MILWAUKEE SCHOOL OF ENGINEERING
B.S. COMPUTER ENGINEERING
INDUSTRY ADVISORY COMMITTEE
Friday, May 21, 2021

Attendees

Industry Members

Mr. Jameel Ahmed, Johnson Controls
Mr. James Conigliaro, Olive Branch Technology
Ms. Elyse Hobson, Hatch Data
Mr. Joe Izzo, Rockwell Automation (retired)
Mr. Keyur Khambholja, Direct Supply
Mr. Tom Kraus, GE Healthcare
Mr. Mark Krueger, NVIDIA
Mr. Nick LaBonte, Milwaukee Tool
Mr. Dave Neuman, Brady Corporation
Ms. Cynthia Petterson, Milwaukee Tool
Mr. Joel Rondeau, Cognex Corporation
Mr. Michael Trader, Rockwell Automation
Mr. Greg Treichel, Robert W. Baird & Co.
Mr. Jeff Zingsheim, IAC Chair, Northwestern Mutual

Student Representatives

Mr. Tom Burback, MSOE '21
Mr. Cameron Bush, MSOE '23
Ms. Joy Cross, MSOE '22
Mr. Jaden DeFields, MSOE '21
Mr. Robert Hinner, MSOE '23

MSOE Faculty and Staff

Dr. Eric Durant, Professor and Program Director
Dr. Adam Livingston, Assistant Professor
Dr. Darrin Rothe, Associate Professor
Prof. Deborah Varnell, Instructor

Recorded by: Dr. Durant

Meeting called to order at 8:33 a.m.

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

Welcome and Introductions

IAC Chair Mr. Zingsheim welcomed the members to this virtual meeting, hosted on Microsoft Teams, and invited everyone present to introduce themselves.

Previous Minutes

Dr. Durant asked the members to review the previous meeting minutes, which are available on the website, and to send him any corrections or additions in the next few days.

Update on Operations Modified for COVID-19

Dr. Durant and Dr. Livingston gave an update of COVID-19 operations. Faculty had the choice of teaching online or in person subject to distancing constraints over the last academic year. Students could also choose 100% online. The CE faculty said a challenge in hybrid delivery is simultaneously doing an in-class activity and supporting online students. On a positive note, Dr. Livingston said that Teams for office hours, which supports screen sharing, is better than meeting in person in some ways. It has facilitated being more available to students. Dr. Rothe said office hours and advising works well on Teams. But when lecturing on Teams it is too easy for students to tune out and is not as interactive despite faculty and student efforts. Prof. Varnell said there have been more social issues with students and it is harder to get interaction and build connections among the freshman class.

Mr. Burback said it was a period of adjustment over the last year and it turned out to be a decent learning medium. In senior design, his team hasn't seen any team members in person all year, but they got to know each other well. Mr. DeFields said that being 100% online can't compare to being in person, but it has gotten a lot better over the last year. The first term in spring was tough, but it got more regular with tool use (Canvas, Box, …) after this year. Ms. Cross said it was hard to focus during lectures, but she still was able to learn; she had to go back and re-watch lectures that were recorded.

Ms. Hobson had a question about student performance. Dr. Durant noted that we have data that grades went down, put on top of that many of us faculty think we've been trying to be more flexible due to COVID-19. Dr. Livingston says test/quiz structure and assessment performance is similar, but that quality of lab work and engagement is down. Dr. Rothe added that his biggest surprise was that some of the high performing students disappeared; he also observed a decline in performance for the average student.

Senior Design Project Collaboration

Mr. Neuman explained that his managing director is on the IAC for Nursing. Being in the digital health space, his company is always challenged with how to engage patients via digital means. He approached Dr. Durant on a collaboration with MSOE's School of Nursing. Dr. Durant gave a recap on the 5 EECS + 2-3 NU student pilot senior project for this fall.

Electives

CE4100 Embedded System Fabrication, a popular elective, was summarized by Dr. Rothe. The project includes packaging and PCB layout. Dr. Rothe had two full sections in the fall. They were on campus using the maker lab. He has two full sections again this fall. This course is very popular with CE and EE students, roughly equally, also open to biomedical engineering students (BME).

Break

The members took a break from 9:44 to 9:54 AM.

Semester Conversion

The committee discussed the semester conversion timeline and transition plans for students. The new curriculum will be approved this fall and winter and the 2022-'23 academic year will be used for developing student transition plans, although work may start earlier. When we return to classes in fall of 2023, all course offerings will be on the semester system.

Dr. Durant then gave overview of the semester curriculum plan explaining that now is a great time for input. A main point was why we're moving embedded systems into the third year and systems programming and networking earlier, recapping recent discussions from program meetings. The C knowledge, tools, systems programming, etc., will be helpful to students as they dive into embedded systems design in the 3rd year of the new curriculum.

Mr. Trader said that these embedded and systems programming topics make sense. He asked if we are getting into bootstrapping and assembly language topics. He asked, "Are these the topics that justify making it later?" Dr. Livingston discussed his project from last summer about sharing embedded systems with EE and how we ultimately went different ways since we do go into this depth, while they are more focused on an embedded systems overview. We will cover assembly and interrupts, and these are indeed pain points for students. An advantage of the new curriculum is that students will have seen pointers in C in the second year (in systems programming). This will let us do deep dives into timers, ADCs, etc. Dr. Livingston said, "We'll be developing this class, but I still want to do VHDL work in the new version about developing custom peripherals in VHDL."

Dr. Livingston said that we think there is need for students to have assembly language. Right now, they have 10 weeks of it. He asked, "Should we keep a similar amount in the new curriculum, given how much firmware programming is now done in C/C++?" Mr. Rondeau notes that Cognex does next to no assembly, but he wants the engineer to understand what is happening when you write the code, even though it is not something you need to get your job done.

Ms. Hobson asked about ability to change majors. Dr. Durant explained that it will be like the current situation as far as great flexibility during the first year and significant flexibility in the second year.

Prof. Varnell also gave an overview of electronics. The current CE electronic class only runs once per year in the spring. Now we'll share electronics with EE and be able to offer it every semester. Prof. Varnell has worked with Dr. Meier and Dr. Holland and Dr. Brocker in EE to develop a shared course. It covers diodes, FETs, BJTs, filters, and much more, and takes a standard approach. We will probably offer a follow-up elective more targeted at CEs. There isn't as much specifically digital in the first electronics class, but there will be more in the advanced class. We're still working on the contents of the labs and figuring out what is shared.

Dr. Livingston noted we wanted to make our curriculum accessible for students who want to take CS classes and others. We have a free elective in second year which could be used to take an important CS prerequisite if the student wants. Then we have two technical electives in the senior year.

Mr. DeFields noted that he really enjoyed the computer graphics class. Dr. Durant said it might survive as an elective. C content will be elsewhere in the 2nd and 3rd year classes, but the required curriculum won't include the graphics material.

Dr. Livingston noted that the 15-week technical electives will have significantly better projects and more depth.

The committee discussed when circuits were introduced. There is some in digital logic.

Mr. DeFields noted that keeping digital logic at the start is good to help decide if you want to be a CE. Also, keeping architecture early helps students confirm they're in the right major after the 1st year.

Mr. LaBonte asked about emphasis/tracks within the program. He is in favor of this since CEs can have a breadth of different careers. Students might go more towards hardware, firmware, or software.

Mr. Ahmed asked about academic rigor at MSOE; MSOE is well known for this and helps students learn the fundamental topics. The faculty believe this will be kept for several reasons, including the amount of material we plan to build in in documented weekly topics for each course. Some members of the committee said they like the longer terms since it will support this and allow a bit of flexibility to catch students up when a topic is difficult.

Adjournment

The meeting was adjourned at approximately 11 AM.