JOINT MEETING OF THE

COMPUTER HARDWARE ENGINEERING TECHNOLOGY
and
ELECTRONICS TECHNOLOGY ADVISORY COMMITTEES

October 30, 1997

Present: Cindy Ball, General Motors Midlux Division
Daniel C. Bednarski, Road Commission of Oakland County
Robert Colenso, Autoliv North America Inc.
Richard T. Collins, Oakland Technical Center, Northeast Campus
Patrick T. Dean, Paraprofessional, OCC
Rudy Latzko, Saturn Electronics and Engineering Inc.
Verna Love, Counselor, OCC
William Maholick, Consultant
Dr. Carlos Olivarez, Dean, Academic and Student Services, OCC
Dr. Robert Powell, Faculty, OCC
Willard Rush, Faculty, OCC
Ruth Springer, Secretary, OCC
Gerald Wells, Electronics Student, OCC

Preliminary Matters

Dr. Carlos Olivarez welcomed the group and invited the members to introduce themselves. The
minutes of the joint meeting of the Computer Hardware Engineering Technology and Electronics
Technology Advisory Committees held on April 17, 1997, were reviewed and approved as written.
The minutes of the follow-up meeting of OCC members of the Electronics Advisory Committee held
on June 25, 1997, were reviewed, and a progress report was given on each committee
recommendation, as follows:

Progress Report on Electronics Technology Advisory Committee Recommendations

1. **That OCC obtain the necessary equipment for at least one or two soldering stations capable of removing or installing surface mount technology in order to give students hands-on training in the soldering of fine pitch parts, suggested equipment to include magnifiers, scopes, and lamps.**

Dr. Robert Powell reminded the group that, at the last advisory committee meeting, he had spoken against spending money on surface mount equipment, because research done by Dr. Powell and Mr. Willard Rush showed that no other Michigan colleges were teaching surface mount technology. Since then, Dr. Powell has become aware of a market for training surface mount technicians, but he believes that much of it can be done on-site at the companies requiring the training. He asked Mr. Rudy Latzko to describe the training which will be done for Saturn Electronics and Engineering Inc.

Mr. Latzko explained that training in surface mount technology is really best done on the job. Many people are unable to do this type of work, even with training. At Saturn Electronics, they first identify appropriate people from their pool of applicants and give them training in basic soldering techniques. Then they go on to the next level of fine pitch repair, which is very difficult to do. Mr. Latzko believes OCC students should be introduced to surface mount technology, so they understand what companies are doing and what skills are necessary. However, there would probably not be enough time within the OCC curriculum to train them to the level needed by companies. This can best be done on-site after they are hired by a company.

Dr. Powell stated that he believes it would be appropriate to get one surface mount station to be used for practice by instructors and Mr. Pat Dean, and also to be used in training students. Such a station would cost about $775, plus a little more for tips. Dr. Powell has been meeting with Bardwell Industries and Saturn Electronics. He has suggested that Saturn purchase several stations to be used in on-site training which could be taught by OCC personnel at their company location.

Ms. Cindy Ball commented that, when she worked in Flint in the printed circuit board area, as technology changed, the company gave away the older equipment they no longer needed. She offered to contact companies which might be willing to donate equipment for a tax write-off.

2. **That OCC staff visit the lab at Jabil Circuit or at Electro Linc to see what equipment they have and model OCC's lab set-up after theirs.**

Mr. Dean reported that he has visited both places. He would like to take training and find out how employees are trained at both companies.

Mr. Rick Collins commented that he has sat in on Jabil's training courses. Jabil has indicated to him that, when he has the equipment to make this type of training part of his high school program, they would be willing to donate boards for his students to practice on.

Mr. Latzko agreed that it is common to practice on scrap boards. Mr. Dean reported that OCC already has sufficient scrap boards that have been donated, at least to get started. More may be needed, depending on how often they are used.

3. **That OCC staff members visit classes at Jabil Circuit to see what films and instructional materials they are using and how they are training their people in surface mount soldering.**

Mr. Dean reported that he has visited Jabil, seen their methods, and talked with their training people. Now that it is clear that OCC intends to move in this direction, he will pursue taking training there.

4. **That OCC obtain the necessary equipment to teach 28XX Series Flash PROM's.**

Mr. Dean reported that a burner has been received from General Motors Proving Grounds that has an enormous stockpile of devices it will burn, including Flash PROM devices. This recommendation has been completed.

5. **That CIS 105 be added to the Electronics Technology curriculum and/or that instruction in the use of appropriate computer software applications be included in the Electronics classes.**

CIS 105 will not be added to the curriculum. Instruction in the use of appropriate computer software applications is being included in the Electronics classes.

6. **That the College explore the possibility of including a co-op internship as part of the Electronics Technology curriculum.**

Dr. Powell reported that he has taken to the curriculum committee a curriculum change to add ECT 170, Microprocessor Co-op Internship, and ECT 270, Advanced Microprocessor Co-op Internship, to the Electronics Technology curriculum as recommended electives.

7. **That lab equipment be updated as much as possible, so students are able to gain hands-on experience with equipment similar to what they will find on the job in industry.**

This recommendation has been completed. Two Pentium Pro 200 servers and an additional seven Pentium 200 work stations have been purchased, as well as some benchtop digital multimeters.

8. **That CAD facilities be made available for the teaching of DRT 114, Electronics Drafting.**

9. **That DRT 114 be taught using one of the newer software packages, preferably one which does simulation.**

10. **That decisions about instructors and software for DRT 114 be made by faculty in the Electronics area.**

Ms. Cindy Ball taught DRT 114 in Spring 1997. She has met with Dr. Olivarez, Mr. Tahir Khan, and Electronics staff members, and has been looking into software packages that could be used in the course. Ms. Ball reported that the updated version of PADS is very expensive. She has discussed with Mr. Khan the possibility of using AUTOCAD. After talking with a number of companies, she has concluded that we need to use software that is Windows driven and icon based. Students need to learn the fundamentals, recognize the icons, and be able to move around on the computer and see the dimensioning. If they can learn to do those things using AUTOCAD, they will be able to learn to use whatever software is used where they may be working in the future.

It was pointed out that Ms. Ball has been invited to serve as a member of the Electronics Technology Advisory Committee. Ms. Ball provided an update to a statement made about her in the minutes of the April 17 meeting. She is no longer retired, as was reported at that meeting. She is now working once again for General Motors.

Progress Report on Computer Hardware Engineering Technology Advisory Committee Recommendations

The minutes of the follow-up meeting of OCC members of the Computer Hardware Engineering Technology Advisory Committee held on June 25, 1997, were reviewed, and a progress report was given on each committee recommendation, as follows:

1. **That the College consider setting up an intranet which could be accessed by Computer Hardware students to obtain information and do assigned exercises from home if they wished.**

Dr. Powell reported that Mr. John Valentine, OCC's Executive Director of Information & Telecommunications Systems, is not in favor of setting up within the College an intranet which has a link to the outside world. Dr. Powell believes this recommendation is premature, as we would not be able to obtain Mr. Valentine's permission to carry it out.

Mr. Rush reported that it is now possible to download web pages via satellite much more rapidly than is possible using phone lines. Mr. Dean is currently negotiating with a local ISP Internet provider to get this into operation as part of the Computer Hardware curriculum, so students will know how to do this for their customers in a work situation. A modem has been ordered, and Mr. Rush has chosen a package for download software, which is being ordered. Mr. Dean stated that it should be operating by Winter 1998.

2.   That students receive instruction in both Novell and Windows NT.

Mr. Rush reported that he has training labs in place for Novell Version 3 and Version 4 and for Windows NT. This recommendation has been completed.

3.   That Dr. Powell and Mr. Rush be trained as certified network administrators for both Novell and Windows NT.

Dr. Powell has taken three training classes on Windows NT, and Mr. Rush and Mr. Dean have received training on Novell. They are currently waiting for Novell 4 training to be offered again, as a previous training session they had signed up for was canceled and not rescheduled.

4.   That the $18,000 allocated for the purchase of lab equipment be used to obtain two high power Pentium Pro servers, along with as many Pentium 200's with SCSI interfaces as possible.

The $18,000 was used to purchase two Pentium Pro 200 servers, an additional seven Pentium 200 work stations, and some benchtop digital multimeters. This recommendation has been completed.

5.   That the College consider adding CD-ROMs to the existing computers in the lab.

Mr. Dean reported that additional CD-ROMs have recently been purchased for those machines where they were needed for specific software that needs a CD-ROM drive. A network has been installed between all machines. This recommendation has been completed.

6. That a two- to three-year business plan be developed for the Computer Hardware Engineering Technology Program to include program goals and projected yearly equipment needs. This plan would be presented to College administration and budget council to seek their support for capital equipment requests.

Dr. Powell reported that this is still in process.

7. That the Computer Hardware Engineering Technology Advisory Committee continue to meet separately from the Electronics Technology Advisory Committee.

8. That the Computer Hardware Engineering Technology Advisory Committee and the Electronics Technology Advisory Committee meet together in Fall 1997.

Recommendation 7 was superseded by Recommendation 8 for this Fall 1997 meeting.

The group agreed that they like having the two committees meet together.

Mr. Dean expressed concern that, if a large number of members of both committees attend a given meeting, a great deal of discussion could develop, and it might not be possible to get the business of both committees taken care of as easily as has been done at today's meeting, which was quite poorly attended.

Licenses and Certifications

Mr. Rush reported that he encourages students to obtain the FCC commercial license, as well as electronic technician certification. He asked the committee whether this is an effective competency indicator to show to a potential employer.

Mr. Rick Collins expressed the opinion that it is worthwhile. Mr. Latzko reported that he likes to see "journeyman" on a resume.

Mr. Rush reported that students can go to the Secretary of State Office and take a test to become state certified in automotive electronics. He encourages students to do that as well.

Mr. Dan Bednarski mentioned that he belongs to the International Municipal Signal Association. One of its main goals is to certify members in two areas. The certification in signals parallels industrial certification, and subject matter that is a part of the Computer Hardware curriculum, such as AC and DC, are all a part of that certification. This certification is being sought more and more in

municipalities and all levels of government. Mr. Bednarski would like to speak with Mr. Rush about how OCC's training may relate to this certification.

Electronics/Computer Hardware Student Evaluation Survey Results

Dr. Powell explained that, as a result of what he learned in doing his dissertation, he is teaching his classes differently than he has in the past. He has found that, with an adult population, students know how to learn and want to be given the tools and task and left alone to solve problems at their own pace. Dr. Powell rarely lectures anymore. He has created computer software which is used by the students to master the course material. They can work at their own pace on computers in the lab or at home. However, they must come to campus to take tests. The software scores their homework and tests. Students like it because it provides them with instant feedback. Because he doesn't need to give long lectures, Dr. Powell can be in the lab to help those who need him. Students can come to class on a flexible schedule. Students in any class can come to class on any night that Dr. Powell has a class scheduled. Students who are not doing well come to him for help, and he shows them what they need to do. Some are not self-starters, so they do need some direction.

Dr. Powell presented the results of a student survey he did during Fall 1996 and Winter 1997. He gathered information from three classes held on the Auburn Hills Campus and two held at General Motors Milford Proving Grounds. He surveyed a total of 83 students. He found that about 75 percent had more than a year of experience on the computer. A summary of his presentation of survey results is attached.

Mr. Bill Maholick noted that several students surveyed commented that a certain amount of lecture should be added to the course. He asked whether Dr. Powell intended to incorporate more lecture in the future. Dr. Powell responded that he has found that most instructors lecture on the basics. However, the basics can be taught very well by computers, which will repeat the material as often as necessary for the individual student to learn it. There are lecture tapes in the library which can be used by students if they wish to see a lecture on a particular subject.

Dr. Powell suggested that the group might want to ask questions of Mr. Gerald Wells, who has taken three of Dr. Powell's classes using this new format. Mr. Wells reported that, when he attended his first class and learned how the course would be taught, he didn't like the idea. He had no computer skills and did not think he would be able to handle the computer aspect of the course. He also didn't like the idea of it being a self-study course. His reaction was, if he had wanted self-study, he would have bought a book or taken a correspondence course. However, he found that he liked it better by the end of the course. Mr. Wells suggested that it might have been helpful if the instructor had given a lecture on general problems many students were having. He believes there are things that could be done differently to enhance the courses, but overall, his experience has been very positive. He had trouble with the computer disks at first, but once he got them to work, he liked that method of

learning because he could get immediate feedback while he was doing his homework. If he had not done it correctly, he could keep trying, thus making up for lack of intelligence with effort. Sometimes when listening to a lecture, you may only hear a piece of information one time, so you only have one chance to get it. With the computer, you can keep trying until you get it. Mr. Wells mentioned that he is having trouble with a course he is currently taking. He plans to withdraw and wait for Dr. Powell to teach it so he can take it with him.

Dr. Powell explained that students must pass two oral exams per course. There is a writing assignment which must be correct in grammar and spelling. There is also a hands-on part. Students report that they are in favor of the learning methodology.
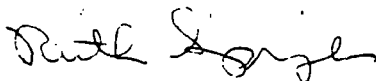
Mr. Maholick asked what the development time was for one class. Dr. Powell responded that it takes him about three weeks, now that he knows the software well. The time that is recouped in the long run is well worth the time and effort spent in development.

Mr. Bednarski commented that he has taken some of Dr. Powell's courses and appreciates what Dr. Powell has done with them. As an older student, he does favor having more lecture in the course because of the feeling of isolation he has working on his own with the instructor. He missed the interaction there would be with other students in a regular classroom situation.

Computer Hardware Engineering Technology Advisory Committee New Recommendation

9.   That the Computer Hardware Engineering Technology Advisory Committee and the Electronics Technology Advisory Committee continue to meet together.

Respectfully submitted,

Ruth Springer

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SUMMARY OF STUDENT EVALUATIONS
COMPUTERIZED INSTRUCTION IN THE CLASSROOM
Fall 1996 - Winter 1997
Dr. Robert A. Powell

The survey asked students to respond to a number of statements according to the following scale:

5	Totally agree
4	Agree
3	No opinion
2	Disagree
1	Totally disagree

Following is a listing of the average numerical response in each area surveyed:

Computer attitude - anxiety	3.89
Computer attitude - confidence	4.04
Computer attitude - liking	4.22
Computer attitude - usefulness	4.58
The course content met or exceeded my expectation for the class.	4.02
I would recommend this course to a friend with similar academic interests.	4.17
This course was well organized.	4.00
I was able to use what I learned in this course.	4.23
Overall, I would rate this course as excellent.	3.96
At the beginning of the course the overall class plan was clearly presented.	4.23
The class plan was followed reasonably well.	4.13
At the beginning of the course my responsibilities as a student were made clear.	4.32
All things considered, the instructor was available to me.	4.45
The instructor treated all students in the class, including me, fairly and with respect.	4.74
The instructor provided prompt feedback in my performance on assigned activities.	4.58
The grading procedures were clearly explained at the start of the course.	4.43
The material presented in class and in assignments was fairly expressed on examinations.	4.17
Overall, the instructor did a good job of teaching this course.	4.19
I was satisfied with the way in which the instructor presented the material.	3.91
I found it acceptable that the instructor did not rely primarily on traditional lectures to deliver the course content.	3.74
I enjoyed the extensive use by which computers were used to help teach the class.	4.34
I enjoyed the flexible way in which I was able to take my tests.	4.28
All things considered, I learned more in this class as compared to those taught primarily through lecture.	3.62
I found that the class meetings/schedules were flexible in such a way as to meet my personal and professional obligations.	4.55
I enjoyed the manner in which I was provided immediate feedback after taking my tests.	4.48
Because of this course, my problem solving skills have been enhanced.	3.96
Because of this course, I am better at critical thinking.	4.04
Because of this course, I network with other students better.	3.81
Because of this course, I am able to perform better within a group.	3.75
Because of this course, my interpersonal skills have improved.	3.77

In the <u>Comments</u> section of the survey, under <u>Best Part(s) of the Class</u>, students mentioned the following:

- Dr. Powell has a great new and fresh way of teaching.
- The software utilization allows students with busy schedules to work at their own pace. I was very impressed with the style of instruction.
- It allows each student the opportunity to push their limits and expand. Excellent content and flexibility.
- Not having a long background in electronics, this class allowed me to approach my assignments in a comfortable manner.
- Being able to take the tests when I felt I was best prepared was found to be a bonus.
- I liked the use of the computer for homework and tests.
- The relaxed non-threatening environment.
- The teacher did not talk for hours.
- Working at my own pace.
- Interacting with other students.
- The labs and homework assignments, it was the best use of time for both the instructor and myself.
- The process which you allowed the students to learn using the computer.
- Instructors available frequently.
- Hands-on labs.
- Being able to work at own pace.
- Learning from someone who really knew what he was talking about.
- The responsibility [of learning] was left up to the student (mostly).
- I really liked the independent study and flexible lab hours. I must admit I enjoyed doing the homework on computer.
- Homework had to be done.
- Group work in problem solving.
- Meeting every week and using the computer.

The following <u>Areas That Need Improvement</u> were mentioned by students in the Fall 1996 survey. Dr. Powell's responses are included following each comment.

- The teacher was available only part of the time due to the constant demands of the other students.
     1) Video delay tapes are now available for reference.
     2) Animated and simulation software for course content is currently being developed.
     3) There has been BBS! Enhancements and a Web Page has been developed.
- The need for group lecture and demonstrations.
     Lecture has been replaced naturally with quality "one-on-one" time where nearby students can "tune-in" or "tune-out" and coded QT in the following responses.
- Need for class lecture to reinforce computer work. - QT
- Working through examples on a class level. - QT
- Correct flaws on homework disks.
     Instructor is becoming more skilled with practice.
- Some lecture or much better book.
     Another text is being looked at for possible adoption.
- More lecture - direction on assignments.
     More in-depth syllabus/schedule explanation.

- There needs to be some group lecture. - QT
- I still prefer some lecture. - QT
- More explaining. - QT
- Get better computers to work on.
    Ongoing process.

The following <u>Areas That Need Improvement</u> were mentioned by students in the Winter 1997 survey:

- Open labs on weekends.
- Labs.
- The teacher needs to lecture at least half of the class.
- Scheduling.
- Some strict regulations about exams. Like scheduling the mid-term in a specific time period. This would allow us to prepare ourselves, rather than working until the last minute.
- The only boggling thing about the class were a couple minor glitches on answers in the homework and tests.
- We need a brief lecture (about 30-40 minutes) at each class.
- I would probably pair students together to do labs to allow them to network more freely with one another.
- I would say call each student in for a mid-semester evaluation because some students will not admit to having problems with an instructors' course . . there is a greater chance that the instructor will be able to help all of his students . . . remain problem free for the duration of his course.
- Dr. Powell needs to have scheduled lab time so everyone is doing the same lab at once.
- I think your idea is great! This method of teaching is the best way I have ever experienced. The only thing, but still important, is that I felt a little lost on where I was supposed to be in the class. You should have scheduled lab time so everyone is working on the same lab, so we can help each other out. Another thing I would change is I would want to have a few minutes of lecture about where we should be and where we are going. I would also ask if anyone have any questions then move out to the lab area. P.S. Enjoyed the class.

Dr. Powell's responses to these comments:

- Video tapes of DC Fundamentals, AC Fundamentals, and Circuit Analysis are now housed at the Milford Proving Grounds.
- Instructor notes in more detail relative to the most significant concepts for each class (fact, understanding, and application) are now available.
- Instructor meets each class for the first session on site and subsequent days when deemed necessary by the moderator.
- Tutorial software has been prepared to support homework assignments on disk (e.g. Principles of Engineering).
- A Web Page with on-line information at **http://www.CoreTECS.com** (to view and/or download syllabi, sample tests, homework, and class offering schedules) has been implemented by Dr. Powell for distributed learning. Students also have access to a "CHAT PAGE."

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