DISTRIBUTION

Gunther, B.	-	HL
Mason, J.	-	OR
Mergner, G.	-	OR
Miller, G.	-	AH
Mueller, M.	-	DO
Orlowski, M.	-	OR
Sam, D.	-	AH
Stanbrough, B.	-	RO
Steele, R.	-	OR
Sullivan, K.	-	RO
Swager, S.	-	OR
Warner, J.	-	DO
Zalapi, D.	-	HL

?

TO: DR. MCCALL DO.

PROCEEDINGS
Enrollment Services Board
94-195, July 14, 1994

The following board members were present: D. Sam, B. Stanbrough, R. Steele, J. Mason, D. Zalapi, M. Mueller, and M. McCall, chairman. Our guests were Marty Orlowski and Sarah Swager.

94-195.01 - creation of the residency review board. This matter was announced and it was noted that this is a crowning activity that is not to affect the way appeals for fees, refunds, and residencies are handled on the various campuses.

94-195.02 - M ty Orlowski presented a most invigorating report (see Attachment A) with regard to his dings of how and why students withdraw. The discussions led to the determination that the Enrollment Services Board would target three elements that Mr. Orlowski had isolated as part of our continuous improvement operating target. The following three seemed pertinent and were noted by a large number of students as reasons for leaving OCC classes: 1) "course too difficult"; (2) "course is not what I expected"; and, 3) "conflict with work". We thought we might be able to somehow influence one or more of these as a part of our continuous improvement work during the upcoming academic year.

The withdrawal form asks the question about "registration error" as a potential cause. It is determined that part of our responsibility will be to redesign the form for clarity because such a statement is not clear as to whether we are looking inward toward college operations or outward at student actions.

94-195.21 - Old Business: the add-a-seat standardized form. After concluding our discourse with Mr. Orlowski, we noticed that time was short, so the agenda was pushed.

The add-a-seat standardized form issue was raised, discussed and it was determined that we need only gain the signature of the faculty person on the forms that we now use. We will use the campus forms and not attempt to have a college-wide standard for this activity.

94-195.22 - catalog distribution. The chairman reminded the campus members that they are the campus authority in many things, but certainly with regard to catalog distribution. Many requests will come through them and such requests need to be evaluated as to whether or not merit is present for the use of the catalog as an administrative tool in that request.

94-195.23 - Mr. Chairman announced that he is attempting to increase the activity of gathering data so that our goal of measuring our process in the registration arena can be based on data that is collected during this time period. We wish to have a base floor of data from which to be able to determine that change/progress has been made with Touch*Tone telephone work, walk-in telephone work, and/or any combination thereof.

94-195.24 - college-wide service consistency mailing. It was noted that we wish that all campuses would mail course schedule documents promptly to any requesting student and not hesitate or hold up such activity. If there is any question about such matters, please consult your campus president.

94-195.25 - ASSET forms inventory. Chris Beacco was called in to discuss the storehouse full of forms which had been received from ACT. It was determined that Ms. Beacco will contact the campus ASSET coordinators with a copy of the form seeking to know whether or not supplies of that document were needed.

New Business

94-195.31 It was noted, as most people didn't need reminding, that the Admissions Team retreat is scheduled for Wednesday, July 20, at the Auburn Hills Hilton Suites, in the Pistons Room. An agenda is sought out, hopefully before the event takes place (see Attachment B).

94-195.33 - The chairman raised a question about the meeting schedule for next year having not found much evidence of special meetings of the Enrollment Services Board through the past academic year. He was reminded that they did meet in alternate months from the Academic Services Steering Committee. Theory is, this is what shall be scheduled for the next academic year.

The meeting ended with announcements that Auburn Hills will indeed move forward with a development of a central welcome center for students. This service combination process will be established in the B Building complex and will serve as a focal point to which students will be directed for any academic/support services they may need. We look forward to seeing how this model works and to learn if it projects the kind of atmosphere and friendly feeling that we wish to see more of in our environment.

David Sam noted that his responsibilities within the institution are changing and that he is leaving the Admissions/Recruitment Team. His duties will increase in the area of training and development as he applies the methods he has learned with regard to teamwork, team cooperation and spirit building to enhance the college human resources in that area. We wish him the best.

Oakland Community College
Preliminary Analysis of Student Withdrawal Surveys
(Calendar Year 1993)

The Office of Institutional Planning & Analysis analyzed students' responses to the Withdrawal Survey to determine predominant reasons for withdrawal from courses. We separated data into multiple categories (such as gender, ethnicity, time of withdrawal, complete withdrawal and age) to help with the analysis. The following statements represent some of the findings from this analysis.

Overall

Reason for Withdrawal	Number	Percent
Transportation Problems	637	4.8 %
Conflict with Work	4916	36.8 %
Moving from the Area	287	2.2 %
Financial Reasons	621	4.7 %
Conflict with Instructor	665	5.0 %
Medical Reasons	999	7.5 %
Child Care Problems	404	3.0 %
Registration Error	255	1.9 %
Course too Difficult	2023	15.2 %
Course too Easy	150	1.1 %
Course Scheduling Conflict	869	6.5 %
Personal Reasons	3690	27.6 %
Course is not what I Expected	1594	11.9 %
Other	1444	10.4 %

Gender

- The most cited reason for withdrawal for both men (43.9 %) and women (31.1 %) was "conflict with work."
- Women (16.5 %) were more likely than men (11.3%) to indicate that their "course was too difficult.".
- Women were more likely to cite "medical reasons" (9.6%), "child care problems" (4.6%), and "conflict with instructor" (5.6%) when compared to men (4.9%, 1.2%, and 4.3%, respectively).
- Both men (26.6%) and women (28.6%) cited "personal reasons" for withdrawal.

Ethnicity

- Minority students (10.1%) were more likely to indicate "problems with transportation" than non-minority students (3.9%).
- Non-minority students (38.6%) were more likely to cite "conflict with work" than minority students (31.5%).
- Minority students were more likely to indicate both "medical reasons" (8.9%) and "child care problems" (5.9%) when compared to non-minority respondents (7.5% and 2.7%, respectively).

Age

- Older students were more likely to cite "medical reasons" (13.6%) and "childcare problems" (4.6%) than younger students (5.5% and 1.5%, respectively).

- Younger students are more likely to withdraw because the "course was too difficult" (17.4%) and to indicate the "course was not what they expected" (13.7%) compared to older students (11.1% and 9.6%, respectively).

Time of Withdrawal

- The responses "course too difficult" (e.g. Fall term 11.5% in September compared to 22.3% in November), "conflict with instructor" (3.4% September, 8.2% November), and "personal reasons" (23.7% September, 32.4% November) were more frequent late in the term than earlier.

- The response "conflict with work" remained constant through the term (36.4% September, 39.6% October, 36.0% November).

100% Withdrawal

- "Conflict with work" is more likely to result in 100% withdrawal (41.4%) than partial withdrawal (33.7%).

- "Conflict with instructor" and "course too difficult" were more likely to result in partial withdrawal (6.2%, 19.4%) than complete withdrawal (3.3%, 9.2%).

Attachment "B"

Admission Retreat Agenda
July 20, 1994
Hilton Suites, Pistons Room

8:30 a.m.
Continental Repass

8:45 a.m.
Discussion Period I
a) Recruiter Ettiquette
b) Understanding the Catalog
c) Knowing Programs
d) Techniques (K. Urban)
- Q & A Tracking
- Data on Minorities
- Retention
- SASP
- Inquiry Responses
- Scholarship Info Process

11:00 a.m.
Interface with Carol Mack, Director of Admissions, U of M-Dearborn

12:10 p.m.
Lunch (interface continues), David Sam Recognition

1:30 p.m.
Carol Mack Interface Continues

3:30 p.m.
Organization/Operation/Schedule Issues
Programs to Cover
Annual Schedule of Anchor Events
a) Scholarship Operation
b) Counselor Luncheon
The Recruitment Plan

RELATED2 by ASSOC associate degree

RELATED2	Count / Row Pct / Col Pct / Tot Pct	ASSOC: not a reason 1	minor reason 2	major reason 3	Row Total
1.00		5	9	40	54
		9.3	16.7	74.1	30.0
		22.7	40.9	29.4	
		2.8	5.0	22.2	
2.00		8	4	42	54
		14.8	7.4	77.8	30.0
		36.4	18.2	30.9	
		4.4	2.2	23.3	
3.00		9	9	54	72
		12.5	12.5	75.0	40.0
		40.9	40.9	39.7	
		5.0	5.0	30.0	
Column Total		22	22	136	180
		12.2	12.2	75.6	100.0

Chi-Square	Value	DF	Significance
Pearson	2.64483	4	.61890
Likelihood Ratio	2.74093	4	.60207
Mantel-Haenszel test for linear association	.03292	1	.85602

Minimum Expected Frequency - 6.600

Statistic	Value	ASE1	Val/ASE0	Approximate Significance
Pearson's R	-.01356	.07213	-.18096	.85661 *4
Spearman Correlation	-.00220	.07427	-.02940	.97658 *4

*4 VAL/ASE0 is a t-value based on a normal approximation, as is the significance

Number of Missing Observations: 0

RELATED2 by CAREER Career in cad

RELATED2	Count / Row Pct / Col Pct / Tot Pct	CAREER: not a reason 1	minor reason 2	major reason 3	Row Total
1.00		3	6	44	53
		5.7	11.3	83.0	29.8
		33.3	27.3	29.9	
		1.7	3.4	24.7	
2.00		3	7	43	53
		5.7	13.2	81.1	29.8
		33.3	31.8	29.3	
		1.7	3.9	24.2	
3.00		3	9	60	72
		4.2	12.5	83.3	40.4
		33.3	40.9	40.8	
		1.7	5.1	33.7	
Column Total		9	22	147	178
		5.1	12.4	82.6	100.0

Chi-Square	Value	DF	Significance
Pearson	.28710	4	.99063
Likelihood Ratio	.29221	4	.99031
Mantel-Haenszel test for linear association	.04734	1	.82775

Minimum Expected Frequency - 2.680
Cells with Expected Frequency < 5 - 3 OF 9 (33.3%)

Statistic	Value	ASE1	Val/ASE0	Approximate Significance
Pearson's R	.01635	.07406	.21700	.82846 *4
Spearman Correlation	.00928	.07401	.12317	.90212 *4

*4 VAL/ASE0 is a t-value based on a normal approximation, as is the significance

Number of Missing Observations: 2

RELATED2 by CERT certificate in cad

RELATED2	Count / Row Pct / Col Pct / Tot Pct	CERT: not a reason 1	minor reason 2	major reason 3	Row Total
1.00		17	11	26	54
		31.5	20.4	48.1	30.2
		23.3	32.4	36.1	
		9.5	6.1	14.5	
2.00		24	9	21	54
		44.4	16.7	38.9	30.2
		32.9	26.5	29.2	
		13.4	5.0	11.7	
3.00		32	14	25	71
		45.1	19.7	35.2	39.7
		43.8	41.2	34.7	
		17.9	7.8	14.0	
Column Total		73	34	72	179
		40.8	19.0	40.2	100.0

Chi-Square	Value	DF	Significance
Pearson	3.18104	4	.52800
Likelihood Ratio	3.23854	4	.51873
Mantel-Haenszel test for linear association	2.51694	1	.11263

Minimum Expected Frequency - 10.257

Statistic	Value	ASE1	Val/ASE0	Approximate Significance
Pearson's R	-.11891	.07341	-1.59333	.11287 *4
Spearman Correlation	-.11700	.07352	-1.56728	.11883 *4

*4 VAL/ASE0 is a t-value based on a normal approximation, as is the significance

Number of Missing Observations: 1

RELATED2 by RAISE improve chances for raise or promotion

RELATED2	RAISE			
Count / Row Pct / Col Pct / Tot Pct	not a reason 1	minor reason 2	major reason 3	Row Total
1.00	29	12	13	54
	53.7	22.2	24.1	30.2
	46.8	22.6	20.3	
	16.2	6.7	7.3	
2.00	15	21	17	53
	28.3	39.6	32.1	29.6
	24.2	39.6	26.6	
	8.4	11.7	9.5	
3.00	18	20	34	72
	25.0	27.8	47.2	40.2
	29.0	37.7	53.1	
	10.1	11.2	19.0	
Column Total	62	53	64	179
	34.6	29.6	35.8	100.0

Chi-Square	Value	DF	Significance
Pearson	15.99335	4	.00303
Likelihood Ratio	15.37583	4	.00398
Mantel-Haenszel test for linear association	11.50439	1	.00069

Minimum Expected Frequency - 15.693

Statistic	Value	ASE1	Val/ASE0	Approximate Significance
Pearson's R	.25423	.07326	3.49717	.00059 *4
Spearman Correlation	.25212	.07333	3.46621	.00066 *4

*4 VAL/ASE0 is a t-value based on a normal approximation, as is the significance

Number of Missing Observations: 1

RELATED2 by REQUIRE employer request

RELATED2	Count / Row Pct / Col Pct / Tot Pct	REQUIRE: not a reason 1	minor reason 2	major reason 3	Row Total
1.00		40 74.1 34.2 22.3	13 24.1 26.5 7.3	1 1.9 7.7 .6	54 30.2
2.00		33 62.3 28.2 18.4	16 30.2 32.7 8.9	4 7.5 30.8 2.2	53 29.6
3.00		44 61.1 37.6 24.6	20 27.8 40.8 11.2	8 11.1 61.5 4.5	72 40.2
Column Total		117 65.4	49 27.4	13 7.3	179 100.0

Chi-Square	Value	DF	Significance
Pearson	4.92746	4	.29482
Likelihood Ratio	5.63798	4	.22786
Mantel-Haenszel test for linear association	3.73117	1	.05341

Minimum Expected Frequency - 3.849
Cells with Expected Frequency < 5 - 2 OF 9 (22.2%)

Statistic	Value	ASE1	Val/ASE0	Approximate Significance
Pearson's R	.14478	.06849	1.94670	.05315 *4
Spearman Correlation	.12516	.07186	1.67829	.09506 *4

*4 VAL/ASE0 is a t-value based on a normal approximation, as is the significance

Number of Missing Observations: 1

RELATED2 by SKILLS improve skills for present job

RELATED2	Count / Row Pct / Col Pct / Tot Pct	SKILLS: not a reason 1	minor reason 2	major reason 3	Row Total
1.00		34	13	7	54
		63.0	24.1	13.0	30.2
		51.5	26.0	11.1	
		19.0	7.3	3.9	
2.00		10	19	24	53
		18.9	35.8	45.3	29.6
		15.2	38.0	38.1	
		5.6	10.6	13.4	
3.00		22	18	32	72
		30.6	25.0	44.4	40.2
		33.3	36.0	50.8	
		12.3	10.1	17.9	
Column Total		66	50	63	179
		36.9	27.9	35.2	100.0

Chi-Square	Value	DF	Significance
Pearson	27.97284	4	.00001
Likelihood Ratio	29.38853	4	.00001
Mantel-Haenszel test for linear association	15.46571	1	.00008

Minimum Expected Frequency - 14.804

Statistic	Value	ASE1	Val/ASE0	Approximate Significance
Pearson's R	.29476	.07015	4.10392	.00006 *4
Spearman Correlation	.28437	.07220	3.94618	.00011 *4

*4 VAL/ASE0 is a t-value based on a normal approximation, as is the significance

Number of Missing Observations: 1

RELATED2 by TRANSFER courses needed to transfer

RELATED2	Count / Row Pct / Col Pct / Tot Pct	TRANSFER not a reason 1	TRANSFER minor reason 2	TRANSFER major reason 3	Row Total
1.00		31	9	14	54
		57.4	16.7	25.9	30.0
		32.0	20.5	35.9	
		17.2	5.0	7.8	
2.00		30	14	10	54
		55.6	25.9	18.5	30.0
		30.9	31.8	25.6	
		16.7	7.8	5.6	
3.00		36	21	15	72
		50.0	29.2	20.8	40.0
		37.1	47.7	38.5	
		20.0	11.7	8.3	
Column Total		97	44	39	180
		53.9	24.4	21.7	100.0

Chi-Square	Value	DF	Significance
Pearson	3.11784	4	.53830
Likelihood Ratio	3.23638	4	.51907
Mantel-Haenszel test for linear association	.03980	1	.84186

Minimum Expected Frequency - 11.700

Statistic	Value	ASE1	Val/ASE0	Approximate Significance
Pearson's R	.01491	.07629	.19898	.84251 *4
Spearman Correlation	.03135	.07593	.41844	.67613 *4

*4 VAL/ASE0 is a t-value based on a normal approximation, as is the significance

Number of Missing Observations: 0

RELATED2 by TWOPLUS two plus two prog. in engineering

RELATED2	Count / Row Pct / Col Pct / Tot Pct	TWOPLUS not a reason 1	minor reason 2	major reason 3	Row Total
1.00		31	13	10	54
		57.4	24.1	18.5	30.3
		31.6	27.1	31.3	
		17.4	7.3	5.6	
2.00		30	11	12	53
		56.6	20.8	22.6	29.8
		30.6	22.9	37.5	
		16.9	6.2	6.7	
3.00		37	24	10	71
		52.1	33.8	14.1	39.9
		37.8	50.0	31.3	
		20.8	13.5	5.6	
Column Total		98	48	32	178
		55.1	27.0	18.0	100.0

Chi-Square	Value	DF	Significance
Pearson	3.59406	4	.46372
Likelihood Ratio	3.57426	4	.46668
Mantel-Haenszel test for linear association	.00125	1	.97178

Minimum Expected Frequency - 9.528

Statistic	Value	ASE1	Val/ASE0	Approximate Significance
Pearson's R	.00266	.07323	.03527	.97190 *4
Spearman Correlation	.01749	.07394	.23203	.81679 *4

*4 VAL/ASE0 is a t-value based on a normal approximation, as is the significance

Number of Missing Observations: 2

File: SPSS/PC+ System File Written by Data Entry II

EMPLOYED employment status by CERT certificate in cad

CERT Page 1 of 1

EMPLOYED	not a reason 1	minor reason 2	major reason 3	Row Total
1 full-time employ	Count 63 Row Pct 39.4 Col Pct 72.4 Tot Pct 30.0	31 19.4 79.5 14.8	66 41.3 78.6 31.4	160 76.2
2 part-time employ	10 52.6 11.5 4.8	3 15.8 7.7 1.4	6 31.6 7.1 2.9	19 9.0
3 unemployed, acti	13 56.5 14.9 6.2	3 13.0 7.7 1.4	7 30.4 8.3 3.3	23 11.0
4 unemployed, not	1 12.5 1.1 .5	2 25.0 5.1 1.0	5 62.5 6.0 2.4	8 3.8
Column Total	87 41.4	39 18.6	84 40.0	210 100.0

Chi-Square	Value	DF	Significance
Pearson	6.24840	6	.39595
Likelihood Ratio	6.64518	6	.35491
Mantel-Haenszel test for linear association	.06265	1	.80236

Minimum Expected Frequency - 1.486
Cells with Expected Frequency < 5 - 5 OF 12 (41.7%)

Number of Missing Observations: 0

File: SPSS/PC+ System File Written by Data Entry II

EMPLOYED employment status by CAREER Career in cad

CAREER Page 1 of 1

EMPLOYED	not a reason 1	minor reason 2	major reason 3	Row Total
1 full-time employ	9 5.7 90.0 4.3	20 12.7 83.3 9.6	129 81.6 74.1 62.0	158 76.0
2 part-time employ		2 10.5 8.3 1.0	17 89.5 9.8 8.2	19 9.1
3 unemployed, acti	1 4.3 10.0 .5	2 8.7 8.3 1.0	20 87.0 11.5 9.6	23 11.1
4 unemployed, not			8 100.0 4.6 3.8	8 3.8
Column Total	10 4.8	24 11.5	174 83.7	208 100.0

Chi-Square	Value	DF	Significance
Pearson	3.27900	6	.77310
Likelihood Ratio	5.47952	6	.48394
Mantel-Haenszel test for linear association	2.03488	1	.15373

Minimum Expected Frequency - .385
Cells with Expected Frequency < 5 - 6 OF 12 (50.0%)

Number of Missing Observations: 2

File: SPSS/PC+ System File Written by Data Entry II

EMPLOYED employment status by RAISE improve chances for raise or promotion

RAISE Page 1 of 1

EMPLOYED	not a reason 1	minor reason 2	major reason 3	Row Total
1 full-time employ	47 29.6 58.0 22.6	49 30.8 86.0 23.6	63 39.6 90.0 30.3	159 76.4
2 part-time employ	15 78.9 18.5 7.2	4 21.1 7.0 1.9		19 9.1
3 unemployed, acti	15 68.2 18.5 7.2	2 9.1 3.5 1.0	5 22.7 7.1 2.4	22 10.6
4 unemployed, not	4 50.0 4.9 1.9	2 25.0 3.5 1.0	2 25.0 2.9 1.0	8 3.8
Column Total	81 38.9	57 27.4	70 33.7	208 100.0

Chi-Square	Value	DF	Significance
Pearson	29.18480	6	.00006
Likelihood Ratio	34.16386	6	.00001
Mantel-Haenszel test for linear association	12.78491	1	.00035

Minimum Expected Frequency - 2.192
Cells with Expected Frequency < 5 - 3 OF 12 (25.0%)

Number of Missing Observations: 2

File: SPSS/PC+ System File Written by Data Entry II

EMPLOYED employment status by REQUIRE employer request

REQUIRE Page 1 of 1

EMPLOYED	not a reason 1	minor reason 2	major reason 3	Row Total
1 full-time employ	99 62.3 70.7 47.4	47 29.6 90.4 22.5	13 8.2 76.5 6.2	159 76.1
2 part-time employ	17 89.5 12.1 8.1	2 10.5 3.8 1.0		19 9.1
3 unemployed, acti	19 82.6 13.6 9.1	1 4.3 1.9 .5	3 13.0 17.6 1.4	23 11.0
4 unemployed, not	5 62.5 3.6 2.4	2 25.0 3.8 1.0	1 12.5 5.9 .5	8 3.8
Column Total	140 67.0	52 24.9	17 8.1	209 100.0

Chi-Square	Value	DF	Significance
Pearson	12.11051	6	.05955
Likelihood Ratio	15.75868	6	.01511
Mantel-Haenszel test for linear association	1.25944	1	.26176

Minimum Expected Frequency - .651
Cells with Expected Frequency < 5 - 5 OF 12 (41.7%)

Number of Missing Observations: 1

File: SPSS/PC+ System File Written by Data Entry II

EMPLOYED employment status by SKILLS improve skills for present job

SKILLS Page 1 of 1

EMPLOYED	not a reason 1	minor reason 2	major reason 3	Row Total
1 full-time employ	52	46	61	159
	32.7	28.9	38.4	76.1
	59.1	82.1	93.8	
	24.9	22.0	29.2	
2 part-time employ	14	4	1	19
	73.7	21.1	5.3	9.1
	15.9	7.1	1.5	
	6.7	1.9	.5	
3 unemployed, acti	16	5	2	23
	69.6	21.7	8.7	11.0
	18.2	8.9	3.1	
	7.7	2.4	1.0	
4 unemployed, not	6	1	1	8
	75.0	12.5	12.5	3.8
	6.8	1.8	1.5	
	2.9	.5	.5	
Column Total	88	56	65	209
	42.1	26.8	31.1	100.0

Chi-Square	Value	DF	Significance
Pearson	26.72473	6	.00016
Likelihood Ratio	29.03653	6	.00006
Mantel-Haenszel test for linear association	20.33947	1	.00001

Minimum Expected Frequency - 2.144
Cells with Expected Frequency < 5 - 3 OF 12 (25.0%)

Number of Missing Observations: 1

File: SPSS/PC+ System File Written by Data Entry II

EMPLOYED employment status by TRANSFER courses needed to transfer

TRANSFER Page 1 of 1

EMPLOYED	not a reason 1	minor reason 2	major reason 3	Row Total
1 full-time employ	82 51.3 72.6 39.0	44 27.5 86.3 21.0	34 21.3 73.9 16.2	160 76.2
2 part-time employ	14 73.7 12.4 6.7		5 26.3 10.9 2.4	19 9.0
3 unemployed, acti	13 56.5 11.5 6.2	5 21.7 9.8 2.4	5 21.7 10.9 2.4	23 11.0
4 unemployed, not	4 50.0 3.5 1.9	2 25.0 3.9 1.0	2 25.0 4.3 1.0	8 3.8
Column Total	113 53.8	51 24.3	46 21.9	210 100.0

Chi-Square	Value	DF	Significance
Pearson	7.23598	6	.29957
Likelihood Ratio	11.67031	6	.06974
Mantel-Haenszel test for linear association	.07092	1	.79000

Minimum Expected Frequency - 1.752
Cells with Expected Frequency < 5 - 5 OF 12 (41.7%)

Number of Missing Observations: 0

File: SPSS/PC+ System File Written by Data Entry II

EMPLOYED employment status by TWOPLUS two plus two prog. in engineering

TWOPLUS Page 1 of 1

EMPLOYED	not a reason 1	minor reason 2	major reason 3	Row Total
1 full-time employ	86	44	28	158
	54.4	27.8	17.7	76.3
	73.5	86.3	71.8	
	41.5	21.3	13.5	
2 part-time employ	12	3	4	19
	63.2	15.8	21.1	9.2
	10.3	5.9	10.3	
	5.8	1.4	1.9	
3 unemployed, acti	16	2	5	23
	69.6	8.7	21.7	11.1
	13.7	3.9	12.8	
	7.7	1.0	2.4	
4 unemployed, not	3	2	2	7
	42.9	28.6	28.6	3.4
	2.6	3.9	5.1	
	1.4	1.0	1.0	
Column Total	117	51	39	207
	56.5	24.6	18.8	100.0

Chi-Square	Value	DF	Significance
Pearson	5.48384	6	.48341
Likelihood Ratio	6.25499	6	.39524
Mantel-Haenszel test for linear association	.00415	1	.94861

Minimum Expected Frequency - 1.319
Cells with Expected Frequency < 5 - 6 OF 12 (50.0%)

Number of Missing Observations: 3

File: SPSS/PC+ System File Written by Data Entry II

EMPLOYED employment status by ASSOC associate degree

ASSOC Page 1 of 1

EMPLOYED	not a reason 1	minor reason 2	major reason 3	Row Total
1 full-time employ	22 13.8 88.0 10.5	20 12.5 71.4 9.5	118 73.8 75.2 56.2	160 76.2
2 part-time employ		2 10.5 7.1 1.0	17 89.5 10.8 8.1	19 9.0
3 unemployed, acti	1 4.3 4.0 .5	6 26.1 21.4 2.9	16 69.6 10.2 7.6	23 11.0
4 unemployed, not	2 25.0 8.0 1.0		6 75.0 3.8 2.9	8 3.8
Column Total	25 11.9	28 13.3	157 74.8	210 100.0

Chi-Square	Value	DF	Significance
Pearson	9.69840	6	.13794
Likelihood Ratio	12.44486	6	.05275
Mantel-Haenszel test for linear association	.13577	1	.71252

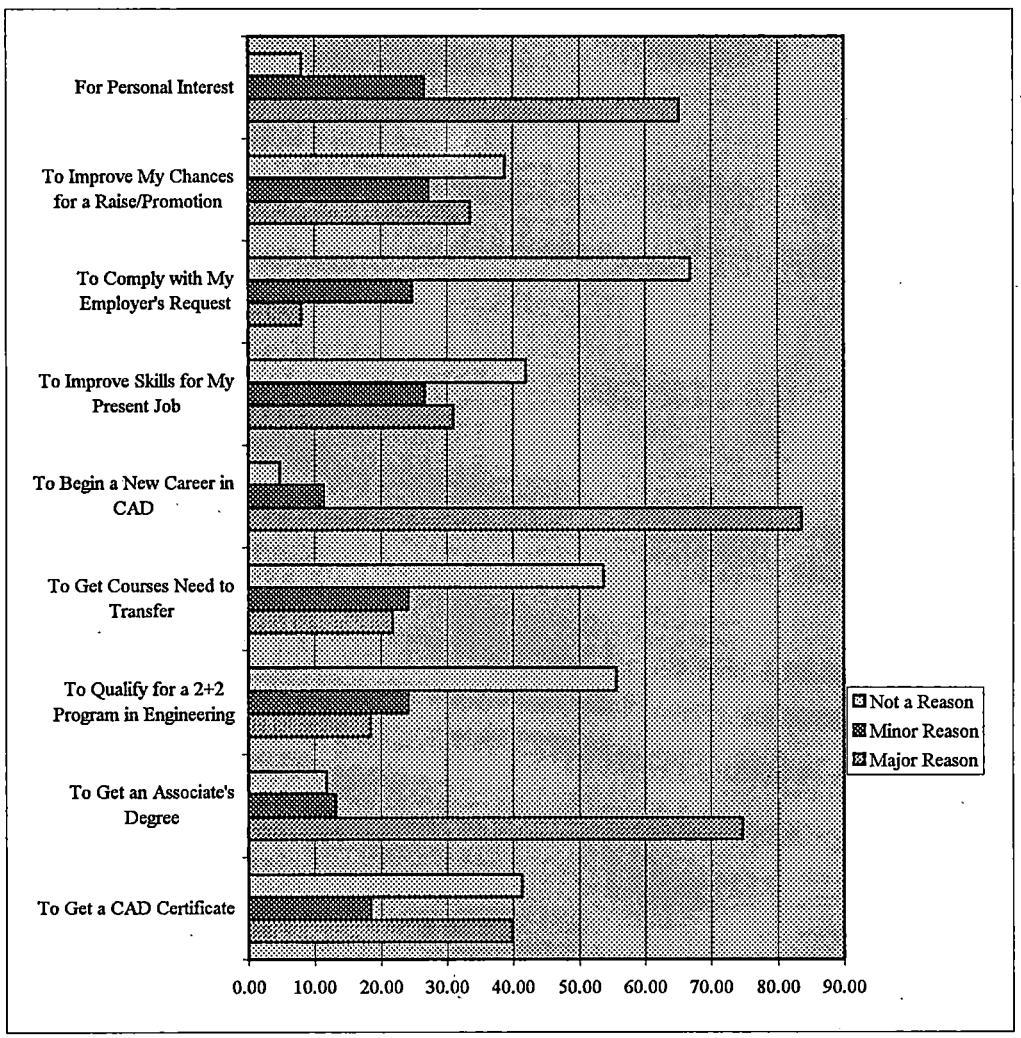
Minimum Expected Frequency - .952
Cells with Expected Frequency < 5 - 6 OF 12 (50.0%)

Number of Missing Observations: 0

Table 11

Why Did You Enroll in CAD Courses at OCC?

Student Responses	*Major Reason*	*Minor Reason*	*Not a Reason*
To Get a CAD Certificate	40.00	18.60	41.40
To Get an Associate's Degree	74.80	13.30	11.90
To Qualify for a 2+2 Program	18.60	24.30	55.70
To Get Courses Need to Transf	21.90	24.30	53.80
To Begin a New Career in CA	83.70	11.50	4.80
To Improve Skills for My Prese	31.10	26.80	42.10
To Comply with My Employer'	8.10	24.90	67.00
To Improve My Chances for a	33.70	27.40	38.90
For Personal Interest	65.20	26.70	8.10

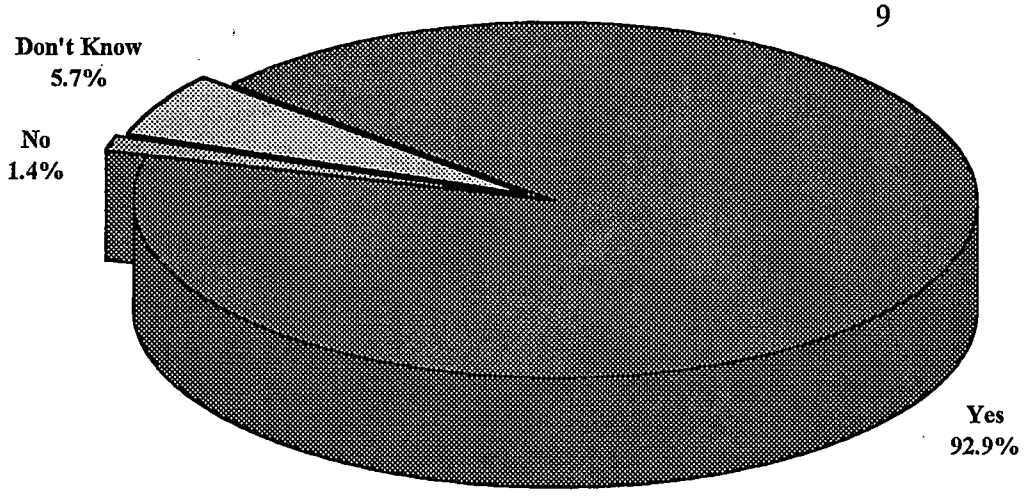


Source: OCC, Office of Institutional Planning & Analysis: Employer Survey.

Is a CAD option in Computer Aided Engineering a Good Idea?

Student Response	*Number*	*Percent*
Yes	195	92.9
No	3	1.4
Don't Know	12	5.7
Total	210	100.0

Figure 15



Source: OCC, Office of Institutional Planning & Analysis: Employer Survey.

Aero Detroit, Inc.
Dave Shelbo
Director of Engineering
1100 E. Mandoline
Madison Heights, MI 48071
583-4900
Fax: 583-4733

Automotive Products, Inc.
Al Stone
Total Quality Management
Facilitator
Automotive Products (USA) Inc.
4000 Pinnacle Court
Auburn Hills, MI 48326-1754
377-6999
Fax: 377-4936

Brothers Industries
Jim Carr
Chief Engineer
32471 Industrial Drive
Madison Heights, MI 48071
588-8090
Fax: 588-8030

Cargill Detroit Corporation
Ken Allison
Vice President Engineering
1250 Crooks Road
Clawson, MI 48017
Empl-200
435-3500

Chrysler Center/OCC
Steven Ward
Chrysler Corporation
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800 Chrysler Drive East
Auburn Hills, MI 48236-2757
576-5894

CMI Inc.
Peter Curcio
Director Human Resources
CMI-Southfield, Inc.
26290 West 8 Mile
Southfield, MI 48034

CMI Inc.
Jo Anne Sturdevant
Human Resources
CMI - Tech Center, Inc.
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Ferndale, MI 48220

D.M.E. Company
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CIM/CAE Systems Leader
29111 Stephenson Highway
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Senior Engineer
Engineering Technology
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589-4577

Fibercraft Descon
Pat Carr
Human Resources
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853-0330
Fax: 853-8830

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Vice President, Engineering
Forming Technology Division
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Administrator
GM Truck and Bus
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597-3959
Fax: 597-7608

Rich Stoey or Joe Ptak
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GM Design Staff
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Warren, MI 48090-9030
986-4675

Leon Streit or Ken Rogus
Design Staff
Cadillac Luxury Car Division
4100 S. Saginaw Street
Flint, MI 48557
Mail Drop A42
236-1276/236-2837

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General Motors
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7000 Chicago Road
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492-1023
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Laserform, Inc.
David Tait
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Auburn Hills, MI 48326
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Masotech Engineering
Clif Tally
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14661 Rotunda Drive
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248-2896

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Nissan Research and Development
Edward W. Anderson
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Patents & Communication
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Saturn Corporation
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UAW
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Chairman Engineer Unit
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Warren, MI 48091-1373
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Sample Survey Questions

	Yes	No
Do you know what the identity standards are?	____	____
Do you follow the standards?	____	____

If not, why not? _____

Are there areas of the Identity Standards that are confusing or need more clarification? ____ ____

If yes, what areas? ___ Section I ___Section II ___Section III
__ other or more detail _____

Do you use Graphics Services? ____ ____

If yes, how often? _____/ week _____/month _____/year

What services of the Graphics Dept. do you use?
___ brochures ___ flyers/posters ___books/manuals ___ forms
___ certificates ___ class schedule info ___ invitations/postcards ___ other

Are you aware that the Graphics Dept. also does:
___ photography ___ slide presentations ___exhibit/displays
___ full color design/printing ___ design/marketing consultation

If you do not use the Graphic Dept. services, is it due to one of the following:
___ unaware of services ___cost/budget ___time factor ___distance ___delivery
___other (explain)_____

TIMELINE FOR ACCOMPLISHING TASKS:

Activities	September	October	November	December
Develop Survey	X			
Administer Survey	X			
Conduct Focus Group Interviews		X		
Conduct Student Interviews		X		
Analyze Results			X	
Prepare Recommendations				X

DEPARTMENT CHAIR MEETING SCHEDULES:

Auburn Hills

10 persons
Once per semester

Highland Lakes

8 persons
Bimonthly as needed

Orchard Ridge

14 persons
Monthly

Southfield/Royal Oak

8 persons
Bi-weekly

RECRUITMENT/ENROLLMENT STAFF:

9-10 persons
Meet monthly

EVENTS PLANNERS:

4-6 per campus
No regular meetings

STUDENT ACTIVITIES:

4 persons
Meet monthly

ISSUES TO BE ADDRESSED:

Survey

Do people know about the identity standards?
Do they follow the standards?
    If not, why not?
Do they use Graphics Services?
    How often?
    What services do they use?
    If none, why not?

Focus Groups

Who follows identity standards?
    If not, why not?
What can the College do to encourage their use?
Do they use Graphics Services?
    How often?
    For what?
    If not, why not?
What can Graphics do to be more useful?

Group Interviews

How do we make sure students know about identity standards?
Do they know about them now?
Do they know who is responsible for compliance with standards?
Do they adhere to standards?
    If not, why not?
How much do they use the College's Graphics Services?
What other graphics services do they use?
    Why?

Reasons for Withdrawal by Gender (Calendar Year 1993)

	Students gender			
	Female		Male	
	Count	Count Percent	Count	Count Percent
Transportation problems				
No	6959	95.6%	5598	94.7%
Yes	318	4.4%	315	5.3%
Total	7277	100.0%	5913	100.0%
Conflict with work				
No	5012	68.9%	3315	56.1%
Yes	2265	31.1%	2598	43.9%
Total	7277	100.0%	5913	100.0%
Moving out of the area				
No	7133	98.0%	5775	97.7%
Yes	144	2.0%	138	2.3%
Total	7277	100.0%	5913	100.0%
Financial reasons				
No	6946	95.5%	5634	95.3%
Yes	331	4.5%	279	4.7%
Total	7277	100.0%	5913	100.0%
Conflict with instructor				
No	6873	94.4%	5659	95.7%
Yes	404	5.6%	254	4.3%
Total	7277	100.0%	5913	100.0%

Reasons for Withdrawal by Gender (Calendar Year 1993)

	Students gender			
	Female		Male	
	Count	Count Percent	Count	Count Percent
Medical reasons				
No	6575	90.4%	5624	95.1%
Yes	702	9.6%	289	4.9%
Total	7277	100.0%	5913	100.0%
Child care problems				
No	6945	95.4%	5845	98.8%
Yes	332	4.6%	68	1.2%
Total	7277	100.0%	5913	100.0%
Registration error				
No	7134	98.0%	5805	98.2%
Yes	143	2.0%	108	1.8%
Total	7277	100.0%	5913	100.0%
Course too difficult				
No	6079	83.5%	5110	86.4%
Yes	1198	16.5%	803	13.6%
Total	7277	100.0%	5913	100.0%
Course too easy				
No	7199	98.9%	5844	98.8%
Yes	78	1.1%	69	1.2%
Total	7277	100.0%	5913	100.0%

Reasons for Withdrawal by Gender (Calendar Year 1993)

	Students gender			
	Female		Male	
	Count	Count Percent	Count	Count Percent
Course scheduling conflict				
No	6787	93.3%	5548	93.8%
Yes	490	6.7%	365	6.2%
Total	7277	100.0%	5913	100.0%
Personal reasons				
No	5198	71.4%	4341	73.4%
Yes	2079	28.6%	1572	26.6%
Total	7277	100.0%	5913	100.0%
Course was not what I expected				
No	6360	87.4%	5246	88.7%
Yes	917	12.6%	667	11.3%
Total	7277	100.0%	5913	100.0%
Other reason				
No	6398	87.9%	5367	90.8%
Yes	879	12.1%	546	9.2%
Total	7277	100.0%	5913	100.0%

Reasons for Withdrawal by Race (Calendar Year 1993)

	Students race/ethnicity			
	Minority		Non-Minority	
	Count	Count Percent	Count	Count Percent
Transportation problems				
No	1670	89.9%	8836	96.1%
Yes	188	10.1%	357	3.9%
Total	1858	100.0%	9193	100.0%
Conflict with work				
No	1272	68.5%	5643	61.4%
Yes	586	31.5%	3550	38.6%
Total	1858	100.0%	9193	100.0%
Moving out of the area				
No	1830	98.5%	8987	97.8%
Yes	28	1.5%	206	2.2%
Total	1858	100.0%	9193	100.0%
Financial reasons				
No	1770	95.3%	8768	95.4%
Yes	88	4.7%	425	4.6%
Total	1858	100.0%	9193	100.0%
Conflict with instructor				
No	1786	96.1%	8714	94.8%
Yes	72	3.9%	479	5.2%
Total	1858	100.0%	9193	100.0%

Reasons for Withdrawal by Race (Calendar Year 1993)

	Students race/ethnicity			
	Minority		Non-Minority	
	Count	Count Percent	Count	Count Percent
Medical reasons				
No	1692	91.1%	8506	92.5%
Yes	166	8.9%	687	7.5%
Total	1858	100.0%	9193	100.0%
Child care problems				
No	1749	94.1%	8943	97.3%
Yes	109	5.9%	250	2.7%
Total	1858	100.0%	9193	100.0%
Registration error				
No	1811	97.5%	9041	98.3%
Yes	47	2.5%	152	1.7%
Total	1858	100.0%	9193	100.0%
Course too difficult				
No	1557	83.8%	7843	85.3%
Yes	301	16.2%	1350	14.7%
Total	1858	100.0%	9193	100.0%
Course too easy				
No	1843	99.2%	9090	98.9%
Yes	15	.8%	103	1.1%
Total	1858	100.0%	9193	100.0%

Reasons for Withdrawal by Race (Calendar Year 1993)

	Students race/ethnicity			
	Minority		Non-Minority	
	Count	Count Percent	Count	Count Percent
Course scheduling conflict				
No	1710	92.0%	8625	93.8%
Yes	148	8.0%	568	6.2%
Total	1858	100.0%	9193	100.0%
Personal reasons				
No	1354	72.9%	6617	72.0%
Yes	504	27.1%	2576	28.0%
Total	1858	100.0%	9193	100.0%
Course was not what I expected				
No	1668	89.8%	8086	88.0%
Yes	190	10.2%	1107	12.0%
Total	1858	100.0%	9193	100.0%
Other reason				
No	1689	90.9%	8173	88.9%
Yes	169	9.1%	1020	11.1%
Total	1858	100.0%	9193	100.0%

Reasons for Withdrawal by Age (Calendar Year 1993)

	AGE					
	25 and under		26 to 35		36 and older	
	Count	Count Percent	Count	Count Percent	Count	Count Percen
Transportation problems						
No	7735	94.3%	3019	96.0%	1790	97.8
Yes	465	5.7%	126	4.0%	40	2.2
Total	8200	100.0%	3145	100.0%	1830	100.0
Conflict with work						
No	5272	64.3%	1879	59.7%	1165	63.7
Yes	2928	35.7%	1266	40.3%	665	36.3
Total	8200	100.0%	3145	100.0%	1830	100.0
Moving out of the area						
No	8022	97.8%	3072	97.7%	1802	98.5
Yes	178	2.2%	73	2.3%	28	1.5
Total	8200	100.0%	3145	100.0%	1830	100.0
Financial reasons						
No	7770	94.8%	3019	96.0%	1780	97.3
Yes	430	5.2%	126	4.0%	50	2.7
Total	8200	100.0%	3145	100.0%	1830	100.0
Conflict with instructor						
No	7756	94.6%	3005	95.5%	1758	96.1
Yes	444	5.4%	140	4.5%	72	3.9
Total	8200	100.0%	3145	100.0%	1830	100.0

Reasons for Withdrawal by Age (Calendar Year 1993)

	AGE					
	25 and under		26 to 35		36 and older	
	Count	Count Percent	Count	Count Percent	Count	Count Percen
Medical reasons						
No	7747	94.5%	2860	90.9%	1582	86.4
Yes	453	5.5%	285	9.1%	248	13.6
Total	8200	100.0%	3145	100.0%	1830	100.0
Child care problems						
No	8074	98.5%	2957	94.0%	1745	95.4
Yes	126	1.5%	188	6.0%	85	4.6
Total	8200	100.0%	3145	100.0%	1830	100.0
Registration error						
No	8049	98.2%	3082	98.0%	1793	98.0
Yes	151	1.8%	63	2.0%	37	2.0
Total	8200	100.0%	3145	100.0%	1830	100.0
Course too difficult						
No	6774	82.6%	2774	88.2%	1626	88.9
Yes	1426	17.4%	371	11.8%	204	11.1
Total	8200	100.0%	3145	100.0%	1830	100.0
Course too easy						
No	8090	98.7%	3117	99.1%	1821	99.5
Yes	110	1.3%	28	.9%	9	.5
Total	8200	100.0%	3145	100.0%	1830	100.0

Reasons for Withdrawal by Age (Calendar Year 1993)

	AGE					
	25 and under		26 to 35		36 and older	
	Count	Count Percent	Count	Count Percent	Count	Count Percen
Course scheduling conflict						
No	7657	93.4%	2943	93.6%	1720	94.0
Yes	543	6.6%	202	6.4%	110	6.0
Total	8200	100.0%	3145	100.0%	1830	100.0
Personal reasons						
No	5811	70.9%	2389	76.0%	1329	72.6
Yes	2389	29.1%	756	24.0%	501	27.4
Total	8200	100.0%	3145	100.0%	1830	100.0
Course was not what I expected						
No	7073	86.3%	2863	91.0%	1655	90.4
Yes	1127	13.7%	282	9.0%	175	9.6
Total	8200	100.0%	3145	100.0%	1830	100.0
Other reason						
No	7400	90.2%	2760	87.8%	1591	86.9
Yes	800	9.8%	385	12.2%	239	13.1
Total	8200	100.0%	3145	100.0%	1830	100.0

Reasons for Withdrawal Fall 1993 Term

	Month of withdrawal		
	September	October	November
	Count Percent	Count Percent	Count Percent
Transportation problems			
No	95.9%	95.5%	95.7%
Yes	4.1%	4.5%	4.3%
Total	100.0%	100.0%	100.0%
Conflict with work			
No	63.6%	60.4%	64.0%
Yes	36.4%	39.6%	36.0%
Total	100.0%	100.0%	100.0%
Moving out of the area			
No	98.1%	97.5%	97.5%
Yes	1.9%	2.5%	2.5%
Total	100.0%	100.0%	100.0%
Financial reasons			
No	94.8%	95.1%	96.3%
Yes	5.2%	4.9%	3.7%
Total	100.0%	100.0%	100.0%
Conflict with instructor			
No	96.6%	95.1%	91.8%
Yes	3.4%	4.9%	8.2%
Total	100.0%	100.0%	100.0%

Reasons for Withdrawal Fall 1993 Term

	Month of withdrawal		
	September	October	November
	Count Percent	Count Percent	Count Percent
Medical reasons			
No	93.8%	91.9%	92.5%
Yes	6.3%	8.1%	7.5%
Total	100.0%	100.0%	100.0%
Child care problems			
No	96.7%	96.8%	98.1%
Yes	3.3%	3.2%	1.9%
Total	100.0%	100.0%	100.0%
Registration error			
No	97.6%	99.2%	98.9%
Yes	2.4%	.8%	1.1%
Total	100.0%	100.0%	100.0%
Course too difficult			
No	88.5%	81.7%	77.7%
Yes	11.5%	18.3%	22.3%
Total	100.0%	100.0%	100.0%
Course too easy			
No	98.4%	98.1%	99.2%
Yes	1.6%	1.9%	.8%
Total	100.0%	100.0%	100.0%

Reasons for Withdrawal Fall 1993 Term

	Month of withdrawal		
	September	October	November
	Count Percent	Count Percent	Count Percent
Course scheduling conflict			
No	91.8%	94.6%	95.4%
Yes	8.2%	5.4%	4.6%
Total	100.0%	100.0%	100.0%
Personal reasons			
No	76.3%	72.5%	67.6%
Yes	23.7%	27.5%	32.4%
Total	100.0%	100.0%	100.0%
Course was not what I expected			
No	84.0%	85.8%	86.7%
Yes	16.0%	14.2%	13.3%
Total	100.0%	100.0%	100.0%
Other reason			
No	88.8%	91.5%	91.9%
Yes	11.2%	8.5%	8.1%
Total	100.0%	100.0%	100.0%

Reasons for Withdrawal Winter 1993 Term

	Month of withdrawal		
	January	February	March
	Count Percent	Count Percent	Count Percent
Transportation problems			
No	95.3%	95.5%	93.9%
Yes	4.7%	4.5%	6.1%
Total	100.0%	100.0%	100.0%
Conflict with work			
No	63.4%	63.7%	63.6%
Yes	36.6%	36.3%	36.4%
Total	100.0%	100.0%	100.0%
Moving out of the area			
No	98.1%	97.5%	98.1%
Yes	1.9%	2.5%	1.9%
Total	100.0%	100.0%	100.0%
Financial reasons			
No	93.9%	95.7%	96.0%
Yes	6.1%	4.3%	4.0%
Total	100.0%	100.0%	100.0%
Conflict with instructor			
No	97.1%	94.0%	94.2%
Yes	2.9%	6.0%	5.8%
Total	100.0%	100.0%	100.0%

Reasons for Withdrawal Winter 1993 Term

	Month of withdrawal		
	January	February	March
	Count Percent	Count Percent	Count Percent
Medical reasons			
No	94.2%	91.0%	92.1%
Yes	5.8%	9.0%	7.9%
Total	100.0%	100.0%	100.0%
Child care problems			
No	97.3%	96.2%	97.3%
Yes	2.7%	3.8%	2.7%
Total	100.0%	100.0%	100.0%
Registration error			
No	96.7%	98.3%	99.1%
Yes	3.3%	1.7%	.9%
Total	100.0%	100.0%	100.0%
Course too difficult			
No	91.7%	83.5%	81.6%
Yes	8.3%	16.5%	18.4%
Total	100.0%	100.0%	100.0%
Course too easy			
No	98.5%	99.0%	99.3%
Yes	1.5%	1.0%	.7%
Total	100.0%	100.0%	100.0%

Reasons for Withdrawal Winter 1993 Term

	Month of withdrawal		
	January	February	March
	Count Percent	Count Percent	Count Percent
Course scheduling conflict			
No	90.9%	93.4%	95.3%
Yes	9.1%	6.6%	4.7%
Total	100.0%	100.0%	100.0%
Personal reasons			
No	78.5%	72.2%	67.1%
Yes	21.5%	27.8%	32.9%
Total	100.0%	100.0%	100.0%
Course was not what I expected			
No	89.5%	86.6%	89.0%
Yes	10.5%	13.4%	11.0%
Total	100.0%	100.0%	100.0%
Other reason			
No	85.9%	86.1%	90.6%
Yes	14.1%	13.9%	9.4%
Total	100.0%	100.0%	100.0%

Reasons for Withdrawal by Type of Withdrawal (1993)

	Credits after transaction			
	100% Withdrawal		Partial Withdrawal	
	Count	Count Percent	Count	Count Percent
Transportation problems				
No	5225	95.3%	7337	95.1%
Yes	255	4.7%	378	4.9%
Total	5480	100.0%	7715	100.0%
Conflict with work				
No	3213	58.6%	5117	66.3%
Yes	2267	41.4%	2598	33.7%
Total	5480	100.0%	7715	100.0%
Moving out of the area				
No	5257	95.9%	7656	99.2%
Yes	223	4.1%	59	.8%
Total	5480	100.0%	7715	100.0%
Financial reasons				
No	5179	94.5%	7405	96.0%
Yes	301	5.5%	310	4.0%
Total	5480	100.0%	7715	100.0%
Conflict with instructor				
No	5297	96.7%	7240	93.8%
Yes	183	3.3%	475	6.2%
Total	5480	100.0%	7715	100.0%

Reasons for Withdrawal by Type of Withdrawal (1993)

	Credits after transaction			
	100% Withdrawal		Partial Withdrawal	
	Count	Count Percent	Count	Count Percent
Medical reasons				
No	4940	90.1%	7264	94.2%
Yes	540	9.9%	451	5.8%
Total	5480	100.0%	7715	100.0%
Child care problems				
No	5306	96.8%	7489	97.1%
Yes	174	3.2%	226	2.9%
Total	5480	100.0%	7715	100.0%
Registration error				
No	5381	98.2%	7563	98.0%
Yes	99	1.8%	152	2.0%
Total	5480	100.0%	7715	100.0%
Course too difficult				
No	4977	90.8%	6217	80.6%
Yes	503	9.2%	1498	19.4%
Total	5480	100.0%	7715	100.0%
Course too easy				
No	5433	99.1%	7615	98.7%
Yes	47	.9%	100	1.3%
Total	5480	100.0%	7715	100.0%

Reasons for Withdrawal by Type of Withdrawal (1993)

	Credits after transaction			
	100% Withdrawal		Partial Withdrawal	
	Count	Count Percent	Count	Count Percent
Course scheduling conflict				
No	5199	94.9%	7140	92.5%
Yes	281	5.1%	575	7.5%
Total	5480	100.0%	7715	100.0%
Personal reasons				
No	3985	72.7%	5557	72.0%
Yes	1495	27.3%	2158	28.0%
Total	5480	100.0%	7715	100.0%
Course was not what I expected				
No	5011	91.4%	6599	85.5%
Yes	469	8.6%	1116	14.5%
Total	5480	100.0%	7715	100.0%
Other reason				
No	4876	89.0%	6893	89.3%
Yes	604	11.0%	822	10.7%
Total	5480	100.0%	7715	100.0%

Withdrawal Due to Transportation by Campus (1993)

	Home campus						
	Auburn Hills		Highland Lakes		Orchard Ridge		Sou
	Count	Count Percent	Count	Count Percent	Count	Count Percent	C
Students race/ethnicity							
White	147	64.2%	70	83.3%	77	73.3%	
African-American	57	24.9%	8	9.5%	16	15.2%	
Other Minority	25	10.9%	6	7.1%	12	11.4%	
Total	229	100.0%	84	100.0%	105	100.0%	

Withdrawal Due to Transportation by Campus (1993)

	Home campus
	Southeast
	Count Percent
Students race/ethnicity	
White	49.6%
African-American	42.5%
Other Minority	7.9%
Total	100.0%

Oakland Community College
Preliminary Analysis of Student Withdrawal Surveys
(Calendar Year 1993)

The Office of Institutional Planning & Analysis analyzed students' responses to the Withdrawal Survey to determine predominant reasons for withdrawal from courses. We separated data into multiple categories (such as gender, ethnicity, time of withdrawal, complete withdrawal and age) to help with the analysis. The following statements represent some of the findings from this analysis.

Overall

Reason for Withdrawal	Number	Percent
Transportation Problems	637	4.8 %
Conflict with Work	4916	36.8 %
Moving from the Area	287	2.2 %
Financial Reasons	621	4.7 %
Conflict with Instructor	665	5.0 %
Medical Reasons	999	7.5 %
Child Care Problems	404	3.0 %
Registration Error	255	1.9 %
Course too Difficult	2023	15.2 %
Course too Easy	150	1.1 %
Course Scheduling Conflict	869	6.5 %
Personal Reasons	3690	27.6 %
Course is not what I Expected	1594	11.9 %
Other	1444	10.4 %

Gender

- The most cited reason for withdrawal for both men (43.9 %) and women (31.1 %) was "conflict with work."
- Women (16.5 %) were more likely than men (11.3%) to indicate that their "course was too difficult.".
- Women were more likely to cite "medical reasons" (9.6%), "child care problems" (4.6%), and "conflict with instructor" (5.6%) when compared to men (4.9%, 1.2%, and 4.3%, respectively).
- Both men (26.6%) and women (28.6%) cited "personal reasons" for withdrawal.

Ethnicity

- Minority students (10.1%) were more likely to indicate "problems with transportation" than non-minority students (3.9%).
- Non-minority students (38.6%) were more likely to cite "conflict with work" than minority students (31.5%).
- Minority students were more likely to indicate both "medical reasons" (8.9%) and "child care problems" (5.9%) when compared to non-minority respondents (7.5% and 2.7%, respectively).

Age

- Older students were more likely to cite "medical reasons" (13.6%) and "childcare problems" (4.6%) than younger students (5.5% and 1.5%, respectively).

- Younger students are more likely to withdraw because the "course was too difficult" (17.4%) and to indicate the "course was not what they expected" (13.7%) compared to older students (11.1% and 9.6%, respectively).

Time of Withdrawal

- The responses "course too difficult" (e.g. Fall term 11.5% in September compared to 22.3% in November), "conflict with instructor" (3.4% September, 8.2% November), and "personal reasons" (23.7% September, 32.4% November) were more frequent late in the term than earlier.

- The response "conflict with work" remained constant through the term (36.4% September, 39.6% October, 36.0% November).

100% Withdrawal

- "Conflict with work" is more likely to result in 100% withdrawal (41.4%) than partial withdrawal (33.7%).

- "Conflict with instructor" and "course too difficult" were more likely to result in partial withdrawal (6.2%, 19.4%) than complete withdrawal (3.3%, 9.2%).

Reasons for Withdrawal by Gender (Calendar Year 1993)

	Students gender			
	Female		Male	
	Count	Count Percent	Count	Count Percent
Transportation problems				
No	6959	95.6%	5598	94.7%
Yes	318	4.4%	315	5.3%
Total	7277	100.0%	5913	100.0%
Conflict with work				
No	5012	68.9%	3315	56.1%
Yes	2265	31.1%	2598	43.9%
Total	7277	100.0%	5913	100.0%
Moving out of the area				
No	7133	98.0%	5775	97.7%
Yes	144	2.0%	138	2.3%
Total	7277	100.0%	5913	100.0%
Financial reasons				
No	6946	95.5%	5634	95.3%
Yes	331	4.5%	279	4.7%
Total	7277	100.0%	5913	100.0%
Conflict with instructor				
No	6873	94.4%	5659	95.7%
Yes	404	5.6%	254	4.3%
Total	7277	100.0%	5913	100.0%

Reasons for Withdrawal by Gender (Calendar Year 1993)

	Students gender			
	Female		Male	
	Count	Count Percent	Count	Count Percent
Medical reasons				
No	6575	90.4%	5624	95.1%
Yes	702	9.6%	289	4.9%
Total	7277	100.0%	5913	100.0%
Child care problems				
No	6945	95.4%	5845	98.8%
Yes	332	4.6%	68	1.2%
Total	7277	100.0%	5913	100.0%
Registration error				
No	7134	98.0%	5805	98.2%
Yes	143	2.0%	108	1.8%
Total	7277	100.0%	5913	100.0%
Course too difficult				
No	6079	83.5%	5110	86.4%
Yes	1198	16.5%	803	13.6%
Total	7277	100.0%	5913	100.0%
Course too easy				
No	7199	98.9%	5844	98.8%
Yes	78	1.1%	69	1.2%
Total	7277	100.0%	5913	100.0%

Reasons for Withdrawal by Gender (Calendar Year 1993)

	Students gender			
	Female		Male	
	Count	Count Percent	Count	Count Percent
Course scheduling conflict				
No	6787	93.3%	5548	93.8%
Yes	490	6.7%	365	6.2%
Total	7277	100.0%	5913	100.0%
Personal reasons				
No	5198	71.4%	4341	73.4%
Yes	2079	28.6%	1572	26.6%
Total	7277	100.0%	5913	100.0%
Course was not what I expected				
No	6360	87.4%	5246	88.7%
Yes	917	12.6%	667	11.3%
Total	7277	100.0%	5913	100.0%
Other reason				
No	6398	87.9%	5367	90.8%
Yes	879	12.1%	546	9.2%
Total	7277	100.0%	5913	100.0%

Reasons for Withdrawal by Race (Calendar Year 1993)

	Students race/ethnicity			
	Minority		Non-Minority	
	Count	Count Percent	Count	Count Percent
Transportation problems				
No	1670	89.9%	8836	96.1%
Yes	188	10.1%	357	3.9%
Total	1858	100.0%	9193	100.0%
Conflict with work				
No	1272	68.5%	5643	61.4%
Yes	586	31.5%	3550	38.6%
Total	1858	100.0%	9193	100.0%
Moving out of the area				
No	1830	98.5%	8987	97.8%
Yes	28	1.5%	206	2.2%
Total	1858	100.0%	9193	100.0%
Financial reasons				
No	1770	95.3%	8768	95.4%
Yes	88	4.7%	425	4.6%
Total	1858	100.0%	9193	100.0%
Conflict with instructor				
No	1786	96.1%	8714	94.8%
Yes	72	3.9%	479	5.2%
Total	1858	100.0%	9193	100.0%

Reasons for Withdrawal by Race (Calendar Year 1993)

	Students race/ethnicity			
	Minority		Non-Minority	
	Count	Count Percent	Count	Count Percent
Medical reasons				
No	1692	91.1%	8506	92.5%
Yes	166	8.9%	687	7.5%
Total	1858	100.0%	9193	100.0%
Child care problems				
No	1749	94.1%	8943	97.3%
Yes	109	5.9%	250	2.7%
Total	1858	100.0%	9193	100.0%
Registration error				
No	1811	97.5%	9041	98.3%
Yes	47	2.5%	152	1.7%
Total	1858	100.0%	9193	100.0%
Course too difficult				
No	1557	83.8%	7843	85.3%
Yes	301	16.2%	1350	14.7%
Total	1858	100.0%	9193	100.0%
Course too easy				
No	1843	99.2%	9090	98.9%
Yes	15	.8%	103	1.1%
Total	1858	100.0%	9193	100.0%

Reasons for Withdrawal by Race (Calendar Year 1993)

	Students race/ethnicity			
	Minority		Non-Minority	
	Count	Count Percent	Count	Count Percent
Course scheduling conflict				
No	1710	92.0%	8625	93.8%
Yes	148	8.0%	568	6.2%
Total	1858	100.0%	9193	100.0%
Personal reasons				
No	1354	72.9%	6617	72.0%
Yes	504	27.1%	2576	28.0%
Total	1858	100.0%	9193	100.0%
Course was not what I expected				
No	1668	89.8%	8086	88.0%
Yes	190	10.2%	1107	12.0%
Total	1858	100.0%	9193	100.0%
Other reason				
No	1689	90.9%	8173	88.9%
Yes	169	9.1%	1020	11.1%
Total	1858	100.0%	9193	100.0%

Reasons for Withdrawal by Age (Calendar Year 1993)

	AGE					
	25 and under		26 to 35		36 and older	
	Count	Count Percent	Count	Count Percent	Count	Count Percen
Transportation problems						
No	7735	94.3%	3019	96.0%	1790	97.8
Yes	465	5.7%	126	4.0%	40	2.2
Total	8200	100.0%	3145	100.0%	1830	100.0
Conflict with work						
No	5272	64.3%	1879	59.7%	1165	63.7
Yes	2928	35.7%	1266	40.3%	665	36.3
Total	8200	100.0%	3145	100.0%	1830	100.0
Moving out of the area						
No	8022	97.8%	3072	97.7%	1802	98.5
Yes	178	2.2%	73	2.3%	28	1.5
Total	8200	100.0%	3145	100.0%	1830	100.0
Financial reasons						
No	7770	94.8%	3019	96.0%	1780	97.3
Yes	430	5.2%	126	4.0%	50	2.7
Total	8200	100.0%	3145	100.0%	1830	100.0
Conflict with instructor						
No	7756	94.6%	3005	95.5%	1758	96.1
Yes	444	5.4%	140	4.5%	72	3.9
Total	8200	100.0%	3145	100.0%	1830	100.0

Reasons for Withdrawal by Age (Calendar Year 1993)

	AGE					
	25 and under		26 to 35		36 and older	
	Count	Count Percent	Count	Count Percent	Count	Count Percen
Medical reasons						
No	7747	94.5%	2860	90.9%	1582	86.4
Yes	453	5.5%	285	9.1%	248	13.6
Total	8200	100.0%	3145	100.0%	1830	100.0
Child care problems						
No	8074	98.5%	2957	94.0%	1745	95.4
Yes	126	1.5%	188	6.0%	85	4.6
Total	8200	100.0%	3145	100.0%	1830	100.0
Registration error						
No	8049	98.2%	3082	98.0%	1793	98.0
Yes	151	1.8%	63	2.0%	37	2.0
Total	8200	100.0%	3145	100.0%	1830	100.0
Course too difficult						
No	6774	82.6%	2774	88.2%	1626	88.9
Yes	1426	17.4%	371	11.8%	204	11.1
Total	8200	100.0%	3145	100.0%	1830	100.0
Course too easy						
No	8090	98.7%	3117	99.1%	1821	99.5
Yes	110	1.3%	28	.9%	9	.5
Total	8200	100.0%	3145	100.0%	1830	100.0

Reasons for Withdrawal by Age (Calendar Year 1993)

	AGE					
	25 and under		26 to 35		36 and older	
	Count	Count Percent	Count	Count Percent	Count	Count Percen
Course scheduling conflict						
No	7657	93.4%	2943	93.6%	1720	94.0
Yes	543	6.6%	202	6.4%	110	6.0
Total	8200	100.0%	3145	100.0%	1830	100.0
Personal reasons						
No	5811	70.9%	2389	76.0%	1329	72.6
Yes	2389	29.1%	756	24.0%	501	27.4
Total	8200	100.0%	3145	100.0%	1830	100.0
Course was not what I expected						
No	7073	86.3%	2863	91.0%	1655	90.4
Yes	1127	13.7%	282	9.0%	175	9.6
Total	8200	100.0%	3145	100.0%	1830	100.0
Other reason						
No	7400	90.2%	2760	87.8%	1591	86.9
Yes	800	9.8%	385	12.2%	239	13.1
Total	8200	100.0%	3145	100.0%	1830	100.0

Reasons for Withdrawal Fall 1993 Term

	Month of withdrawal		
	September	October	November
	Count Percent	Count Percent	Count Percent
Transportation problems			
No	95.9%	95.5%	95.7%
Yes	4.1%	4.5%	4.3%
Total	100.0%	100.0%	100.0%
Conflict with work			
No	63.6%	60.4%	64.0%
Yes	36.4%	39.6%	36.0%
Total	100.0%	100.0%	100.0%
Moving out of the area			
No	98.1%	97.5%	97.5%
Yes	1.9%	2.5%	2.5%
Total	100.0%	100.0%	100.0%
Financial reasons			
No	94.8%	95.1%	96.3%
Yes	5.2%	4.9%	3.7%
Total	100.0%	100.0%	100.0%
Conflict with instructor			
No	96.6%	95.1%	91.8%
Yes	3.4%	4.9%	8.2%
Total	100.0%	100.0%	100.0%

Reasons for Withdrawal Fall 1993 Term

	Month of withdrawal		
	September	October	November
	Count Percent	Count Percent	Count Percent
Medical reasons			
No	93.8%	91.9%	92.5%
Yes	6.3%	8.1%	7.5%
Total	100.0%	100.0%	100.0%
Child care problems			
No	96.7%	96.8%	98.1%
Yes	3.3%	3.2%	1.9%
Total	100.0%	100.0%	100.0%
Registration error			
No	97.6%	99.2%	98.9%
Yes	2.4%	.8%	1.1%
Total	100.0%	100.0%	100.0%
Course too difficult			
No	88.5%	81.7%	77.7%
Yes	11.5%	18.3%	22.3%
Total	100.0%	100.0%	100.0%
Course too easy			
No	98.4%	98.1%	99.2%
Yes	1.6%	1.9%	.8%
Total	100.0%	100.0%	100.0%

Reasons for Withdrawal Fall 1993 Term

	Month of withdrawal		
	September	October	November
	Count Percent	Count Percent	Count Percent
Course scheduling conflict			
No	91.8%	94.6%	95.4%
Yes	8.2%	5.4%	4.6%
Total	100.0%	100.0%	100.0%
Personal reasons			
No	76.3%	72.5%	67.6%
Yes	23.7%	27.5%	32.4%
Total	100.0%	100.0%	100.0%
Course was not what I expected			
No	84.0%	85.8%	86.7%
Yes	16.0%	14.2%	13.3%
Total	100.0%	100.0%	100.0%
Other reason			
No	88.8%	91.5%	91.9%
Yes	11.2%	8.5%	8.1%
Total	100.0%	100.0%	100.0%

Reasons for Withdrawal Winter 1993 Term

	Month of withdrawal		
	January	February	March
	Count Percent	Count Percent	Count Percent
Transportation problems			
No	95.3%	95.5%	93.9%
Yes	4.7%	4.5%	6.1%
Total	100.0%	100.0%	100.0%
Conflict with work			
No	63.4%	63.7%	63.6%
Yes	36.6%	36.3%	36.4%
Total	100.0%	100.0%	100.0%
Moving out of the area			
No	98.1%	97.5%	98.1%
Yes	1.9%	2.5%	1.9%
Total	100.0%	100.0%	100.0%
Financial reasons			
No	93.9%	95.7%	96.0%
Yes	6.1%	4.3%	4.0%
Total	100.0%	100.0%	100.0%
Conflict with instructor			
No	97.1%	94.0%	94.2%
Yes	2.9%	6.0%	5.8%
Total	100.0%	100.0%	100.0%

Reasons for Withdrawal Winter 1993 Term

	Month of withdrawal		
	January	February	March
	Count Percent	Count Percent	Count Percent
Medical reasons			
No	94.2%	91.0%	92.1%
Yes	5.8%	9.0%	7.9%
Total	100.0%	100.0%	100.0%
Child care problems			
No	97.3%	96.2%	97.3%
Yes	2.7%	3.8%	2.7%
Total	100.0%	100.0%	100.0%
Registration error			
No	96.7%	98.3%	99.1%
Yes	3.3%	1.7%	.9%
Total	100.0%	100.0%	100.0%
Course too difficult			
No	91.7%	83.5%	81.6%
Yes	8.3%	16.5%	18.4%
Total	100.0%	100.0%	100.0%
Course too easy			
No	98.5%	99.0%	99.3%
Yes	1.5%	1.0%	.7%
Total	100.0%	100.0%	100.0%

Reasons for Withdrawal Winter 1993 Term

	Month of withdrawal		
	January	February	March
	Count Percent	Count Percent	Count Percent
Course scheduling conflict			
No	90.9%	93.4%	95.3%
Yes	9.1%	6.6%	4.7%
Total	100.0%	100.0%	100.0%
Personal reasons			
No	78.5%	72.2%	67.1%
Yes	21.5%	27.8%	32.9%
Total	100.0%	100.0%	100.0%
Course was not what I expected			
No	89.5%	86.6%	89.0%
Yes	10.5%	13.4%	11.0%
Total	100.0%	100.0%	100.0%
Other reason			
No	85.9%	86.1%	90.6%
Yes	14.1%	13.9%	9.4%
Total	100.0%	100.0%	100.0%

Reasons for Withdrawal by Type of Withdrawal (1993)

	Credits after transaction			
	100% Withdrawal		Partial Withdrawal	
	Count	Count Percent	Count	Count Percent
Transportation problems				
No	5225	95.3%	7337	95.1%
Yes	255	4.7%	378	4.9%
Total	5480	100.0%	7715	100.0%
Conflict with work				
No	3213	58.6%	5117	66.3%
Yes	2267	41.4%	2598	33.7%
Total	5480	100.0%	7715	100.0%
Moving out of the area				
No	5257	95.9%	7656	99.2%
Yes	223	4.1%	59	.8%
Total	5480	100.0%	7715	100.0%
Financial reasons				
No	5179	94.5%	7405	96.0%
Yes	301	5.5%	310	4.0%
Total	5480	100.0%	7715	100.0%
Conflict with instructor				
No	5297	96.7%	7240	93.8%
Yes	183	3.3%	475	6.2%
Total	5480	100.0%	7715	100.0%

Reasons for Withdrawal by Type of Withdrawal (1993)

	Credits after transaction			
	100% Withdrawal		Partial Withdrawal	
	Count	Count Percent	Count	Count Percent
Medical reasons				
No	4940	90.1%	7264	94.2%
Yes	540	9.9%	451	5.8%
Total	5480	100.0%	7715	100.0%
Child care problems				
No	5306	96.8%	7489	97.1%
Yes	174	3.2%	226	2.9%
Total	5480	100.0%	7715	100.0%
Registration error				
No	5381	98.2%	7563	98.0%
Yes	99	1.8%	152	2.0%
Total	5480	100.0%	7715	100.0%
Course too difficult				
No	4977	90.8%	6217	80.6%
Yes	503	9.2%	1498	19.4%
Total	5480	100.0%	7715	100.0%
Course too easy				
No	5433	99.1%	7615	98.7%
Yes	47	.9%	100	1.3%
Total	5480	100.0%	7715	100.0%

Reasons for Withdrawal by Type of Withdrawal (1993)

	Credits after transaction			
	100% Withdrawal		Partial Withdrawal	
	Count	Count Percent	Count	Count Percent
Course scheduling conflict				
No	5199	94.9%	7140	92.5%
Yes	281	5.1%	575	7.5%
Total	5480	100.0%	7715	100.0%
Personal reasons				
No	3985	72.7%	5557	72.0%
Yes	1495	27.3%	2158	28.0%
Total	5480	100.0%	7715	100.0%
Course was not what I expected				
No	5011	91.4%	6599	85.5%
Yes	469	8.6%	1116	14.5%
Total	5480	100.0%	7715	100.0%
Other reason				
No	4876	89.0%	6893	89.3%
Yes	604	11.0%	822	10.7%
Total	5480	100.0%	7715	100.0%

Withdrawal Due to Transportation by Campus (1993)

	Home campus						
	Auburn Hills		Highland Lakes		Orchard Ridge		Sou
	Count	Count Percent	Count	Count Percent	Count	Count Percent	C
Students race/ethnicity							
White	147	64.2%	70	83.3%	77	73.3%	
African-American	57	24.9%	8	9.5%	16	15.2%	
Other Minority	25	10.9%	6	7.1%	12	11.4%	
Total	229	100.0%	84	100.0%	105	100.0%	

OAKLAND
COMMUNITY
COLLEGE

Auburn Hills Campus
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COMPUTER AIDED DESIGN AND DRAFTING TECHNOLOGY

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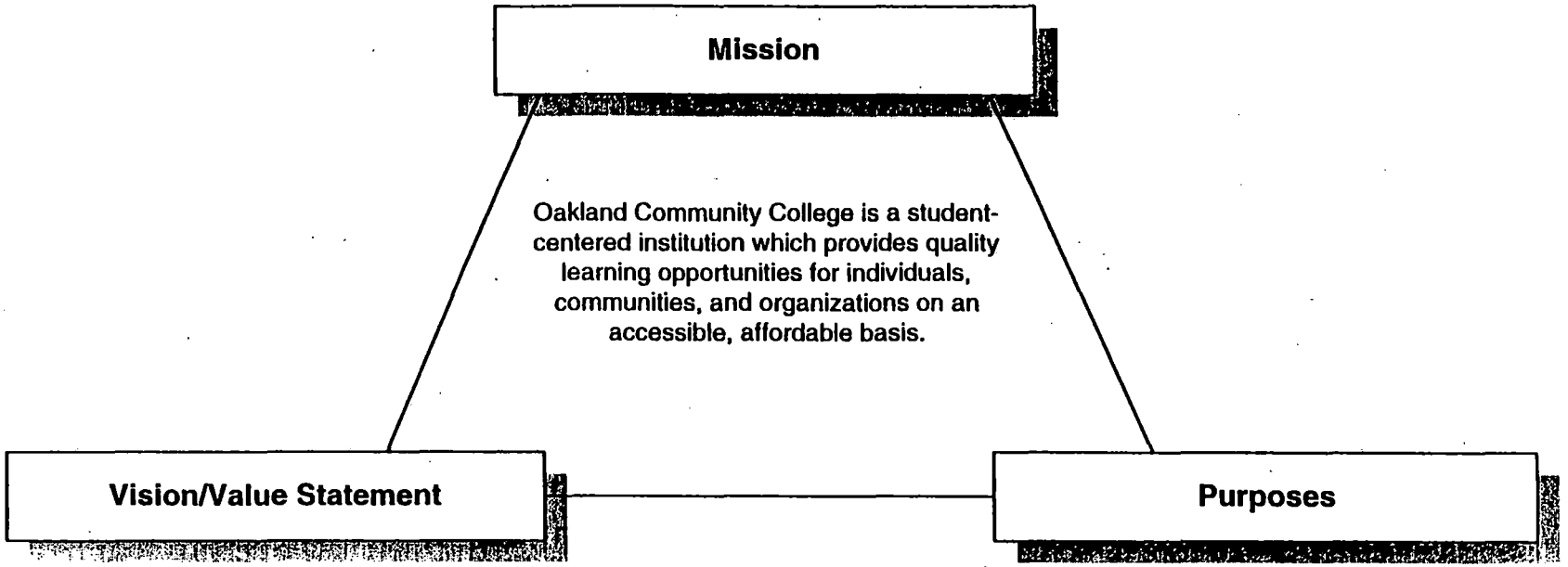
OAKLAND
COMMUNITY
COLLEGE

Oakland Community College



Oakland Community College is a dynamic, accessible, learning-centered community dedicated to excellence. This community values:

* Shared responsibility, open communication, collaboration;
* Personal empowerment, integrity, ethical commitment;
* Diversity, global awareness, responsiveness to community needs.

OCC provides quality:

* Educational experiences enabling students to transfer to other institutions of higher education.
* Occupational and technical learning opportunities to improve student's employability.
* Community services, including cultural, social, and enrichment opportunities for lifelong learning.
* Opportunities in development education to prepare students for college-level studies.
* Workforce development training and learning opportunities to meet the needs of business and industry.
* General Education opportunities enabling students to learn independently and develop skills for personal and career success.

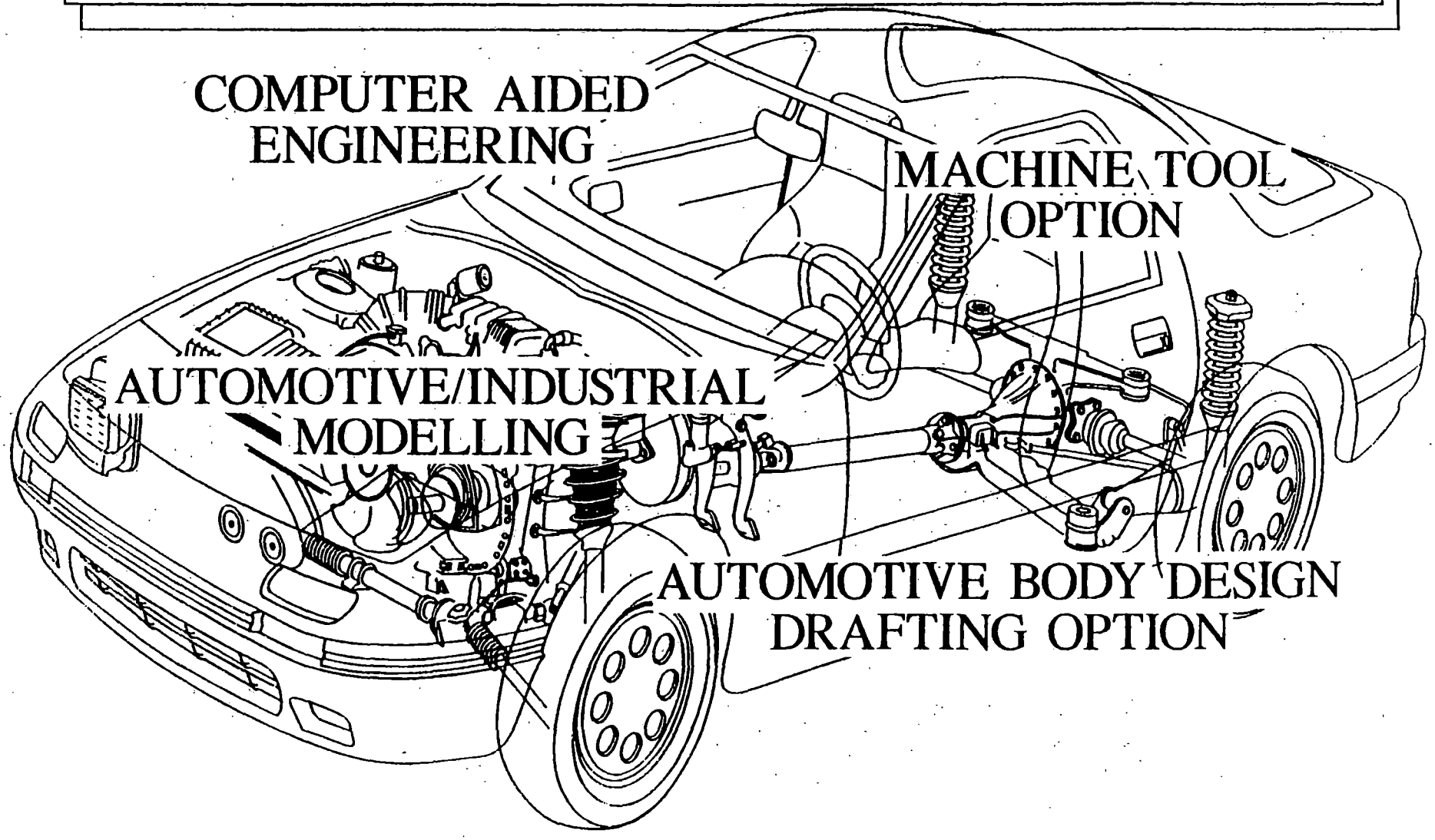
Approved by Board of Trustees October 21, 1996

OAKLAND
COMMUNITY
COLLEGE

Auburn Hills Campus
2900 Featherstone Road, Auburn Hills, MI 48326-2845

(810) 340-6500 Fax: (810) 340-6507

COMPUTER AIDED DESIGN & DRAFTING



For More Information, Please Contact T. Khan: (810) 340-6688; or Counseling: (810) 340-6574

Computer Aided Design (CAB) and Drafting Technology

Automotive Body Design and Drafting Option

Auburn Hills — **Associate in Applied Science**

Major Requirements		Credits
CAD 110*	Introduction to Computer Aided Design and Drafting	3
CAD 120*	Product Detailing	3
CAD 130*	Descriptive Geometry/Assembly Drawing	3
CAD 210.1*	Three Dimensional Wireframe Design and Surfacing	4
CAD 220*	Product Design and Layout	3

Required Supportive Courses		
CAD 145[1]	Drafting and Design Co-op Internship	3
CAD 215	Advanced Curves and Surfaces	4
CAD 245[1]	Advanced Drafting and Design Co-op Internship	3
DDT 100*	Fundamentals for the Drafting Industry	3
DDT 105*	Product Drafting	3
DDT 115*	Descriptive Geometry	3
ENG 151★	Composition I	3
MAT 154★	College Algebra	4
MAT 156★	Trigonometry	3
MEC 101	Introduction to Manufacturing Processes	3
MEC 102	Manufacturing and Fabrication Processes	3

Automotive Body Design and Drafting Option Courses		
ADT 110*	Introduction to Body Drafting	3
CAD 260*	Body Print Interpretation and Detailing	3
CAD 270*	Body Layout Applications	3
CAD 280*	Applications of Vehicle Body Surface Development	3

General Education Requirements

See graduation requirements for an Associate in Applied Science Degree on pages 47 and 50.

[1] Technical electives may be substituted with departmental approval.

★ General Education courses listed as Required Supportive may be used to meet requirements of the General Education component.

* Students not pursuing the degree program may apply for a Certificate when all courses marked with an asterisk are completed.

Students are responsible for all prerequisites and/or corequisites–see course descriptions.

This Associate in Applied Science degree program is designed to prepare students for entry level positions in the field of computer aided design and drafting. The students will use the computer as a tool in engineering, analysis, design, drafting, machine tool, robotics, electrical, industrial technology, and automotive body design technology. Students will learn the concepts and principles of computer aided design and drafting and gain skills in the operation of computer aided design terminals, programming principles, and evaluation of software problems. The students will apply knowledge of such systems, software configurations, and design principles in solving increasingly complex design problems involving, but not limited to, metals, plastics, and composites.

The Body Design and Drafting Option of the program provides the student with instruction in principles and concepts of body design evolution, terminology, body surface blueprint interpretation, surface and structure applications and advanced body practices and theories. An extensive use and application of computer aided design will be applied throughout the course of the program.

Upon completion of the program, graduates will be prepared for employment in engineering and manufacturing design industries using computers for automotive body design and drafting applications.

Computer Aided Design (CAI) and Drafting Technology

Automotive/Industrial Modeling Option

Extended Degree Program

Associate in Applied Science — Auburn Hills

This option in the CAD degree program represents an interdisciplinary approach to Industrial Product Modeling. It is a combination of the Auto Body Option within the CAD program and the Industrial Product Design program.

This program allows students preparing for the industrial modeling/sculpting and prototyping industries to fully understand the concepts of the disciplines involved and the technical background to apply the latest technologies. Students will be prepared for careers in clay, wood, cardboard and metal model making, as well as working in a prototype situation or generation of solid modeling using sophisticated tools such as stereolithography.

This program is designated as an Extended Degree Program in that students must complete a minimum of 73 or more required credit hours.

Major Requirements			Credits
ADT	110	Introduction to Body Drafting	3
ADT	230	Body Layout II - Surfacing	3
APD	838	Template and Fixture Layout	3
CAD	110	Introduction to Computer Aided Design and Drafting	3
CAD	120	Product Detailing	3
CAD	130	Descriptive Geometry/Assembly Drawing	3
CAD	145[1]	Drafting and Design Co-op Internship	3
CAD	210.1	Three Dimensional Wireframe Design and Surfacing	4
CAD	213	Techniques and Applications of Solid Modelling for Design and Manufacturing	4
CAD	215	Advanced Curves and Surfaces	4
CAD	245[1]	Advanced Drafting and Design Co-op Internship	3
DDT	105	Product Drafting	3
DDT	115	Descriptive Geometry	3
IPD	151	Model Making Techniques	3
IPD	252	Industrial Sculpture I	3
IPD	253	Industrial Sculpture II	3
MAT	114★	Plane Geometry	3
MEC	101	Introduction to Manufacturing Processes	3

Suggested Electives

ADT	210	Body Layout I - Detailing	3
CAD	220	Product Design and Layout	3
DDT	125	Advanced Descriptive Geometry	3
IPD	101	Industrial Design Drawing I	3

General Education Requirements

See graduation requirements for an Associate in Applied Science Degree on pages 47 and 50.

[1] Students are responsible for checking to ensure that all prerequisites have been met.

[2] A student may substitute suggested electives for co-op classes with departmental approval.

★ General Education courses listed as Required Supportive may be used to meet requirements of the General Education component.

Students are responsible for all prerequisites and/or corequisites–see course descriptions.

Computer Aided Design (CAM) and Drafting Technology

Machine Tool Option

Auburn Hills — Associate in Applied Science

Major Requirements			Credits
CAD	110*	Introduction to Computer Aided Design and Drafting	3
CAD	120*	Product Detailing	3
CAD	130*	Descriptive Geometry/Assembly Drawing	3
CAD	210.1*	Three Dimensional Wireframe Design and Surfacing	4
CAD	220*	Product Design and Layout	3

Required Supportive Courses			
CAD	145[1]	Drafting and Design Co-op Internship	3
CAD	215	Advanced Curves and Surfaces	4
CAD	245[1]	Advanced Drafting and Design Co-op Internship	3
DDT	100*	Fundamentals for the Drafting Industry	3
DDT	105*	Product Drafting	3
DDT	115*	Descriptive Geometry	3
ENG	151★	Composition I	3
MAT	154★	College Algebra	4
MAT	156★	Trigonometry	3
MEC	101	Introduction to Manufacturing Processes	3
MEC	102	Manufacturing and Fabrication Processes	3

Machine Tool Option Courses			
APD	825*	Die Design I	3
APD	844*	Tool Design I	3
CAD	230*	CAD Applications in Machine Tool Fixtures and Gauges	3
CAD	235*	CAD Applications in Die Design	3

General Education Requirements

See graduation requirements for an Associate in Applied Science Degree on pages 47 and 50.

[1] Technical electives may be substituted with departmental approval.

★ General Education courses listed as Required Supportive may be used to meet requirements of the General Education component.

* Students not pursuing the degree program may apply for a Certificate when all courses marked with an asterisk are completed.

Students are responsible for all prerequisites and/or corequisites–see course descriptions.

This Associate in Applied Science degree program is designed to prepare students for entry level positions in the field of computer aided design and drafting. The students will use the computer as a tool in engineering, analysis, design, drafting, machine tool, robotics, electrical, industrial technology, and automotive body design technology. Students will learn the concepts and principles of computer aided design and drafting and gain skills in the operation of computer aided design terminals, programming principles, and evaluation of software problems. The students will apply knowledge of such systems, software configurations, and design principles in solving increasingly complex design problems involving, but not limited to, metals, plastics, and composites.

The Machine Tool Option includes the principles and concepts of tool and fixture design and die design on a CAD system. The option also includes the study of the use and application of drafting practices and principles, manufacturing processes, and computer aided design hardware and software. Emphasis will be placed on computer aided drafting and production.

Upon completion of the program, graduates will be prepared for employment in engineering and manufacturing design industries using computers for drafting and design applications.

COMPUTER AIDED ENGINEERING TECHNOLOGY (CAE)

(Under Development)

Major Requirements		Credits
CAD 110*	Introduction to Computer Aided Design and Drafting	3
CAD 120*	Product Drafting	3
CAD 130*	Descriptive Geometry/Assembly Drawing	3
CAD 210.1*	Three Dimensional Wire Frame Design and Surfacing	3
CAD 215*	Advanced Surfaces	4

Required Supportive Courses		
CAD 145[1]	Drafting and Design Co-op Internship	3
DDT 100*	Fundamentals for the Drafting Industry	3
DDT 105*	Product Drafting	3
DDT 115*	Descriptive Geometry	3
ENG 131[2]★	Basic Writing: Paragraphs	4
OR		
ENG 135★	Business Communications	3
MAT 115[3]★	Intermediate Algebra	4
OR		
MAT 156[3]★	Trigonometry	3
MEC 101	Introduction to Manufacturing Processes	3
PHY 161[3]*	College Physics I	4
OR		
APP 815[3]*	Applied Technology I	2
AND		
APP 816[3]*	Applied Technology II	2

CAE Specialty Option		
CAD 213*	Techniques & Applications of Solid Modeling for Design & Manufacturing	4
CAD 214*	Kinematics	4
CAD 216*	Finite Element Modeling	3
CIM 230*	Introduction to CAM (Computer Aided Manufacturing)	4

General Education Requirements

See graduation requirements for an Associate in Applied Science Degree in Catalog.

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[1]Technical electives may be substituted with departmental approval.

[2]ENG 151 may be substituted for ENG 131.

[3]Students taking PHY 161 should take MAT 156; students taking APP 815 and APP 816 should take MAT 115.

★General Education courses listed as Required Supportive may be used to meet requirements of the General Education component.

*Students not pursuing the degree program may apply for a Certificate when all courses marked with an asterisk are completed.

COURSE DESCRIPTIONS
COMPUTER AIDED DESIGN

CAD 100 **4 Credits**

Fundamentals of Engineering Graphics

This course is designed to introduce the fundamentals of computer graphics using AUTOCAD, a micro-based computer aided design and drafting system. Students will develop skills and abilities to solve basic geometry problems in two dimensions. The student will learn the basic disk operating system commands and become familiar with plotting procedures. The course will also cover an overview of various computer aided design and manufacturing applications. Course/lab fees.

CAD 110 **3 Credits**

Introduction to Computer Aided Design and Drafting

This course is an introduction to the field of computer aided design and drafting. It will provide students with an overview of the applications and development of computers as applied to the field of engineering, drafting and design. The students will learn and apply computer aided design techniques and principles to create drawings and will learn the software capability of the system by generating, moving and editing the basic geometric elements. Students will become familiar with system hardware such as, but not limited to, CRT, keyboard, tablet/menu, etc. In addition to formal classroom lecture and demonstrations, students will use equipment such as a CAD system and other related hardware to complete a series of assignments. Course/lab fees.

CAD 115 **3 Credits**

CAD Applications in Architecture/Civil Engineering Technology

Prerequisite: CAD 100 or at least six months of auto CAD software experience.
Prerequisite or Corequisite: Basic Architectural or Civil Engineering Drafting course.
This course is specially designed to assist students in the use of CAD system as applied in the field of Architectural/Civil Engineering and Landscape Design Technology. It includes methods of creating site plans, floor plans, elevations, sections, details, dimensioning, and related topics; concepts of layers, blocks and library for symbols such as: plumbing, electrical, and landscape. All projects will be done on a CAD as the software package. Course/lab fees.

CAD 120 **3 Credits**

Product Detailing

Prerequisite: CAD 110 or consent of instructor.
Prerequisite or corequisite: DDT 105 or consent of instructor.
The student will learn the techniques and principles of creating orthographic and auxiliary views on a CAD system. The student will create working detail drawings by adding the necessary sections, dimensions, tolerances, notes and specifications to multiviews.
Given a work description or isometric view of a simple object, the student will be able to completely describe its shape in orthographic multiview projection. The student will also develop skills in the use and selection of standard parts from the CAD data base. Course/lab fees.

CAD 130 **3 Credits**

Descriptive Geometry/Assembly Drawings

Prerequisite: CAD 120 or consent of instructor.
Prerequisite or corequisite: DDT 115 or consent of instructor.
Students will learn the principles and techniques of dealing with advanced concepts of computer aided

design and drafting drawings. The student will apply the principles of descriptive geometry to create views such as, but not limited to, isometric and true views. Students will perform analysis, such as section analysis and calculate weight and volume of the part. Emphasis is also placed on creating working details and assembly techniques to create assembly drawings. Course/lab fees.

CAD 145 **3 Credits**

Drafting and Design Co-op Internship

Prerequisite: CAD 210.1.

This course provides the student with practical training in the field of Drafting/Design and CAE (Computer Aided Engineering Applications). The student will be employed in a supervised situation under the guidance of a qualified coordinator. During the Co-op Internship period, the student will identify and describe, through reports, technical problems encountered on the job.

CAD 210.1 **4 Credits**

Three Dimensional Wireframe Design and Surfacing

Prerequisite: CAD 130 or consent of instructor.

The student will learn the principles and techniques of creating parts in three dimensions. Emphasis is also placed on basic surface generation techniques for design and manufacturing. Some of the topics include three dimensional part design, various types of surfaces, analysis, layers and filter, use of sets, volume creation, two dimensional and three dimensional space integration, intersection and development of flat surface objects and double curved surfaces, etc. The student will use computer hardware and software to solve three dimensional engineering and drafting problems using computer aided engineering (CAE) techniques. Replaces CAD 210. Course/lab fees.

CAD 211 **4 Credits**

Topics in Design and Drafting Applications

Prerequisite: CAD 130 or consent of instructor.

Using CAD/CAE software package, the student will develop skills and abilities to create two and three dimensional designs and the extraction of multiview drawings from three dimensional model. Some of the topics include, 2-D and 3-D part creation, image manipulation, layer control, surfacing, analysis, menu structure, dimensions and drafting symbols, plotting, section cuts from 3-D models. The student will use a CAD/CAE system to complete design and drafting projects. Course/lab fees.

CAD 212 **8 Credits**

Line and Surface Development for End Users

Prerequisites: CAD 210.1 or consent of instructor.

Using CGS (Corporate Graphic System), the student will develop skills and abilities in developing curves and surfaces, execute system commands and control operators, utilize data management techniques and identify and use consolidated operators. The students will use a CAD/CAM (Computer Aided Design and Computer Aided Manufacturing) system to complete the computer aid drafting and design projects dealing with but not limited to plastics, composites and metals. The course will also emphasize basic design techniques for manufacturing. Course/lab fees.

CAD 213 **4 Credits**

Techniques and Applications of Solid Modelling for Design and Manufacturing

Prerequisite: CAD 210.1 or consent of instructor.

Using a Computer Aided Design and Engineering (CAD/CAE) software package, the student will learn the principles and techniques of solid modeling for design and manufacturing. Practical applications of solid modeling are incorporated into this product- oriented class. The student will use

a CAD/CAE system to complete the solid modeling projects dealing with and not limited to metals, plastics and composites. The course also includes the basic analysis of solids, an overview of desktop manufacturing such as stereolithography (technique of making plastic objects directly from Computer Aided Design data) and shading techniques of solid models. Course/lab fees.

CAD 214 **4 Credits**
Kinematics
Prerequisites: CAD 210.1 or consent of instructor.
The students will learn the techniques and concepts of two-dimensional and three-dimensional kinematics. The course involves geometric modeling, kinematic modeling and simulation of kinematic mechanisms, generation of traces and numerical outputs. The course also includes the study of multitude of joints and their limitations, analysis, modification and management of kinematic mechanisms. Check the class schedule for application software to be used. Course/lab fees.

CAD 215 **4 Credits**
Advanced Curves and Surfaces
Prerequisites: CAD 210.1 or consent of instructor.
Using the three dimensional computer aided design and manufacturing system, the student will learn the concepts and techniques of creating advanced curves and surfaces for design and manufacturing. Some of the topics included in the course are smoothing of curves, application and creation of advanced surfaces, analysis, scan data, and overview of solid modeling. The student will use computer hardware and software to solve advanced three dimensional engineering design and drafting problems dealing with, but not limited to, metals and plastics/composites. Course/lab fees.

CAD 216 **3 Credits**
Finite Element Modeling
Prerequisites: CAD 210.1 and PHY 161.
The student will learn the techniques and concepts of finite element modeling. The focus of the course is the preprocessing stage of preparing geometric models for analysis. The student will design geometry of parts, define mesh, properties, loads, restraints and constraints. An overview of finite element solver and post processor to visualize the model will be presented. The student will use CAD/CAE hardware and software to prepare finite element models. Check the class schedule for the application software to be used. Course/lab fees.

CAD 220 **3 Credits**
Product Design and Layout
Prerequisite: CAD 130.
The course is designed to provide the student with principles and techniques used in view layout and transformation on a computer aided design system. The student will learn the concepts and develop skills in dealing with projects related to product design and layout. Some of the topics included in the course are designing of new parts and modification of existing parts, proper methods of doing changes to a design layout, use and maintenance of log sheets, bill of material list, etc. The student will use a CAD system to complete computer aided design and drafting projects dealing with, but not limited to metals, plastics and composites. Course/lab fees.

CAD 230 **3 Credits**

CAD Applications in Machine Tool Fixtures and Gauges

Prerequisite: CAD 130.

Prerequisite or Corequisite: APD 844.

This course will cover the basic principles of tool and fixture design as they relate to machining and assembly operations on a Computer Aided Design (CAD) System. Topics include: fixtures, gauges, cutting tools, tool layouts and picture process sheets. There will be emphasis on how the above can be completed with greater productivity on a CAD System. Course/lab fees.

CAD 235 **3 Credits**

CAD Applications in Die Design

Prerequisite: CAD 130.

Prerequisite or Corequisite: APD 825 (Die Design I) or consent of instructor.

The student will study the various types of dies and standard die components. The techniques and principles of Computer Aided Design will be applied in the designing of blanking, piercing, compound blanking, and piercing dies. Design considerations of parts to be stamped and reactions of stock material will be studied. Emphasis will be on designing a die with greater productivity on a CAD system. Course/lab fees.

CAD 245 **3 Credits**

Advanced Drafting and Design Co-op Internship

The Advanced Drafting and Design Co-op Internship students will continue practical training in the field of Drafting/Design and CAE (Computer Aided Engineering Applications). Students will be employed in a supervised situation under the guidance of a qualified coordinator. During the Advanced Co-op Internship period students will be involved in design activity relating to their specialty area, such as, but not limited to, Body Design, Tool and Fixture Design, Plastics Design, etc.

CAD 250 **3 Credits**

Plastic Product Design Applications

Prerequisites: CAD 213, PCT 241, PCT 251, PCT 271.

In this course, students will develop skills in dealing with parts strictly made of plastic or composite materials. The student will apply the knowledge of plastics product design theory and plastic manufacturing process to complete projects and assignments on a three dimensional CAD/CAE system. The students will design parts using three dimensional wireframe, surfacing and solid modeling techniques. Course/lab fees.

CAD 260.1 **4 Credits**

Principles of Body Design

Prerequisites: CAD 215, ADT 110 or consent of instructor.

This course will introduce students to current industry procedures and methods of designing body-in-white components. Students will review and evaluate sheet metal components of vehicles ready for production and introduction into the marketplace. Students will become familiar with the concepts of modifying existing part geometry; surfacing and facing of wireframe geometry and the principles of designing an underbody component from engineering sketches and verbal direction. Students will learn and use current standards and sheet metal design techniques in the design of functional parts. Also, basic vehicle overview will be presented. Course/lab fees.

CAD 270.1 **4 Credits**

Applications of Body Design

Prerequisite: CAD 260.1.

The student will learn to design body-in-white parts by generating construction surfaces and planes to create the wireframe. The student will also learn how to completely surface and face these parts and what data is necessary for the three levels of releasing: wireframe release, draw die release, and production release. In addition, students will learn the basic 3-2-1 locating scheme of geometric tolerancing and how it applies to their parts, dies used to stamp their parts, and the assembly line. Course/lab fees.

CAD 280.1 **4 Credits**

Vehicle Body Surface Development

Prerequisite: CAD 270.1.

The student will learn the principles and techniques of creating Class A body surfaces and surface nomenclature and terminology. Students will also learn techniques to design complex mathematical surfaces and distinguish between other surface types. The course covers the use of digitized data from the styling department, concepts of curvature and tangent continuity, and use of an existing surface as an aid in developing a new surface. Course/lab fees.

COURSE DESCRIPTIONS
OTHER RELATED COURSES

ADT 110 **3 Credits**
introduction to Body Drafting
Prerequisite: DDT 100 (formerly DRT 111) or advance placement through Tech Prep.
This course is an introduction to the Body Drafting/Design field. The student will study the relationship of points, lines, planes and views as they relate to body drafts. The students will become familiar with the terms and projection techniques used in the body drafting field. Occupational awareness will be enhanced through group and individual projects. Course/lab fees.

ADT 210 **3 Credits**
Body Layout I - Detailing
Prerequisite: ADT 110.
The student will solve body related problems through the use of true radial sections and true views of oblique surfaces. Application of the principles of Geometric Dimensioning and Tolerancing will be stressed in preparing body product drawing. Occupational preparation will be enhanced through the preparation of cover letters and a resume. Course/lab fees.

ADT 230 **3 Credits**
Body Layout II - Surfacing
Prerequisites: ADT 110, DDT 115 (formerly DRT 116), DDT 105 (formerly DRT 112).
The students will develop skills in advanced body surfacing through the application of proportional surfacing techniques. Problems will include design clearance considerations, surfacing and developing several major vehicle panels as well as studying the impact of federal regulations on vehicle design. Course/lab fees.

APD 825 **3 Credits**
Die Design I
Prerequisite: DDT 105.
The student will design blanking, piercing and compound blank and piercing dies; and will study stock material utilization, strip layouts, shearing action and stripper construction. The student will also learn the use of parts catalogs, design standards and how to incorporate safety in die design. Course/lab fees.

APD 838 **3 Credits**
Template and Fixture Layout
Prerequisites: ADT 110, DDT 100 (formerly DRT 111 and APD 813).
The student will use basic body drafting projection techniques to develop templates and surfaces of body product parts. The projects will require the application of body section cutting techniques to produce templates and simulated fixtures. The student will construct models of parts and fixtures demonstrating the application of Geometric Dimensioning and Tolerancing to body parts. Course/lab fees.

APD 844 **3 Credits**
Tool Design I
Prerequisites: DDT 100, DDT 105 or equivalent.
This course is designed to acquaint the apprentice with the procedures involved in developing jigs,

fixtures and other tooling devices needed for efficient and economical manufacture of products. It includes the preparation of all necessary drawings and is the first of three tool design courses. Course/lab fees.

APP 815 **2 Credits**

Applied Technology I

Prerequisite: APM 811 or MAT 110 or equivalent, or consent of instructor.

Applied Technology I is a course designed to prepare students more effectively for technical careers. The complexity and rapid change of modern technology require training that is applicable to more than a single job. Technicians will be exposed to the concepts of the mechanical, fluid, electrical and thermal principles on which modern technology is based. This course integrates the above mentioned four concepts with the physical principles of force, work, rate and resistance. This material is taught by lecture, video tape and lab experiments to reinforce the concepts of technical physics.

APP 816 **2 Credits**

Applied Technology II

Prerequisite: APM 811.

Applied Technology II is a course designed to prepare students more effectively for technical careers. The complexity and rapid change of modern technology require training that is applicable to more than a single job. Technicians will be exposed to the concepts of the mechanical, fluid, electrical and thermal principles on which modern technology is based. This course integrates the above mentioned four concepts with the physical principles of energy, power and force transformers. This material is taught by lecture, video tape and lab experiments to reinforce the concepts of technical physics.

CIM 230 **4 Credits**

Introduction to CAM (Computer Aided Manufacturing)

Prerequisites: CIM 220, CAD 120, and ROB 150.

This course will provide the student with the procedures and principles of creating a cutter path for Computer Numerical Control (CNC) machining and programming a robot using appropriate software. Students will also download this data to robots and CNC machines to execute their programs. Course/lab fees.

DDT 100 **3 Credits**

Fundamentals for the Drafting Industry

A course which introduces the student to the drafting industry. Emphasis is placed on the fundamentals so as to help students in their chosen technical program and/or for those who wish to pursue other classes in drafting and design. The course will focus on geometric construction, view interpretation, scales, orthographic and pictorial projection. The basics of dimensioning, lettering, first auxiliary, and sectional views, identification and classification of lines and planes will also be covered. Students will be required to do both freehand and instrument drawings. Replaces DRT 111 and/or APD 813. Course/lab fees.

DDT 105 **3 Credits**

Product Drafting

Prerequisite: DDT 100.

Corequisite: DDT 115.

Students will utilize preferred drafting techniques and conventions for the purpose of making detail and small assembly working drawings. Areas of study will include ANSI & ISO standards for dimensioning, basics of surface characteristics and texture symbols, geometric tolerance

fundamentals, threaded fasteners, welding symbols, second auxiliary views as well as related shop terminology. Emphasis on problem solving and design considerations for casting, forging, plastic, composite, and other manufacturing requirements will be covered with selected assignments. Line quality, neatness and accuracy will be stressed throughout the course. Replaces DRT 112 and/or APD 814. Course/lab fees.

DDT 115 **3 Credits**
Descriptive Geometry
Prerequisite: DDT 100.
Corequisite: DDT 105.
Descriptive geometry is a course that focuses on using orthographic projection, auxiliary views, and standard drawing conventions for the two-dimensional graphic solutions to three-dimensional spatial problems. First, second and third auxiliary views will be used for solving typical applied projection problems. Some of the topics covered will be the defining of planes, parallelism, perpendicularity, cutting planes, piercing points, and the intersection of solids as required on layout drawings. Projection accuracy and problem solving will be stressed during the course. Replaces DRT 116. Course/lab fees.

DDT 125 **3 Credits**
Advanced Descriptive Geometry Applications
Prerequisite: DDT 115.
Using advanced projection concepts such as revolution, developments, and vector diagrams students will solve typical problems in mechanical design. Projection conventions and design considerations, for metal forming and blanking will be some of the topics covered. Emphasis will be placed on problem solving by analyzing reasoning, and visualizing the desired outcome. Replaces DRT 135. Course/lab fees.

ECT 208 **4 Credits**
Introduction to Microprocessors
Prerequisite: Two years of secondary school algebra, or MAT 110, or consent of instructor.
Introduction to Microprocessors is designed to introduce individuals who are interested in the application of digital logic to current and popular/commercially available 8 and 16 bit microprocessors including their supporting components. This course will provide information which will enable the student to understand the various families of currently utilized microprocessors. Course/lab fees.

ENG 131 **4 Credits**
Basic Writing: Paragraphs
Prerequisite: Appropriate placement scores.
This course presents elements of the writing process: planning, composing, and revising. It emphasizes the relationship of form to content. Course/lab fees.

ENG 135 **3 Credits**
Business Communications
Students will identify the basic elements of the oral and written communication in careers. Based on these elements, which include principles of organization, purpose, proofreading, graphics, and language structure, students will produce communications appropriate to the careers of their choice.

ENG 151 **3 Credits**
Composition I
Prerequisite: Satisfactory score on Placement Test.
The student will write compositions of various kinds, applying the rules of straight thinking and the basic principles of rhetoric and language structure. Course/lab fees.

IPD 101 **3 Credits**
Industrial Design Drawing I
Prerequisite: ART 151.
This is an introduction to the methods and practice of studio drawing applied to the preliminary solution of industrial drawing design problems. Design drawing fundamentals, problem solving concepts, and the design process are applied toward the visual development and design of products. The student is led to understand the potential of freehand drawing as a tool in analyzing and designing spatial relationships. Visual thinking is concentrated on three dimensional development. Applied use of value structure to produce form and surface, and in-depth examination of the nature of structured forms in relation to one and two point perspective based on the current and traditional drawing and design procedures in the profession of Industrial Design are studied.

IPD 151 **3 Credits**
Model Making Techniques
Prerequisite: IPD 101.
This course examines the materials and methods by which products are shaped in the preliminary model and prototype stages of development. The student is introduced to the materials and techniques that the professional modeler normally encounters in the automotive and product industry. Projects are assigned to enable the student to acquire firsthand experience in concept model making through the use of various materials such as clay, wood, styrofoam, plaster, paper, cardboard and plastic. Course/lab fees.

IPD 252 **3 Credits**
Industrial Sculpture I
Prerequisite: IPD 151.
This course is focused on modeling and fabrication of full-sized and scale models of manufactured products through the development of mechanical and creative aptitudes of three dimensional interpretation from designer sketches and verbal description. Procedures from rough stages of development through refinement, using bucks, armature, section and grid lines, compound empathics, sweeps, and splines will be applied. Course/lab fees.

IPD 253 **3 Credits**
Industrial Sculpture II
Prerequisite: IPD 252.
This course examines advanced problems of modeling and fabrication, including surface development, construction of flat, concave and complex planes and surfaces. Use and design of templated and shop machinery to create unique appearances and the application of materials to simulate finished production surfaces are studied. Course/lab fees.

MAT 114 **3 Credits**
Plane Geometry
Prerequisite: One year secondary college-prep algebra or MAT 110 with a C or better.
The study of the properties and characteristics of geometric figures through an axiomatic approach

that focuses on proof and the building of a logical system. In particular, the material includes angles, similarity and congruence of triangles, parallel and perpendicular lines, quadrilaterals, right triangles, circles, area and volume and constructions.

MAT 115 **4 Credits**
Intermediate Algebra
Prerequisite: MAT 110 with a C or better or one year of secondary college-prep algebra.
Review of basics from elementary algebra; absolute value equations and inequalities; rational exponents; complex numbers; completing the square; the discriminant; quadratic inequalities; equations of lines; determinants; conic sections; functions, inverses, and their graphs; word problems; exponential and logarithmic functions. Replaces MAT 113

MAT 154 **4 Credits**
College Algebra
Prerequisite: Two years of secondary college-prep algebra or MAT 115 with a C or better.
Brief review of algebra fundamentals; equations quadratic in form; rational inequalities; graphing polynomials and rational functions; algebra of functions; including composition; inverse functions; theory of equations, Rational Root Theorem and Descartes' Rule; exponential and logarithmic functions; matrices, determinants and linear programming; partial fractions; mathematical induction; sequences and series; permutations and combinations; Binomial Theorem. Replaces MAT 155.

MAT 156 **3 Credits**
Trigonometry
Prerequisite: Two years of secondary college-prep algebra or MAT 115.
Definition of the trigonometric functions as circular functions; graphs of the trigonometric functions; development and use of identities; solution of equations; inverse functions; applications; definition of the functions in a right triangle; solution of right triangles; solution of non-right triangles by use of Law of Sines and Law of Cosines; complex numbers and De Moivre's Theorem; vectors; polar coordinates.

MEC 101 **3 Credits**
Introduction to Manufacturing Processes
Prerequisites: Secondary school algebra and geometry or MAT 110.
The student will explain basic manufacturing procedures in terms of materials tooling, machines, molding, measurements, gaging, automation and selected machine operations. Course/lab fees.

MEC 102 **3 Credits**
Manufacturing and Fabrication Practices
The student will identify and define the equipment and procedures used in welding, metal casting, forging, heat treatment extrusions, rolling and selected operations in welding and changing the shape of metals. Course/lab fees.

PHY 161 **4 Credits**
College Physics I
Prerequisite: MAT 156 or MAT 163 or consent of instructor.
The student will investigate the physical aspects of mechanics, sound and heat. The student will perform measurements and experiments in mechanics, sound and heat. Course/lab fees.

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