

**MILWAUKEE SCHOOL OF ENGINEERING
B.S. COMPUTER ENGINEERING
INDUSTRY ADVISORY COMMITTEE
Friday, May 26, 2017**

Attendees

Industry Members

Mr. Lon Bushweiler – Plexus
Ms. Elyse Hobson – Johnson Controls
Mr. Joe Izzo – Rockwell Automation
Mr. Thomas Kraus – GE Healthcare
Mr. Mark Krueger – NVIDIA
Mr. Ryan Speiser – NVIDIA
Mr. Jon Ubert – Sharp Packaging Systems
Mr. Jeff Zingsheim, IAC Chair – Honeywell Corporation

Student Representatives

Mr. Sam Aspinwall '20
Ms. Jessica Flock '19
Mr. Gregory Johnson '20
Ms. Josie LoCurto '18
Mr. Hunter Parks '18
Mr. Paul Scarborough '19

CE Faculty

Dr. Eric Durant, Program Director
Dr. Russ Meier
Dr. Darrin Rothe

Recorded by: Dr. Durant

Meeting called to order at approximately 8:30 a.m.

Note: All items on the agenda were discussed, but several informational items are not repeated in these minutes.

Welcome and Introductions

Mr. Zingsheim, Chair, called the meeting to order. Mr. Zingsheim and Dr. Durant welcomed the group and introductions were made.

Approval of Minutes

The November 2, 2016 meeting minutes were approved.

Senior Design

Dr. Rothe reported all senior design teams formed and there are some industry projects in the coming year.

Senior Debriefing

Dr. Durant summarized several key themes from the recent debriefing meeting he conducted with the seniors. The student representatives then expanded on these themes from their own experiences.

The seniors indicated that learning early what CE is about is important. They generally noted that the program does a good job with this and should further emphasize this. The student representatives present at the IAC meeting expanded on this theme. Mr. Johnson said that he learned a lot and had a smooth transition through the first three digital logic classes. He said, "I feel I learned what the field was pretty quickly. When I started, I didn't have a specific career path in mind, but I was interested in particular in the embedded controls installation industry and am still interested in that area." Mr. Aspinwall said that he had a lot of software experience in high school, but got more exposure to computer hardware towards the end of high school and became interested in performance, so he liked what freshmen learned at MSOE about gates, differences between processors, etc. He enjoyed the VHDL system design experience. Dr. Meier said that MSOE has done a good job over last five to seven years explaining what CE is to prospects, loosely phrased as "CEs shove computers in stuff to control things." Previously there was confusion with MIS; that doesn't happen anymore.

The members then discussed challenges in the freshman software sequence. Dr. Durant explained how he had considered potential identification of freshmen with less software experience with a pre-test building on published work by Purdue. This could lead to special SE1011 sections with additional, integrated support mechanisms for students, such as problem practice sessions and RCAS partnerships, e.g., tutoring services offered within the EECS department facilities. Dr. Durant then asked Dr. Meier how this might fit with Carter Academy. Dr. Meier gave an overview of the Carter Academy, explaining that it is not a deficiency program, but bridges traditional entry students who come from a non-traditional background (e.g., their high school had weak math, physics, or science courses). It is not open to transfer students. The academy hosts 40 to 60 incoming freshmen and begins August 1. It has contained four intensive weeks not directly related to the curriculum, but we are changing that this year by integrating with Calculus I in the fall, making it effectively a 15-week experience. We will start with an intensive review of high school algebra in MA136C, which begins on August 1. The university knows that calculus is the number one reason that students leave. We're also extending the Carter Academy to the humanities and social sciences. This year, we are also adding a hardware component to the academy. We will be taking Arduinos and implementing hydrometers to measure soil moisture; we will introduce students to sensing of signals, basic embedded control loops, and basics of foundational programming. We would not want Carter Academy students to have overlapping summer commitments in SE1011.

Mr. Johnson noted that he struggled a lot with software design 1 and 2. He said that it seemed like the class went very quickly into some challenging labs making it hard to get ahead and really understand the principles. It seemed overwhelming having no programming experience coming in. Mr. Aspinwall noted that he maxed out my high school software classes. For him, it wasn't all that challenging although it was a lot harder than what he was used to from high school. For people who had no software

experience, or just one class in Scratch, the class was generally a struggle. The idea of “SW0”, etc. would have been really helpful. Mr. Johnson noted that he didn’t expect nearly as much outside of class work as there was and Mr. Aspinwall agreed. Mr. Johnson noted that he was using two hours with a tutor every week, plus five to six hours working on each week’s lab on average, in addition to studying and working on his other classes, etc. Ms. Hobson gave highly positive feedback on Carter Academy, which Dr. Meier noted is going into its fourth year. Ms. Hobson emphasized the importance of not having an environment that “weeds out” students.

Mr. Zingsheim and Mr. Johnson asked whether having more teamwork in SE1011 would benefit students. Dr. Durant said he would follow-up with Dr. Taylor, who coordinates the freshman software sequence and has researched and implemented a number of changes to enhance learning. Dr. Durant noted that students at the senior debriefing mentioned the value of teamwork as well. He suggested that perhaps the pendulum has swung too far away from teamwork as we’ve worked to add individual projects focusing on ensuring that all students ultimately know material and get a grade that reflects what they know. Mr. Izzo said that he would prefer seeing this done more informally; when forcing students to work together the high performing students can get frustrated. Informal groups may be even better at keeping all students motivated to contribute. Mr. Ubert suggested that requiring individual lab write-ups on group work may be a way to confirm that each student understands the material. Mr. Aspinwall said that there is informal grouping in the software classes; if someone is struggling, as long as they’re trying, he and many other students are willing to help; but that won’t be the case for a student who isn’t trying. Students generally won’t show them their code, etc. The students agreed that everybody needs help once in a while. Ms. Hobson noted that when she was at Alverno before attending MSOE, the faculty forced the students to take on different team roles: mediator, leader, etc., and this was effective at helping them learn about the various roles. Mr. Scarborough said that he thinks we should further investigate learning communities. On his floor our floor in RWJ, 25 of 30 residents are CEs and were put together intentionally. This proximity encourages students to work together and help each other. This leads to a lot of positive collaboration on labs. He thinks doing this more formally at MSOE, i.e., placing students in appropriate learning communities, would help. Mr. Zingsheim said this would be great especially for freshmen and sophomores who haven’t built their networks yet. Mr. Scarborough said that (MSOE’s current practice of) requiring underclassmen to live in the dorms supports this. Dr. Meier shared that there is a lot of literature on this – such communities foster scrum-like collaboration among students and also foster computational thinking. You’ll hear later when we discuss strategic planning that this is an area that MSOE is considering. Dr. Meier suggest that it would be awesome if CE and SE had a room on campus where students would work together and which would support commuters as well. Ms. Hobson noted that in the dorms this was difficult for the females since they didn’t live on the CE and SE floors. Mr. Zingsheim likes the idea of a space for this purpose – working on software projects, etc. The EECS Technical Support Center is used this way for hardware projects. Mr. Parks, who is a double major in SE, noted that on software projects, the SE program is looking at upgrades to their senior design lab and would like to use it to support other students in the program to hang out and work on programs.

Discussion of new leadership team being complete

Dr. Durant and Dr. Meier shared that that key roles of VP of Development and VP of Academics have been successfully recruited for. Mr. Jeff Snow is our new VP of Development, and Dr. Eric Baumgartner,

our new VP of Academics will be joining us over the summer. Dr. Durant summarized the impressive credentials of these members of President Walz's leadership team and noted that Dr. Walz is completing his first year as MSOE's fifth president.

Overview of Electives

Dr. Rothe told about a new maker space that is being developed in the department thanks to the support of an alumnus. It will include a solder reflow oven, bench tools, 3-D printers, and much more. It is a step above what we have now and includes more robust equipment. He will work on putting this lab together over the summer and will use it in his 4100 system fabrication elective in fall.

Dr. Meier noted that CEs EE372x Control Systems is available as an elective, but students would also need to take the EE3050 Dynamic Systems prerequisite. Dr. Meier plans to follow up with EE on this option. The CE faculty will be encouraging this as an elective. The CE curriculum has several electives, including two "program" electives that must be taken in the EECS department and a "free" elective; all of these could be dedicated to controls and related topics if a student chooses.

Committee Comments

Mr. Johnson said that he appreciates and is honored to serve on the committee.

Ms. Hobson said that she is glad to see that signals and systems is before DSP in the new curriculum. She took both, in the opposite order, and thinks the new order will be an improvement.

Mr. Bushweiler said it is important to give students some opportunity to study controls. Most of their projects at Plexus projects involve controls. Needing to take two or three courses to get into it this area would be problematic. Ms. Hobson noted that offering a mini-minor in controls might encourage interested students to take additional credits beyond their degree requirements.

Group Photo

A new group photo was taken at the end of the meeting and will be posted on the IAC website.

Adjournment

Meeting adjourned to the senior design show at approximately 11:00 a.m.