



OAKLAND
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COMPUTER AIDED DESIGN AND DRAFTING TECHNOLOGY

ADVISORY COMMITTEE MEETING

April 24, 1997

Present: David Carr, Chrysler Corporation
Jeff Figa, ITT Automotive
Harminder Grover, General Motors
Heidi L. Hoyles, Silicon Graphics
Sally Kalson, Coordinator of Cooperative Education, OCC
Tahir Khan, Faculty, Technology Department Chair, OCC
Thomas J. Kudzia, Chrysler Corporation
Donna Nissen, Paraprofessional, OCC
Pat Nowaczynski, Counselor, OCC
Buz Nowicki, IBM
Dr. Carlos Olivarez, Dean, Academic and Student Services, OCC
Victor Rhoder, Deneb Robotics
Norm Robbins, Chrysler Corporation
Tom Sawasky, Faculty, OCC
Ruth Springer, Secretary, OCC
Steve Ward, Chrysler Corporation

1. Welcome and Introductions

Dr. Carlos Olivarez welcomed the group and thanked them for their willingness to assist OCC as members of the advisory committee. He asked the members to introduce themselves.

Mr. Tahir Khan gave a brief overview of the four options which may be taken by students in the Computer Aided Design and Drafting (CAD) Program. He asked for direction from the committee in regard to the Automotive/Industrial Modeling Option, which has not been popular with students, and the Machine Tool Option, which may need to be revamped.

2. Automotive/Industrial Modeling Option

Mr. David Carr expressed the opinion that clay modelers will soon be a thing of the past in the automotive industry. It is his understanding that no clay model will be done in the future. He offered to go back to his company and ask the clay modelers to comment on this curriculum and whether there will be a need for more people to be trained in this field in the future. Mr. Thomas J. Kudzia agreed that in the future no clay model will be done.

Mr. Khan commented that this option has been available for three years. It was put together at the request of Chrysler Corporation, which was in the process of retraining their clay modelers. There are a few students taking this option, but not many. There has been a problem with the required Industrial Product Design (IPD) classes being canceled due to low enrollment, which makes it difficult for students to complete their program. If we continue to offer this option, we will need to ensure that required classes are being offered on a regular basis.

3. Automotive Body Design and Drafting Option

Mr. Khan asked the group for their comments on this option. He pointed out that both manual and computer drafting classes are offered.

In regard to ADT 110, Introduction to Body Drafting, Mr. Steve Ward asked how many jobs will be available for students to do body drafting on the board. Mr. Khan responded that no one employs people today to do body design on the board. This course is in the program because there is a school of thought that says fundamental concepts cannot be taught directly on the computer, but must be taught on the board.

Mr. Kudzia commented that he does not believe anyone uses descriptive geometry, but that visualization is very important. He believes that could be taught using the computer.

Mr. Carr pointed out that the basics of design are learned in the first drafting course taken. The value of the board drafting classes is in learning what the various views are and how to do them. Those courses help the students visualize what is going on.

Mr. Kudzia responded that the CAD courses should be used to teach the basic process of designing, rather than how to use a particular software. The software is simply a tool. If students are taught the logic of how to create using the tool, they will understand the process and be able to do it using any tool. Perhaps this does not have to be taught in a manual class.

Mr. Norm Robbins pointed out that students who have had no manual drafting courses seem to have more trouble catching on to the concepts of designing in CATIA. Those with manual drafting experience seem to do better. Mr. Robbins commented that he himself has spent most of his career

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in CATIA design, but his early experience in manual drafting has helped him many times. The engineering field is still in the manual mode of thinking, and designers need to be able to convey concepts in terms the engineers understand. Manual drafting experience gives the designer the ability to think in terms of manual design, even though he/she is designing in space using CATIA.

Mr. Kudzia agreed that the student with manual drafting experience has an advantage, but he questioned whether the advantage comes from the manual drafting itself or from the knowledge gained through that experience. Mr. Kudzia believes that the same design concepts could be taught using the computer.

Mr. Jeff Figa commented that he took manual drafting courses at OCC, but has never worked on a board on the job. However, everything designed at ITT Automotive ends up on paper. Those who have always worked in a CAD 3D world do not know what the engineers mean when they tell them what to do.

Mr. Khan pointed out that we are currently requiring students to take CAD 120, Product Detailing, as well as DDT 105, Product Drafting. In these two classes, the same concepts are covered on the board and then again on the computer. The same thing is true of DDT 115, Descriptive Geometry, and CAD 130, Descriptive Geometry/Assembly Drawing.

Mr. Carr commented that there seems to be some redundancy in this course work. Perhaps CAD 110 or CAD 120 could be replaced by a course in Kinematics.

Mr. Khan responded that many students do take CAD 214, Kinematics. Students who are already working in the industry do not wish to take the co-op classes, so they are allowed to substitute the Kinematics and Solids classes.

Mr. Carr suggested that perhaps Kinematics could be made a requirement instead of some other things that are not done anymore in industry. Kinematics and body design will continue to be needed in industry.

Mr. Khan suggested that CAD 214, Kinematics, could be added to the program in place of DDT 105, Introduction to Body Drafting. Mr. Carr agreed that this would be a good idea, since it appears that now students are getting the same type of process knowledge three different ways. He emphasized that kinematics is used a great deal in the industry.

Mr. Khan suggested that perhaps DDT 105 is not an appropriate course for Body Design students because it deals with a different type of drawing which might be more appropriate for Tool and Die students. Perhaps DDT 105 could be removed from the program and replaced with CAD 214. We have to keep in mind that the Auto Body Option already is an extended degree option, with 78 credit hours, so we must take something out of the program if we want to add something.

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Ms. Donna Nissen pointed out that the students do not see the need for MEC 101, Introduction to Manufacturing Processes, and MEC 102, Manufacturing and Fabrication Processes. She reported that students in the Machine Tool Option like these courses, but Body Design people do not.

Mr. Khan responded that the purpose of those classes is to teach manufacturing processes to the students. If the focus of the courses has shifted, we need to go back and make sure they are doing what they are supposed to be doing.

Mr. Kudzia commented that students should learn about the manufacturing process while they are learning about the design process. After they design a part, they should learn how to make it as well.

Mr. Victor Rhoder suggested that the fundamentals of Computer Aided Design must be taught first, and then students must be taught how to draw in context, for what you want to do with the finished product. It is also important to be able to translate data from platform to platform, because in industry you often get data from a supplier in the wrong format and need to be able to translate it into your system. Another needed emphasis is data validation. Perhaps one course could address these issues which come up in the real world.

Mr. Kudzia pointed out that we are discussing what should be taught in each course based on our own individual assumptions as to what is currently being taught in the courses. We need to have clear information as to what is actually covered in the classes; then we can look at that and determine what should be added or what is no longer needed in industry. Mr. Kudzia mentioned that he does address various systems in the classes he teaches.

Dr. Olivarez commented that the course syllabus should show what is taught in each course. Perhaps a common syllabus is needed for each CAD course. Mr. Khan responded that there is a common syllabus for all sections of the same CAD course. While all instructors may not follow exactly the same sequencing, all are careful to include all the content mentioned in the syllabus.

Mr. Khan mentioned that he has heard feedback from students in regard to the MEC classes, that they are more related to such things as numerical control programming, and that manufacturing processes are no longer the focus of the courses.

Mr. Carr suggested that it would be good for Body Design students to take APD 825, Die Design I, since much of their work will be involved with designing a part that will be stamped. He believes it is more important that students know something about die design than about manufacturing processes, so they are able to interface with the die process engineers and understand what they are talking about. From their course descriptions, MEC 101 and MEC 102 do not appear to be strong courses.

The group suggested that the content of these two courses which is needed by a body designer be combined and offered as one course.

Mr. Robbins commented that his own design work became easier after he had visited a few stamping plants to gain an understanding of the stamping process. Students in CAD 260, Body Print Interpretation and Detailing, visit a stamping plant, where they can see the parts they work on in class being stamped. This gives them an understanding of how the part will be manufactured, in addition to working with it on the screen. Mr. Robbins requires students to do a brief report on what they learned at the stamping plant. All the students' papers show they have gained valuable knowledge through the tour.

Mr. Ward suggested that each class should have an industry tour included as part of the course work, so students are not just sitting in the CAD Lab drawing pictures. Ms. Kalson commented that co-op students get that kind of knowledge, and it is very beneficial to them.

Dr. Olivarez asked whether all CAD courses should include field trips. Mr. Khan responded that students in the higher level Auto Body classes are required to take field trips. Students in the lower level classes do not take field trips.

Dr. Olivarez asked whether a field trip should be made part of the standard syllabus for all courses so that all instructors will take their students on a field trip. Mr. Khan responded that that would be a good idea, but that a commitment from industry would be required.

Mr. Ward stated that most companies jump at the chance to host a student tour. He has found it very easy to set up field trips for students.

Mr. Carr suggested that one week should be spent on fasteners in the MEC class. Mr. Robbins commented that in CAD 260, students are exposed briefly to fasteners.

Mr. Rhoder asked about the level of detail and intricacy of student projects done in each class. He suggested that there is a need for industry representatives to address the issue of what kind of part companies want students to be able to do after they finish each class, so students are learning what is needed by industry.

Mr. Khan explained that students do fairly complex parts, within the limitations of what can be finished in a 15-week term. Instructors have to maintain a balance between teaching the concepts and requiring students to do realistic projects for the time period.

Mr. Rhoder suggested that there should be a list of key characteristics that should be included in design projects.

Mr. Kudzia pointed out that he has a problem as an instructor. He covers the material, but he hesitates to give the students extensive assignments because of the problem of limited equipment and no open lab time for students who work during the day and can only come to work in the lab at night. Mr. Robbins agreed, pointing out that time is taken in class for the lecture, and then two students

must share a computer, so it is difficult to complete projects during the class time. Mr. Kudzia added that he is unable to give students the problems they should have, due to the open lab problem. However, he does give them a project that cannot be solved, because this is a typical real world situation.

Dr. Olivarez commented that the problem of open lab time is a common problem, due to the popularity of the program. The College could possibly cut back on the number of classes offered to allow for more open lab time, or perhaps an open CAD Lab could be established in a separate location, possibly in an area that will be free when the current F Building construction is completed. He agreed that more open lab time is needed. He wondered whether the funds would be available to set up an open lab with perhaps 20 stations.

Mr. Khan responded that they are considering beginning with 15 stations in an open lab. A proposal was submitted to the Budget Council this year which would allow the CAD Program to get away from the mainframe and become work station based. Another proposal is being submitted to Chancellor's Council through OCC's Manufacturing & Technological Services to obtain more work stations, with the ultimate objective of having one student to one work station. There would be 15 work stations with CATIA and Unigraphics on them. The key thing would be networking, because students would need to be able to access their work in the open lab.

Mr. Carr asked whether the College has considered using the students' lab fees to lease training computers on Saturday and Sunday from Chrysler or another company involved in training people. These could be used by students for open lab time. It was suggested that students could put their assignments on floppy disk to use elsewhere.

Mr. Khan suggested that perhaps the IDEC room could be used, or another area, when they were not in use for other purposes. With networking, those areas could be used for open lab time.

Mr. Carr commented that perhaps industry, such as IBM, would like to help by donating equipment.

Mr. Carr suggested that CAD 235, CAD Applications in Die Design, might be a good addition to the Body Design Option, rather than APD 825, which he had suggested earlier.

Mr. Khan agreed, suggesting that possibly MEC 102 could be removed from that option in order to add CAD 235.

Mr. Ward suggested again that the content of the two MEC courses which is needed by a body designer be combined and offered as one course. He emphasized that every body designer must know manufacturing processes because of the need to communicate with those involved in that area.

4. Computer Aided Engineering Technology Option

Mr. Khan called the group's attention to the Computer Aided Engineering (CAE) Technology Option, which was recently added to the program. He asked for their feedback about this program.

Mr. Carr commented that the engineers in his area do their own finite element modeling. They do not have assistants to help them. However, Mr. Kudzia added that there has been discussion of possibly having designers do the modeling but not the analysis portion.

Mr. Khan explained that OCC is attempting to arrange a 2+2 agreement with the University of Michigan Dearborn so that students who receive an associate degree in the CAE Option could go on to earn a Bachelors in Manufacturing Engineering from U of M Dearborn. OCC is not trying to produce an engineer, but rather an engineering technologist who could work with an engineer. The graduate of this option could do the CAD work, and the engineer could do the analysis. Mr. Khan mentioned that he is putting together a course called Simulation for Designers which will be part of this option.

Mr. Kudzia explained what finite element modeling does. When a solid model is created for manufacturing, it needs lots of modifications in order to build it. The CAD operator could do that part of the work, while the engineer did the analysis. That is what is intended to be taught in the Finite Element Modeling course.

Mr. Carr expressed a concern about the fact that CAD 216, Finite Element Modeling, is the heart of the program, but is only a three-credit course. He wondered whether it could be made more rigorous.

Mr. Khan responded that CAD 216 is the first course that has been set up in finite element modeling. He also wants to include a course in finite element analysis. However, he sees a problem in trying to teach finite element analysis with the math background that two-year students have. He believes the course could still be developed and offered for industry or for those with the necessary math background. Perhaps it could be marketed to area industry through OCC's Manufacturing & Technological Services. Mr. Khan is not sure how it will fit into the associate degree program.

Mr. Carr offered to ask the modelers' manager at his company what he thinks of the idea of having assistants work with them.

Mr. Khan asked the group for their opinion of virtual reality in design. Mr. Kudzia expressed the view that virtual reality will become a useful tool. It is being developed and used at Chrysler, more in the styling group. It is still in the infancy stages. Mr. Rhoder commented that students should be shown the breadth of virtual prototyping and virtual manufacturing, including design, visualization, and evaluation.

Mr. Khan asked whether a class in design simulation belongs in the CAE Option. Mr. Rhoder responded that the next step from CAD is simulation. Those who do it will come from the CAD world. Mr. Kudzia added that simulation is a part of CAD. It is being done more every day.

Mr. Carr suggested that students who are working in the field be asked to come back and tell the College what they think of the program, what they use on the job and what they do not use.

Mr. Ward commented that when students get entry level jobs, employers want them to be able to do Draw Mode on CATIA, and they have not been exposed to that at OCC. Several members agreed that this should be included in CAD 210.1, Three Dimensional Wire Frame Design and Surfacing.

Mr. Figa suggested that 2D side CATIA is needed.

Mr. Khan stated that 2D-3D integration of space is not addressed in CAD 210.1. Perhaps less time could be spent on projects so that some time could be spent doing 2D-3D space integration.

The group agreed that such things as text and dimensioning, cut sections, views, and layers of filters are needed. Mr. Khan commented that this could almost be a class in itself. Mr. Ward pointed out that it would be almost like a descriptive geometry class. Mr. Kudzia suggested that instead of doing descriptive geometry on the board, it could be done in Draw mode on the computer.

Mr. Khan suggested that perhaps this could be offered as an optional class for those who are interested, since the degree already has so many credit hours. Perhaps it could be an extra course to enhance students' background after they are employed, according to what they need on the job. We need to consider what are the absolute minimums necessary for the degree, and what could be offered as extra courses. Mr. Khan believes that instruction in 2D-3D is important and needed.

Mr. Robbins suggested that students need to know such concepts as plan view, projections, and planes, but perhaps they could be taught using CATIA, rather than in manual classes such as DDT 115 and ADT 110.

It was suggested that perhaps CAD 120, Product Detailing, could be used to teach 2D-3D concepts. That class will be taught using AutoCAD beginning in Spring 1997. Or perhaps those concepts could be taught on CATIA if the group thinks that would be better.

Mr. Buz Nowicki explained that CATIA owns CADAM now and is developing the two systems together. There are plans to move customers currently on CADAM into CATIA. One agenda at the Big Three is to bring suppliers into the 3D world. Perhaps if suppliers and students could be shown how 2D and 3D are related, they would be able to move more easily into the 3D world.

Mr. Kudzia suggested doing a draw class that looks at more than one system and compares systems, including Unigraphics, CATIA, and AutoCAD. Students would learn the concepts and the logic

behind the commands and be able to grasp what is different in each system and how they relate to each other. Mr. Khan responded that that could be done in a separate class outside the degree option.

Dr. Olivarez pointed out that we should not limit ourselves to the traditional 15-week courses. Perhaps a shorter course could be done to see if there is a need for it in industry. If the need exists, it could be developed into a full course.

Mr. Rhoder suggested that there is a need for a forum which would allow students to talk to people in the industry and receive suggestions from them. This could be done in the form of seminars, workshops, or sessions at the beginning or end of classes. This would help newer students make career decisions, such as what option to take. This could be made part of an early CAD class.

Mr. Khan responded that, in CAD 110, Introduction to Computer Aided Design and Drafting, he distributes a handout which describes the options and courses, and he talks about the options so that students understand what is involved in each. Perhaps students could be taken to the different labs to see demonstrations on Unigraphics and CATIA. Mr. Rhoder stressed the importance of having people from industry available for that kind of session.

Mr. Kudzia suggested the possibility of a yearly technology fair with industry coming in to show what they are working on with the various systems being taught on campus, so students can see firsthand where the technology is going.

Ms. Kalson reported that, on co-op day this year, six employers came in who were not doing interviews, but wanted to make themselves available to talk with students. This was helpful for the students. Ms. Kalson has a list of industry people who are willing to talk one-on-one with students. Students could be encouraged to call and talk with these people.

5. Employment Needs

Mr. Khan asked the group to comment on their employment needs.

Mr. Rhoder reported that Deneb Robotics is always looking for six to twelve people. It takes six to nine months to get them. They need people with an understanding of CAD, as well as of robots and programming. Their customers also look for the same type of person. Thirty to forty people with those qualifications could be hired immediately.

Committee members from Chrysler reported that the best possibility of entry level positions are with suppliers, not Chrysler itself. The suppliers are usually looking for people at various skill levels. A minimum of a two-year degree is needed to get a job at Chrysler.

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Mr. Figa reported that, at ITT Automotive, people are hired based on whether the CAD package they know is needed at the time. Experience also helps. They go through contract agencies to find people who know CATIA, and it is very hard to find people with those skills. They are even going to Europe to find CATIA people, since it has been in use in Europe longer than in the United States.

Mr. Harminder Grover reported that, at General Motors, they are looking for people who know Unigraphics and have two years of experience.

Advisory Committee Recommendations

1. That OCC attempt to find out whether there is a need for the Automotive/Industrial Modeling Option in industry.
2. That CAD 214, Kinematics, be added to the Automotive Body Design and Drafting Option.
3. That OCC explore the possibility of offering as one course the content of MEC 101 and MEC 102 which is needed by a body designer.
4. That a field trip/industry tour be made part of the standard syllabus for all CAD courses.
5. That one week in the MEC class be spent on fasteners.
6. That industry representatives be consulted about what kind of part students should be able to do after they finish each class, so students are learning what is needed by industry.
7. That steps be taken to provide an adequate amount of open lab time for students in all classes. That, if necessary, OCC consider the possibility of leasing training computers on Saturday and Sunday from Chrysler or another company for the use of students for open lab time.
8. That CAD 235, CAD Applications in Die Design, be added to the Body Design Option.
9. That additional instruction in finite element modeling be added to the Computer Aided Engineering Technology Option.
10. That a class in design simulation be added to the Computer Aided Engineering Technology Option.
11. That instruction in Draw Mode on CATIA be included in CAD 210.1, Three Dimensional Wire Frame Design and Surfacing.


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12. That OCC consider the possibility of including instruction in 2D-3D space integration in the CAD program.
13. That OCC consider the possibility of teaching such concepts as plan view, projections, and planes using CATIA, rather than in manual drafting classes.
14. That OCC consider offering a draw class that looks at more than one system and compares systems.
15. That OCC provide a forum for students to talk with people in the industry and receive career suggestions from them.
16. That OCC consider the possibility of holding a yearly technology fair with industry coming in to show students what they are doing with the systems taught on campus.

Respectfully submitted,



Ruth Springer

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