

**Implementation Plan Report
Biosystems and Agricultural Engineering
University of Kentucky
Update 2016 – 2017**

1. Devise a plan to support machine systems automation engineering in the long run.

Assessment method: The number of machine systems technical elective courses available to our machinery students, and the number of machinery students in those courses.

Results:

Academic Year	BAE 417	BAE 515 Fluid Power	BAE 599 Component Design	BAE 599 Control of Off-Road Vehicles	Total (by year)
12-13 F	4	-	-	-	4
12-13 S	-	-	-	-	
13-14 F	20	-	-	-	31
13-14 S	-	4	7	-	
14-15 F	32	7	-	-	54
14-15 S	-	-	-	15	
15-16 F	29	10	-	-	48
15-16 S	-	-	9	-	
16-17 F	13	-	-	-	20
16-17 S	-	-	-	7	
17-18 F	31	12	-	-	

Analysis of results and reflection: The number of students in our machinery classes grew exponentially when we hired our two new machinery professors (2012, 2013). There was a slight dip in the 2016-2017 academic year, but 43 students are enrolled in machinery classes during Fall 2018 and BAE 599 Component Design will be offered in Spring 2018.

Ongoing improvement actions: We will continue to support this area with teaching resources.

2. Determine future department direction based on current areas with strong faculty support and identify areas that need more support.

Assessment method: This suggestion was accepted by internal recommendation and also accepted by external review committee recommendation. In August of 2015 we held a two day faculty retreat to discuss future faculty hiring decisions based on teaching, research, and extension needs.

Results: We held a faculty retreat again in the Summer 2015 where we discussed future departmental direction. BAE may have up to 5 retirements in the next 5 years, and replacing these faculty members provides an opportunity to redirect our department if desired. As a faculty we agreed to recruit a new assistant professor to teach BAE 427, and this position was filled in July, 2016. The course has been taught by one of Dr. Colliver’s PhD students who works in industry in the Controlled Environment area, and the students are very complimentary of his

knowledge and teaching ability, and Christian Tabor will teach the course again this year while Dr. Hayes sits in and prepares to teach the course herself in Spring, 2018.

Analysis of results and reflection: The discussion we had within the department was a healthy one, and one that was necessary. Not only did we solve our immediate concern regarding offering the BAE 427 course, but we have chosen to rededicate ourselves to livestock system engineering, hiring 3 faculty in that area this past year (Joshua Jackson, Morgan Hayes, and Mick Peterson) and one in the bioenvironmental area (William Ford III).

Ongoing improvement actions: We developed a long-term hiring plan to focus on fewer areas but with more depth in each area. This discussion is on-going and we have had one faculty member fully retire and have two in phased retirement. We require additional planning for future faculty hires.

3. Publications or building plans that still have some value should be considered for revision if faculty, with expertise in the area, are still an active part of the department. Original authors should be a consideration for making a revision, if available. Web links should be reviewed so that the number of broken links to internal publications and plans are resolved.

Assessment method: This recommendation was accepted by external review committee recommendation. In February, 2013, we hired an Extension Associate Senior, Karin Pekarchik, to coordinate this effort. In 2015-2016 the extension faculty worked with Dr. Tanya Dvorak to reinvigorate our extension programs by defining objectives, goals, and performing situational analyses.

Results: In past years we moved the older publications and plans to the archive, and a warranty disclaimer was added to each individual plan or publication. The warranty disclaimer is found both on the webpage and then on the first page of the PDF, in instances where there is an attachment that can be downloaded. The archive can be found at <https://www.uky.edu/bae/extension-programs>. Karin has initiated an overhaul of our extension webpages based on the discussions the departmental extension faculty. Individual faculty members are initiating plans to rewrite some of the older, but still relevant, publications.

Analysis of results and reflection: Much care was taken in crafting the warranty disclaimer to ensure that the public would understand that these archived items are conceptual plans only. Every effort has been made to ensure that the warranty disclaimer is prominent and, even if the plan or publication is downloaded, that it remains with the publication/plan as the first page of the document.

Ongoing improvement actions: The entire website has been redone. There are numerous plans and publications that need to be updated or archived. When they are moved to the archive, the warranty disclaimer is added. We are working on a plan on how to update relevant publications.

4. Lab facilities are an asset to the department, and a mechanism should be adopted for better coordination of labs and equipment.

Assessment method: This recommendation was accepted by external review committee recommendation. This topic was brought to the faculty in 2013. This item is assessed by monitoring faculty member's ability to conduct their projects in the space assigned to them.

Results: We improved the coordination of laboratory equipment use by creating two lab manger positions who oversee these issues. Consequently labs are being better utilized. We have designated some of our underutilized labs to be shared-use facilities so that projects which need more space intermittently will have room to expand temporarily. We also use the shared-use lab for teaching because, with our increased enrollment, we need additional space for student laboratories.

Analysis of results and reflection: The situation has improved, however we continue to work on freeing up space for new activities. Being an engineering department, our faculty members build equipment, and the timely disposal of these innovations is a continual challenge.

Ongoing improvement actions: Our two facilities supervisors work with members in BAE to identify and discard items that are no longer in use. We have instituted a yearly "dumpster day" to encourage the entire department to clean their labs. This has worked well. The facilities managers are working on repairing valuable equipment, sending excess equipment to surplus, and upgrading obsolete/non-functioning equipment. The storage barn at North Farm was destroyed in a windstorm and we are working on replacing it.

5. Growth areas in general should be evaluated to determine the level of support and specialty courses needed to accommodate students.

Assessment method: This suggestion was accepted by internal recommendation and also accepted by external review committee recommendation. During the summer of 2013 we determined, as a department, what our ideal enrollment growth would be. This was followed by (SU/FA 2013) the development of a recruitment plan to encourage students to major in under-populated specializations.

Results: We continue to have lower enrollment in our Controlled Environment and our Food Engineering area, however we are seeing signs of increased interest in both of these areas.

Analysis of results and reflection: This is the second year we have seen freshman interested in Controlled Environment and Food Engineering, so we believe we are on the right track. Three of our four new faculty this year work in the area of controlled environment, so we believe additional students will be attracted to this specialization.

Ongoing improvement actions: The switch to the common first year engineering program has changed the first two years of our undergraduate students education. We are still unsure how that change will impact our entire program. Dr. Crofcheck has been active with the Beer, Wine, and Distilling Certificate and Dr. Agouridis with Stream and Watershed Certificate.

6. The department should help students to develop ways to market themselves by using more recognizable terms for résumés and other forms of communication with prospective employers.

Assessment method: This suggestion was accepted by internal recommendation and also accepted by external review committee recommendation. In the summer of 2013, we devised a

simple, clear, consistent message regarding our department and we display this message on the web page and educate our students to promote themselves in this manner.

Results: Both BAE 200 and BAE 400 have incorporated “BAE elevator speeches” into their courses, so we are beginning earlier to encourage the students to develop their marketing message and then reinforcing this again in their senior year.

Analysis of results and reflection: BAE is a fairly unique major, especially within Engineering because there is only one program of BAE per state. BAE departments are associated with the Land Grant system only. Another challenge is that BAE keeps reinventing the profession to attract more students, which is working, but our marketing message keeps changing. Considerable effort has been made to promote the department in a consistent way to as many arenas as possible. Our goal is to educate our students to market themselves clearly and accurately.

Ongoing improvement actions: We continue to work with the students. We continue to improve our marketing description on our web page, and use that description consistently in all our recruitment materials.

7. Extension specialists need to explore current options for program delivery that could reduce unnecessary travel and that would accommodate teaching schedules.

Assessment method: This recommendation was accepted by external review committee recommendation. On February 11, 2013, we hired an Extension Associate Senior, Karin Pekarchik, to assist with distance learning and web delivery pedagogy and technology.

Results: During our faculty search and interview process for the livestock systems engineering position, the department utilized skype and virtual meetings frequently to connect with county extension agents and receive input.

Analysis of results and reflection: The use of lync/skype technology was very successful. We have several agents attend the interviews and provide feedback regarding our interview candidates.

Ongoing improvement actions: As we work toward reinvigorating our extension programs, we continue to think of creative ways to reach our extension clientele. We have two new extension specialists in the area of livestock systems engineering who are working on alternative means for distributing information (YouTube). We are still evaluating how to make the videos and promote them.

8. The department needs to strongly encourage publication as a visible way of documenting activity. The department should send a consistent message to graduate students regarding publication of their work and explore a publishing incentive program like that used by the UK Entomology Department as long as funding sources are available.

Assessment method: The department continues to encourage graduate students to publish with our departmental awards for publishing. In addition, we have created a policy that a published paper can count towards reducing their required credit hours for their PhD. The department chair continues to ask faculty members to set publishing goals, and to hold people

accountable for the goals they made. Assessment is the number of journal articles per FTE in research.

Results: Our goal is for every active scientist (faculty/staff/student) to contribute at least 2 papers per year to the department (one per year for newer graduate students). According to internal tracking for calendar year 2016, the UK Department of Biosystems and Agricultural Engineering had 34 publications from our 19 faculty members and twenty-three graduate students (thirteen masters, ten PH.D.s) in the BAE program in 2016.

Analysis of results and reflection: We were very close to our goal of 2 papers per scientist for 2016. This is an improvement on 2015 where we had 14 publications by 16 faculty members.

Ongoing improvement actions: Part of our decreased publication numbers was because of an aging faculty with impending retirements. We have replaced some retirements, and now have six assistant professors (four research/teaching). Ideally, publishing is an on-going part of the departmental culture. We have started recording and announcing publications at each faculty meeting and in a monthly departmental newsletter as an encouragement to keep publishing.

9. Movement of equipment needs to be monitored to reduce inventory burden. All faculty and staff are encouraged to keep inventory requirements in mind to reduce current problems locating equipment and computers.

Assessment method: This suggestion was accepted by internal recommendation and also accepted by external review committee recommendation. The November 2012 inventory and all inventories since have gone much more smoothly than did the November 2011 inventory, thanks to the database developed and populated by Alex Fogle, with Julie Tolliver's assistance. In August 2013, the faculty and staff were educated about inventory protocol, and we now do this yearly for new employees through an informal training session.

Results: We now have an accurate database of our capital and departmental (between \$500 - \$2000) equipment, complete with a photograph and location for each item purchased since 2013 (and every item over \$2k purchased any year) and processes are in place to keep the database continuously updated.

Analysis of results and reflection: Our departmental database is current, and includes a location and photograph for each item. We are still working with PPD to correct our inventory list. This takes persistence because we have sent in the required paperwork several times for the same items and they have not yet been removed from our inventory. We upgraded to the bar code scanner to perform inventory. This works for 2/3 of our tagged items, however the old tags do not scan. Alex Fogle has found software that will let him scan both types of tags with his ipad to enable us to scan our entire inventory.

Ongoing improvement actions: Inventory is occurring this Fall, we will reevaluate the outcome.

10. Labs should be maintained in a presentable manner (while maintaining consideration for the need to be productive) so that they serve as a safe environment and are not a detriment to student recruitment.

Assessment method: This suggestion was accepted by internal recommendation and also accepted by external review committee recommendation. Alex Fogle initiated a major clean-up

of the labs in August 2012 with the intention of eliminating items that have not been used in the last 5 years. Labs are reviewed twice per year for accumulated clutter, and these areas are cleaned up as appropriate.

Results: Our goal is to have productive, safe, and orderly laboratories. We will save analytical samples until the data are published or for 5 years, whichever comes first. Apparatuses that have not been used for the past year or so will go to long-term storage, and be disposed of, if not used within 5 years. We have instituted yearly “dumpster days” to encourage lab clean-up.

Analysis of results and reflection: We are consistently making progress towards changing the lab culture and people are beginning to think of needed storage time and space when planning experiments. This is a change of culture for the department and will require consistent vigilance to reinforce our new culture.

Ongoing improvement actions: Alex Fogle, BAE’s facilities manager, reports to the manager’s group on storage space, especially when it becomes limited and is in need of being cleared out. He has identified outdated equipment that will be sent to the UK auction in the Spring. We have made “Dumpster Day” an annual event, so people are getting in the habit of a yearly lab clean-up. Off-campus storage locations are being reevaluated.