Administrative Response to Program Review
Microelectronics Technology Program
March 2017

On March 10, 2017, the Microelectronics Technology SAC presented their Program Review findings to an audience of PCC administrators and others with an interest in the discipline. The presentation was informative and thought provoking. It provided an opportunity for engagement with those in attendance through an informative and interactive dialogue.

This Administrative Response will: A) note particular highlights of the Microelectronics Technology Program and Program Review; B) provide observations and recommendations; and C) provide the administrative response to the SAC recommendations.

Noteworthy Efforts or Achievements

- Kudos for an excellent program review presentation. The presentation was engaging and demonstrated the commitment of the faculty and staff to student success and opportunity. It was well planned and balanced between faculty and staff. Thank you!
- Significant curriculum updates to improve student attainment of course outcomes.
- An active and effective advisory committee that meets quarterly as a large group and more frequently in smaller work groups.
- Dorina Cornea founded the STEAM lab (Maker's Space) at Rock Creek. This space is being widely used by a variety of faculty across the campus including those in Auto Collision and Art.
- Dorina Cornea's role as the lead manager of the **Intel Ultimate Engineering Experience** (summer camp initiated and sponsored by Intel).
- Dorina Cornea served as a Co-Principle Investigator for the **Young Innovators and Makers**, Intel PCC Foundation Grant.
- Dorina Cornea served as Co-Principle Investigator for the **New STEM Co-Curriculum Modules-An Approach to Engaging Underserved High School Students in STEM Activities**, Intel PCC Foundation Grant.
- Dorina Cornea served as the Co-Principle Investigator for **Targeted STEM Recruiting**, Internal PCC grant.
- Dorina Cornea authored and was awarded a National Science Foundation S-STEM grant titled Me(ntoring) MT.
- Eric Kirchner has been acting as an advisor for Ruth Carranza Productions who is developing a new video on semiconductor manufacturing.
- Development of the MT brand; the list of the companies that come to PCC to recruit MT students is a "who's who" of the semiconductor industry.
- Articulation agreement with OIT for MT students to allow them to complete a BS in EET in two additional years. All credits required for the MT AAS apply to the OIT BS in EET.

- Faculty and staff are actively engaged in outreach activities at the Rock Creek campus and the local community.
- Excellent partnership with faculty, staff, Cooperative Education Staff and cooperative-education sites.

Observations and Recommendations

Your strong and intentional approach to assessment of students' achievement in key technical skills, and engagement of your advisory committee in assessment approaches, is noteworthy. It is useful that the program-level outcomes are well-aligned across your several degrees and certificates. We did note, however, that two key outcomes that appear in all of the AAS degrees (work effectively in teams, and communicate effectively with colleagues and vendors) do not seem to have had received much attention, at least not as reported in the Program Review (or in your TSAs. Communication was reported in the 13-14 annual assessment report. We appreciate that Recommendation Ai specifically addresses the need to develop assessments for "teamwork" – noting that this was a recommendation from the 2012 program Review. Please do attend to the assessment of this outcome.

In the mapping matrix, no levels are entered for "Professional Competency" and there is a note at the bottom of page 5: "**CO5 is the only core outcome that in our opinion is not connected to our program outcomes." This seems curious in light of the fact that professional competency would seem to be the point of the program, and is explicitly aligned with each set of Degree and Certificate outcomes. http://www.pcc.edu/resources/academic/degreeoutcome/default.cfm?fa=program&subject=MT. Part of the purpose of mapping the courses to these outcomes is to know both where, and to what level, the relevant skills are taught. Please review the Professional Competence outcome indicators for the courses in the matrix, or provide a stronger rationale for excluding this outcome from your map.

Also, on page 15, the data presented (which we did really appreciate) indicated that the percentage of students meeting proficient criteria in troubleshooting has gone down, steadily, from 2013 to 2016 (from 94%, to 92%, to 89%, to 86%). Each step may or may not be statistically significant but 94% to 86% does seem like it might be. No comment was made on this. I suspect it could be that the assessment has itself gotten more rigorous, and that would account for the apparent decline.

Administrative Response to Microelectronics Technology Recommendations

What is the SAC planning to do to improve teaching and learning, student success, and degree or certificate completion, for on-campus and online students as appropriate?

i. **Teaching and assessing "teamwork" professional development program at the TLC:
    This was a recommendation from our 2012 program review. Availability of funds
    for professional development was advertised out of the Teaching Learning Centers,
    and we jumped on that opportunity to request this training. The TLC program was
    designed around our needs, and it is hoped that we can directly use this training to
    develop teaching assessment tools that we can directly plug into our curriculum.** *We
    applaud the SAC's taking full advantage of the professional development for the teaching
    and assessment of teamwork offered by the TLCs. In addition, your colleagues in the
    Veterinary Technology program have spent quite a lot of time and effort developing
    teaching and assessment strategies for teamwork, and it would be useful to confer with
    them for ideas that might well translate to the Microelectronics environment. We look
    forward to seeing this reflected in upcoming annual reporting as well as in your next
    Program Review.*

ii. **Hired a Student Resource Specialist to support recruitment and retention, advising,
    counseling, learning and time management skills: The Science and Technology
    division at Rock Creek campus was able to hire a specialist to support the CTE
    programs. This will finally allow us to address the specific needs of MT that have
    never been adequately addressed through the Rock Creek directed Perkins funds
    and General Advising. Since we must share this resource with the other CTE
    programs, not all of our needs will be immediately addressed, but it is hoped that
    this person will be able to grow into this position and develop the skills and abilities
    to support our critical needs.** *Thank you for sharing the creation of this position and
    the positive impact that will be realized with this person supporting your program.*

iii. **Implementing the newly awarded NSF MeMT grant.** *Congratulations on this award.
    We look forward to hearing more about the success of this grant at your next program
    review.*

iv. **Continuing outcomes and technical skills assessment activities.** *Please see the
    Observations and Recommendations section above for comments.*

What support do you need from administration in order to carry out your planned improvements?

i. **Continue funding our Student Resource Specialist: the needs of MT, BIT, and VT
    are diverse and will require time for the specialist to become effective in all of these
    critical areas. We need this person to be part of the program for years.** *This
    position is a permanent position funded by campus dollars. The previous Dean of
    Science and Technology, along with the campus President and campus Dean of
    Instruction lobbied for permanent funding which has been allocated. We understand the
    importance of having a Student Resource Specialist permanently embedded in these
    programs.*

ii. **Support the program through the next two learn years (low enrollment): To keep
    the program viable we need to support the challenging schedules of our students.
    With unemployment currently at record low levels most of our students are**

working. Some work days, some work nights, and some work compressed work week schedules that are the norm in the microelectronics industry (working Sunday, Monday, Tuesday and every other Wednesday, or working every other Wednesday, Thursday, Friday and Saturday). Many students are taking classes part-time. To accommodate their schedules we need to run our classes around the compressed work week (classes meeting either Monday/Tuesday or Thursday/Friday) and also evenings. This forces dilution of class fill levels, making it difficult to meet an enrollment target. We also need to continually get enough students through the first year classes in order to have sufficient numbers for the second year classes. *We understand the challenges your program has faced with low enrollment. We are hopeful that having a Student Resource Specialist and additional marketing will increase the number of students in the program. In addition, during leaner enrollment times, we would encourage program evolution. The department can work closely with its advisory committee and related departments to take advantage of opportunities, such as the proposed collaboration in the mechatronics area that may point the way to new credit offerings and perhaps programs.*

iii. **Lab Process Equipment: One of the crown pieces of the PCC MT program is the set of five Lam Research 8 inch plasma etchers donated to the program by Intel when they closed down on of their jobs. Each of these new might have cost $1,500,000. Unfortunately, they were designed to run continuously, and do not take kindly to the repeated power cycling required in a training environment. As a result of this they are suffering failures that are becoming more difficult and more expensive to repair. We would greatly benefit to replacing these with another set of five tools from a fab. Ideally these would be donated. We continually impress this idea on our advisory committee, but recognize that these people working at the ground level in production and human resources are not the ones making decisions about multi-million dollar donations. We have been working on the management of equipment obsolescence. We develop a list of parts that are most likely to fail. We have identified a reliable vendor of the most important parts, through a lead from one of our industrial partners who is also using our model of equipment in their production. This should help continue to supply us with critical parts for some years to come. This is only a stop-gap measure, as even the parts in stock at the vendor are continuing to age on the shelf. We are currently evaluating the possibility of replacing our equipment not by whole pieces of process equipment, which are exorbitantly expensive, but by functional parts. We have also identified aging supporting equipment that is prone to failure. We developed the solution of replacing them with smaller but more modern alternatives, which are not powerful enough for factory use, but suit our educational purpose adequately. The price of such modern alternatives is such that we can purchase and stock them up with our budget at a faster rate than the failure rate of our aging equipment. We do hope our administrators will explore opportunities to interact with high level management of these companies in our community. We hope the administration can educate those decision makers about the huge benefit they gain from having our students to hire, and the synergetic solutions they can enable at PCC.** *We are aware of and support the need for the regular replacement of equipment, especially as older*

equipment becomes outdated. Please work with your division dean to explore potential sources of replacement parts. The long-term goal is to ensure that this equipment is replaced by industry surplus equipment.

iv. **An alternative to getting donated equipment would be to purchase tools on the highly competitive used market. The cost would likely be prohibitively high unless we can fund the purchase with a grant. There is also the challenge of finding a set of five identical tools.** *We are aware of and support the need for the regular replacement of equipment. Please work with your division dean to explore potential sources of replacement parts as well as to explore purchasing tools and potentially writing a grant.*

v. **Professional Development opportunities designed for CTE: While we appreciate any professional development training that the Teaching Learning Center can provide, these are usually presented by people more associated with and more directed at lower division education. The content can be difficult to translate to the CTE environment, and the trainers often have difficulty appreciating the differences. Any effort put towards developing, defining or presenting CTE specific training would be appreciated.** *We applaud your request for CTE professional development training. The RC Teaching Learning Center coordinator has identified someone who has put together CTE specific professional development. The plan is to offer this training during fall 2017. We hope that you will find this useful and that you will continue to work with the TLC coordinator so they can identify additional CTE professional development opportunities.*

Closing

In closing, we want to again thank the Microelectronics Technology Faculty and staff for sharing the results of your program review with us. We enjoyed learning more about the discipline, your successes and plans for the future. We look forward to supporting your on-going work on continuous program improvement.

Administrative Response submitted by Cheryl L. Scott, on behalf of the Deans of Instruction and Dean of Academic Affairs.

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