believed the University administration expected us to get accredited. Results were better than most but not atypical. He has been in contact with other Deans on the ABET process and evaluators. He noted that ABET provides publically only information on national trends.

Bob Ballard asked if the Dean expected ME faculty lines to be retained in the Department? The Dean felt confident that lines would remain in the department.

Pat Burns asked what the future of state funding looked like. Dean Ettema seemed to feel that there is more money available. An example is the Energy GA's currently being

solicited for Fall 2011 and other money initiatives. There is talk again about salary raises. However, there is not talk on new faculty positions. SER II monies may result in possible additional faculty positions. Overall, the college needs to broaden endowment and excellence funding.

Ken Jensen asked in the future if a tuition differential was possible. The reply was that the college has had little to work with money wise. SER II will hopefully include more funding for engineering. The Dean reiterated that it is an opportunity for them to express to the state the need for engineering.

Pat Burns asked if the college had considered additional exchange opportunities. The example he gave was of electromagnetic motors as an opportunity with nationwide demand. The Dean had no comment.

Annette Lynch asked about the impact on the college on unconventional energy (extracted oil and gas or uranium mining/processing). Bob Ballard indicated that the SER I Clean Coal position would be a college position, but not sure of line description. There will be a new faculty position requested in the SER II initiative. Rowland Linford asked if the SER position would possibly be an opportunity for Energy Systems Engineering to get a faculty position. Bill Dolling stated its good news and bad news. Resources are not growing to meet the need for more faculty but faculty are still expected to provide education to students. The Dean agreed and indicated he is always looking for possible opportunities for faculty lines. He also indicated that other sources of funding are important and departments should be looking for this funding. He gave the examples of funding an endowed chair that requires a minimum \$5M. Strategic investment endowment is another source of funding for faculty position where a smaller endowment is spent down over 15 years to support a professor. We should also consider using graduate students in more teaching-related areas including tutoring and grading.

Pat Burns asked what the Dean's expectations were for ME in the future. The Dean replied he expected the department to maintain the reputation for rigor and quality while increasing in faculty and students. He encouraged working on developing distinction strategies and opportunities. ME and all departments need to develop other autonomous sources of funding, and to continue to react and respond as opportunities develop.

"An Outside Perspective" – (Appendix F– PowerPoint Presentation)

Rowland Linford presented a review of his experience teaching ME/ESE 4360 Intro to Nuclear Engineering and his perception of the ME Department. He discussed first his general observations of the teaching, students, and ME Department. Then he described the course content and then the student strengths/weaknesses and response to a very challenging course. He concluded his presentation with an assessment of the ME Department and college.

In a Q&A session after his presentation he was asked about current nuclear technology. He indicated the hot issues in DoE are hydraulics and passive features on 4th & 5th generation plants. DoE is looking at breeder concepts but GE and Westinghouse are working on them as well. The current areas of changing nuclear technology include

plant bridging processing, laser enrichment, change from gas diffusion enhancement to centrifuge separation, and reprocessing of plutonium warheads. There is a Blue Ribbon Commission that will be making a formal report in January of 2012 on reprocessing efforts.

(Afternoon Break)

New ME Faculty – (Appendix G – PowerPoint Presentation New Faculty)

Dr. Dellenback introduced Dr. Carl Frick, Dr. Yuan Zheng, and Dr. Jay Sitaraman who each gave a brief presentation. The presentations covered their academics history, experience prior to UW, courses they have taught at UW, and current research areas.

Board New Business/Discussion –

The board discussed the Educational Objectives that were based on those developed at last year's meeting.

The Board felt the Dean' needs to do a better job of balancing faculty support with their workload (as compared to other units within the college). It was noted that Pat Burns is on the National Advisory Board as an advocate for Mechanical Engineering. Concern was the "squeaky wheel" gets more attention than the actual department working with what they have in the way of resources. Ideas to resolve this included a possible letter from the board. The board wanted to know if there was anything the department could do in the way of better utilization of resources (i.e., graduate student in more teaching situations).

Mechanical Engineering needs to look for a funding niche and develop "areas of distinction." The discussion then turned to areas within Mechanical Engineering which could be considered for distinction. It was noted that there is a large commitment required from the department for "start-up" funds, and this can impact recruitment of faculty.

The review/revision of the Advisory Board By-laws was discussed (Appendix H). Suggested changes are included in the appendix. The revised By-laws will be sent to members before the next meeting so that they can be voted on at that meeting.

Don Slaughterbeck asked for feedback from the student comments on the Life Skills seminars.

The Board completed self-evaluation forms developed previously by Barb Dorr.

Dr. Dellenback reviewed his recent external review at University of Utah and recommended to the board that they consider this as the format for next meeting. He would like to use the Advisory Board as a mechanism for a self-study of the program. This would include interviews with students, faculty, and staff.

(Meeting adjourned for the day)

Saturday April 30th Session convened at 8:00 by Chair Maureen Hand. (Appendix A - 2011 Meeting Agenda).

Board Recap:

The Board reviewed proposals for By-laws revisions, to be voted on at the next meeting, after further review by email.

The Board reviewed its self-assessment results.

Commendations:

1. The EAB commends the Department for successfully achieving full six year ABET accreditation.
2. The EAB commends the Department for revising and simplifying the alumni survey to get better participation, and to align with the new Program Educational Objectives.
3. The EAB commends Dr. Dennis Coon for optimizing the data collection process to focus on the key variables aligned with the ABET Outcomes.
4. The EAB commends Dr. Paul Dellenback for developing and presenting metrics demonstrating the state of the Department.
5. The EAB commends the Department and Dr. Dennis Coon for being thorough and proactive in preparing the ABET application for ESE in 2011.
6. The EAB commends Dr. Dennis Coon for his foresight in planning for his replacement as ME/ESE ABET coordinator.
7. The EAB commends the Department for attracting impressive and enthusiastic faculty and appreciates the opportunity to meet three of them at this meeting and hear about their research.
8. The EAB commends Dr. Dennis Coon and Dr. Dave Walrath for being selected as Mortar Board "Top Profs."
9. The EAB commends Dr. Jonathan Naughton for being selected for the CEAS "Graduate Research and Teaching Award."
10. The EAB commends the Department for maintaining a rigorous program that results in student achievement of a 96% ten year average pass rate on the FE Exam, which exceeds the national average of 83%, despite increasing student/faculty ratios.
11. The EAB commends the Department for attracting increased numbers of graduate students and the external funding to support their research.
12. The EAB commends the Department for making substantial progress toward achievement of its goals in the 2009-2014 academic plan.
13. The EAB commends the Department for hiring two new faculty members with exceptional credentials, both of whom were the Department's first choice out of over one hundred applicants in each search. Dr. Chung-Souk Han specializes in materials and mechanics, and Dr. Ray Fertig specializes in computational mechanics.

Recommendations:

1. The EAB recommends the Department continue to work with the College to bring the Department student/faculty ratio in line with the rest of the college programs.
2. The EAB recommends the Department work with the Dean and the Development Office to secure an endowed chair for the ME/ESE department to improve the student/faculty ratio.
3. The EAB recommends the Department study options for graduate students to help reduce faculty workload.
4. The EAB recommends the Department consider ways of increasing attendance at the Life Skills Seminars, such as holding the sessions concurrent with student association chapter meetings.

Observations:

1. The EAB notes that Dr. Paul Dellenback has presented the need for increased ME faculty to the College National Advisory Board. The Board is concerned that the quality of education may suffer if the ME/ESE student/faculty ratio is not reduced.

Board Requests

1. The Dean challenged the Department to identify an area of distinction. The EAB requests the Department report what their plan is to develop area(s) of distinction that uses the strengths of the Department and, if possible, links to the needs of the State of Wyoming.
2. The EAB requests the Department plan the next board meeting to be in a different format, which involves interaction with students. A subcommittee of Rowland Linford, Emily Beagle, and Ken Jensen will work with the department to plan the format.
3. The EAB requests Dr. Dennis Coon to report on the ESE ABET evaluation.

Board Actions

1. Rowland Linford and Pat Burns will look at the make-up of the present board and make recommendations for categories of new members to look for, in order to increase the diversity of the Board.

Tentative Agenda Topics for 2012 EAB meeting

Update from the CEAS Dean
State of the ME Department
Status of ESE ABET
Elect new Chair and Vice-Chair

Next Meeting

Date of next meeting to be determined later. The Tau Beta Pi Banquet, National Advisory Board, and UG Research Day are all scheduled within the same 24-hour block of time, which will make it unfeasible to coordinate the Advisory Board meeting with UG Research Day.