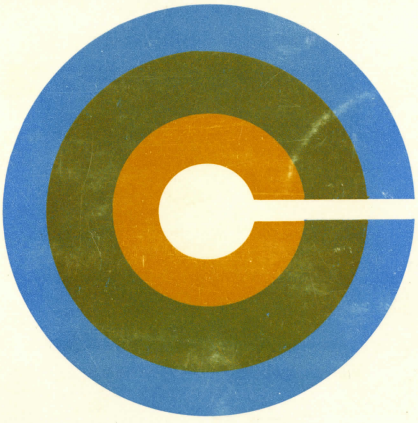
PROGRAM REVIEW REPORT

on the

COMPUTER AIDED DESIGN & DRAFTING TECHNOLOGY DIPLOMA PROGRAM



Cariboo College

PROGRAM REVIEW REPORT

on the

COMPUTER AIDED DESIGN & DRAFTING TECHNOLOGY DIPLOMA PROGRAM

OFFICE OF INSTITUTIONAL RESEARCH & EVALUATION

February, 1991

SUMMARY

The CADD Program Review Committee has found the Computer Aided Design and Drafting Technology Program (CADD) to be generally effective in providing sound training and educational experience for its students. This is evidenced by a relatively high job procurement rate of its graduates, with 92% being employed in CADD-related fields. In many ways the program is unique in that it plays a leadership role in defining the skills that are expected of CADD technologists. It is the belief of the Committee that the CADD Program should continue to pursue this role.

It is the question of role, however, which forms a major challenge for the CADD Program. On the one hand, it has been very successful in teaching general drafting skills which are valued by several sectors of industry, while on the other, many employers have come to expect more specialized skills associated with particular branches of the technology. The Committee feels that this situation is one of opportunity for the CADD Program, and has formulated recommendations on how CADD faculty should re-think, restructure, and redirect the program. While some of these involve curricular reorganization and improved internal and external liaison, much of the initial direction must come from the CADD Advisory Committee and employers.

The second major issue facing the CADD Program is student workload. The Committee feels that the workload imposed on the students is excessive and not consistent with good educational practices. It discussed at length ways in which student workload could be reduced without sacrificing the program's integrity. It is a pleasure to report that many of the faculty were supportive in this regard and provided valuable advice on how the CADD workload may be lessened.

TABLE OF CONTENTS

THE PROGRAM EVALUATION COMMITTEE

(December 13, 14 & 17, 1990)

COMMITTEE CHAIRPERSON	**Joseph Spuller** Instructor, Physics
FACULTY REPRESENTATIVE	**J.S. Bourget** Chairman, Electronics
EXTERNAL REPRESENTATIVE	**Gordon Antenbring** Antenbring & Assoc., Kamloops, B.C.
PROGRAM RESOURCE PERSON	**Dennis Oldridge** Chairman, CADD
DIVISIONAL DEAN (EX-OFFICIO)	**Earl Bloor** Dean, Applied Industrial Technology
PROGRAM REVIEW CO-ORDINATOR	**Alastair Watt,** Co-ordinator, Institutional Research & Evaluation
DATA COLLECTION & CLERICAL SUPPORT	**Larry Xiong** **Carol Davy**

INTRODUCTION

The Computer Aided Design and Drafting Technology Program Review was initiated on July 13, 1990, with a request for data from the Divisional Dean. Discussions on review procedure and questionnaire design were held with Dennis Oldridge, Chairman, CADD, on August 3. Questionnaires were mailed to Advisory Committee members on August 20, and to former students (1984 - 1988) on August 24. CADD faculty were surveyed on September 20. Second mailings went out to Advisory Committee members on the same date, and to former students on September 24. Telephonic prompting of former students took place between October 16 and 24. The first-year CADD class was surveyed on October 30, the second-year on November 8. The cut-off date for all responses was November 16. The Evaluation Committee met to analyze the questionnaires and other data on December 13, 14 & 17.

PROGRAM BACKGROUND

The CADD Program evolved in 1981 from a 10 month General Drafting Certificate Program which had been offered at the College throughout the 1970's. Between 1981 and 1985, CADD and Drafting ran concurrently, until the latter was discontinued in 1985.

The General Drafting Program included basic drafting instruction followed by courses in architectural, structural, civil, and piping drafting. By 1981, mechanical (materials handling) and electrical drafting had been added to the program. But even prior to the 1970's, other institutions (notably V.V.I.) had dropped this type of program, and were instead offering 10 month post-basic certificate programs in these areas of specialty.

A combination of factors determined the general multi-disciplinary character of the Cariboo College CADD Program. In the first place, a large city college such as V.V.I. could easily fill a spectrum of specialized courses beyond the basic level; Cariboo, on the other hand, did not have the enrolment base to support several separate 10 month courses in speciality areas. Secondly, whereas CADD jobs were plentiful in Vancouver and the Lower Mainland, local Kamloops industry was too sparse and unfamiliar with CADD applications to absorb specialized personnel.

When the program first started, Computer Aided Design & Drafting was in its infancy. In fact, the leading CADD software company, Autodesk Inc., did not even exist at that time. CADD workstations were expensive (up to $250,000 each), and it was envisioned that a CADD operator would have to be multi-disciplinary, and that industry would hire generalist Computer-Aided Design & Drafting Technologists as opposed to the

specialists in the disciplines of civil, mechanical, electrical, etc. What has happened, however, is that CADD workstations have dropped substantially in price (to under $10,000) and companies are using technical staff with specialized knowledge in a particular discipline to operate these workstations, thus increasing demand for the specialist.

This was brought home to CADD during its 1985 accreditation review by the Applied Science Technologists and Technicians of British Columbia, (A.S.T.T.B.C.), which expressed reservations about the general nature of the program and the lack of concentration on specific disciplines. Also, recent employers of CADD graduates, while voicing reasonable satisfaction with their capabilities, have echoed this theme of lack of specialization in the program. With an A.S.T.T.B.C. re-accreditation due later this year, and with conflicting feedback from employers, the CADD Program is at a cross-roads in its evolution, and must decide which route to pursue in the 1990's.

ADMISSION DATA, PROGRAM UTILIZATION RATES, COMPLETION AND ATTRITION RATES

Admissions Requirements:

a) Educational Requirements:

1. B.C. Grade 12 or equivalent;
2. B.C. Algebra 12 or equivalent with C Grade minimum;
3. B.C. Physics 11, Physics 12 recommended;
4. 67% on the combined English 12 and Government Exam (within the last 5 years), or Level 3 on the composition section of the LPI (within the last 2 years), or completion of English 050.

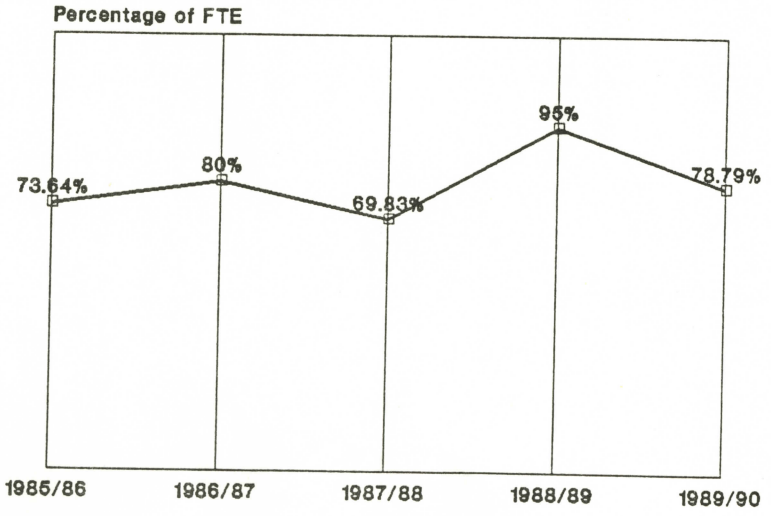
b) General Requirements:

1. Good eyesight;
2. Good hand-eye co-ordination.

Program Utilization Rates over the past five years:

Year	Funded FTE	Actual FTE	Utilization Rate
1990/91	58	55.0	94.83%
1989/90	58	45.7	78.79%
1988/89	58	55.1	95.00%
1987/88	58	40.5	69.83%
1986/87	57	45.6	80.00%
1985/86	22	16.2	73.64%

Computer Aided Drafting Porgram
Utilization Rates



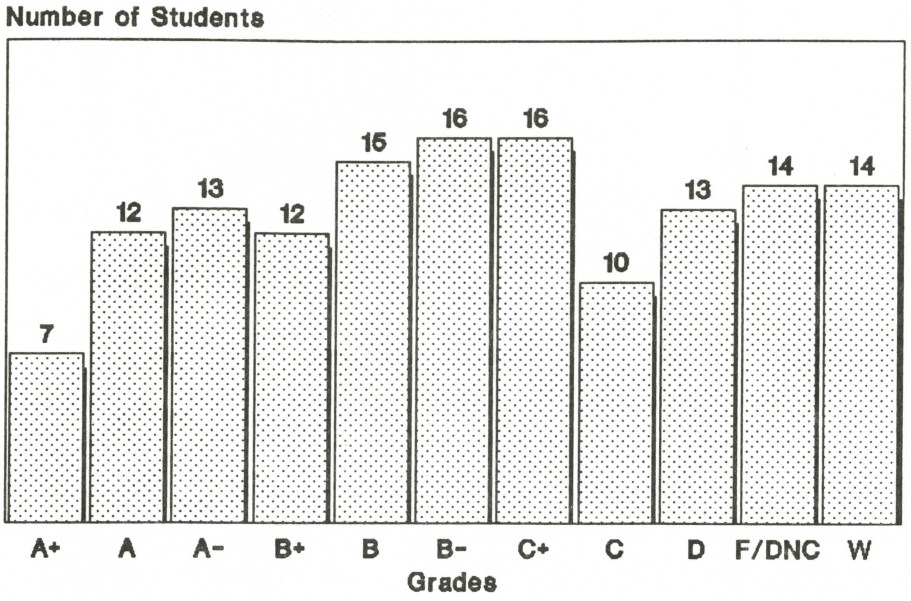
Completion & Attrition Rates (five year period):

Year	Enrolment	2nd Year	Survival-%	Grad.	%	Attrition-%
1984		17		13		
1985	37	21	57%	14	38%	62%
1986	31	20	65%	16	52%	48%
1987	23	20	87%	18	78%	22%
1988	34	20	59%	15	44%	56%
1989	37	18	47%			
1990	33					
Total 1985-88	**125**	**81**	**65%**	**63**	**50%**	**50%**

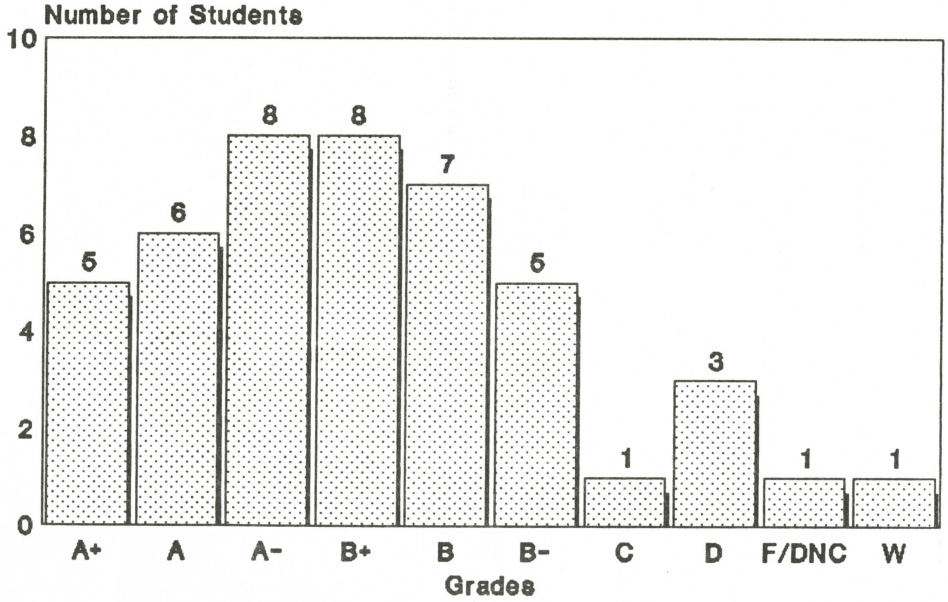
Grade Distribution:

Graphs illustrating grade distribution and/or enrolment/ completion patterns for selected CADD core and CADD service courses appear on the following pages.

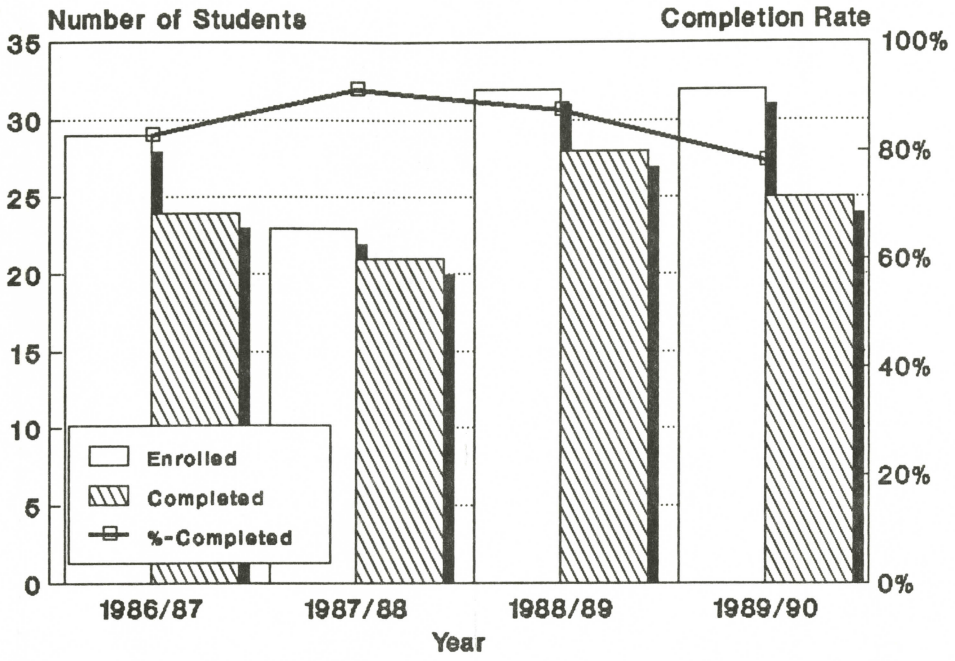
SELECTED CAD COURSE GRADES DISTRIBUTION
---- COMP155: Computing 1
(September 1985 to May 1990)



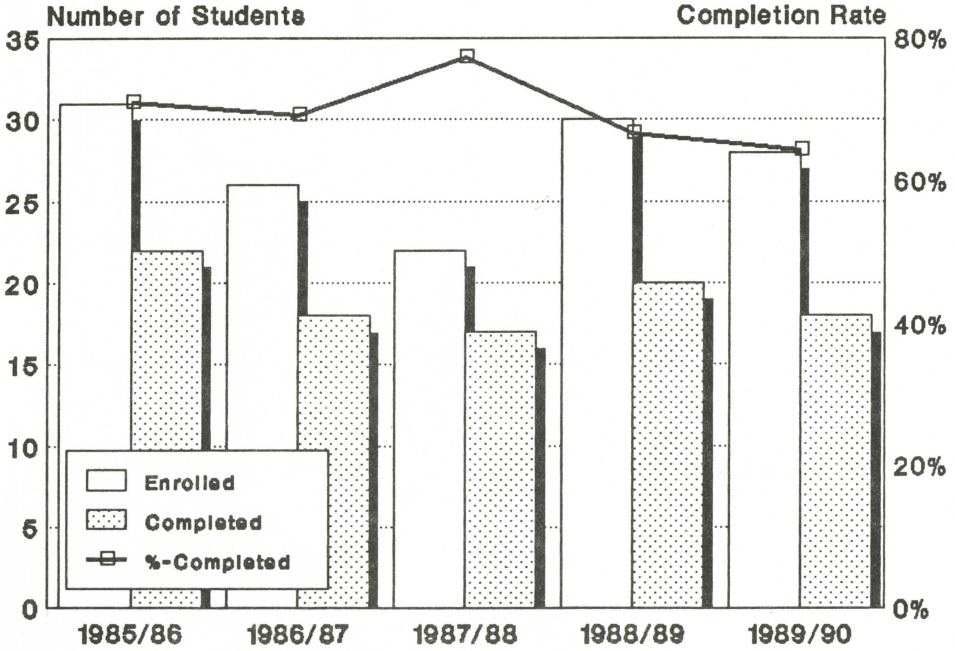
SELECTED CAD COURSE GRADES DISTRIBUTION
DRAFT157:Architectural Drafting & Design
(September 1985 to May 1990)



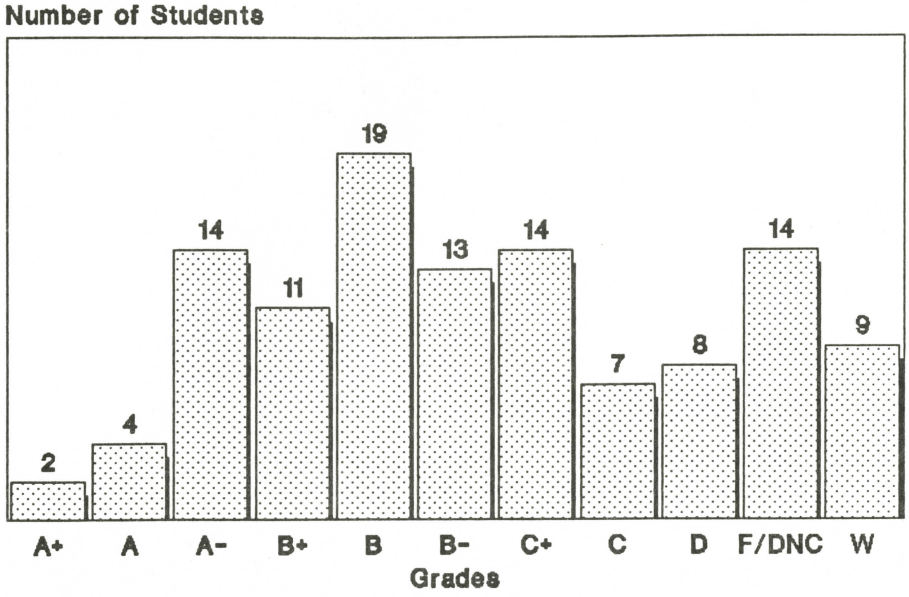
SELECTED CAD COURSE ENROLMENT/COMPLETION
TECH152: Materials - Specifications



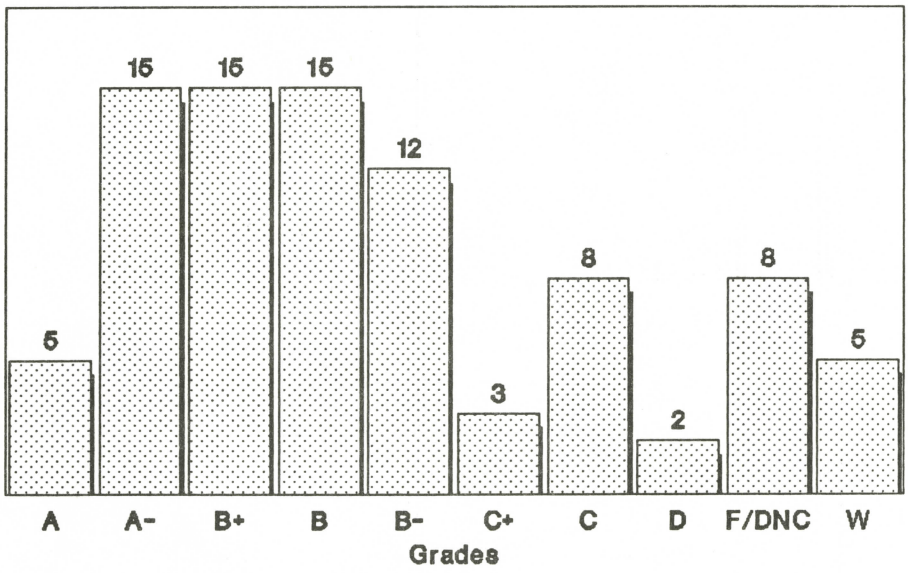
SELECTED CAD COURSE ENROLMENT/COMPLETION
MATH164: Calculus I



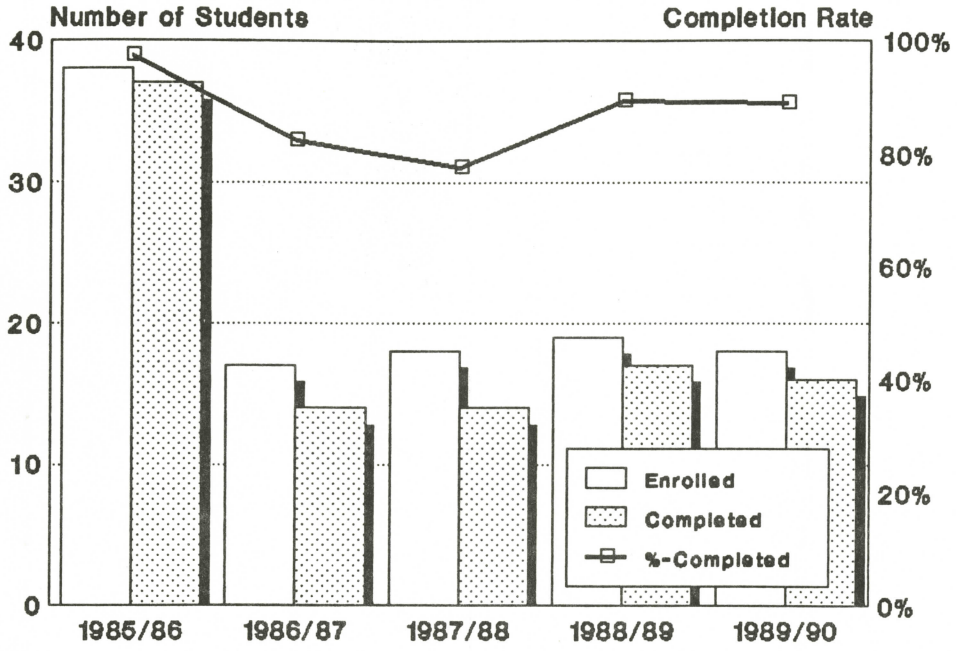
SELECTED CAD COURSE GRADES DISTRIBUTION
---- ENGL155: Technical Writing I
(September 1985 to May 1990)



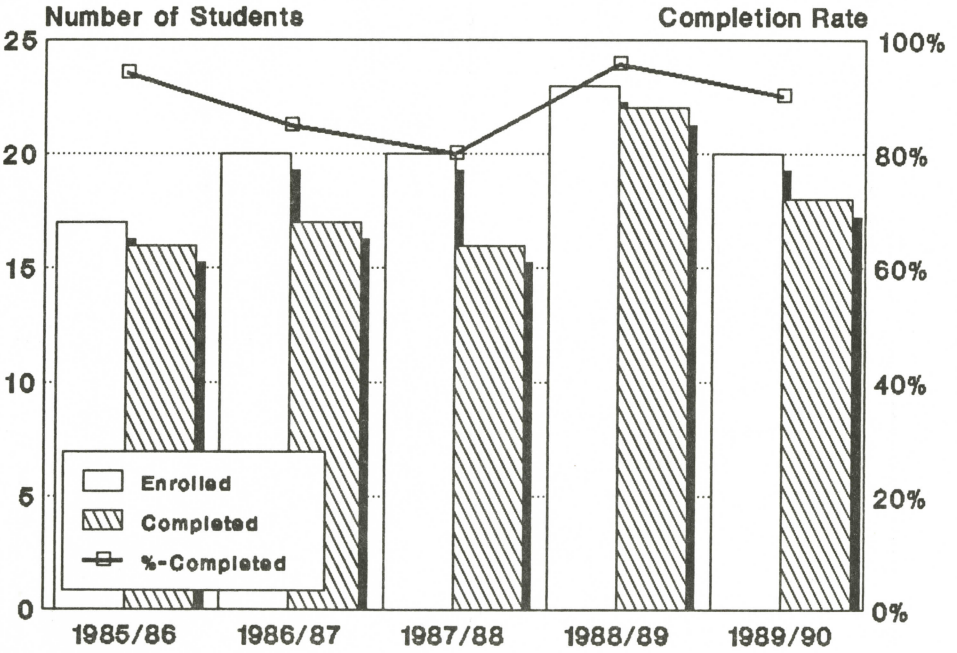
SELECTED CAD COURSE GRADES DISTRIBUTION
---- ENGL165: Technical Writing II
(September 1985 to May 1990)



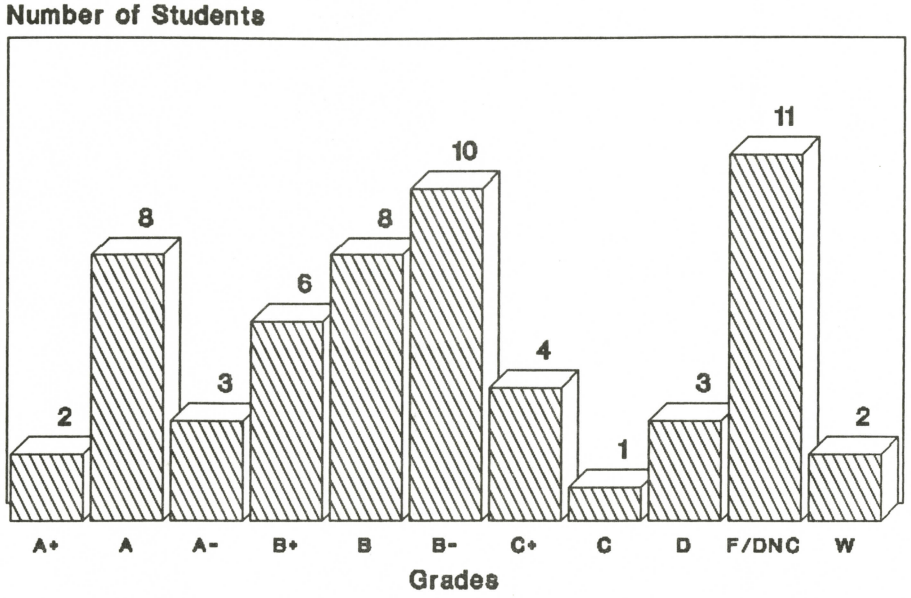
SELECTED CAD COURSE ENROLMENT/COMPLETION
COMP255: Computer Graphics



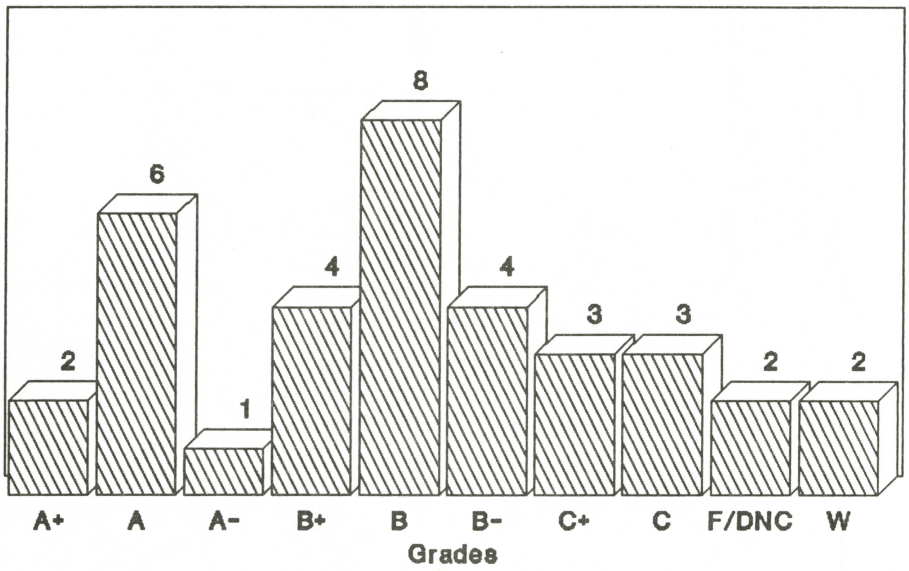
SELECTED CAD COURSE ENROLMENT/COMPLETION
DRAF270: CAD Fundamentals



SELECTED CAD COURSE GRADES DISTRIBUTION
DSGN291: Statics & Strength of Materials
(September 1985 to May 1990)



SELECTED CAD COURSE GRADES DISTRIBUTION
DSGN294: Steel & Timber Design
(September 1985 to May 1990)



SUMMARY OF QUESTIONNAIRE RESPONSES

Advisory Committee Survey:

Five out of seven Advisory Committee members responded to the questionnaire for a return rate of 71%.

Employer Survey:

Seventeen out of 27 employers surveyed responded for a return rate of 63%.

Faculty Survey:

Ten out of 11 faculty responded for a return rate of 91%. One refused to fill out the survey on the grounds that he "had nothing to contribute".

Current Student Survey:

Twenty-three of 33 first year current students responded for a return rate of 70% and 17 of 22 second year students for a return rate of 77%.

Former Student Survey:

Of the 121 former CADD students surveyed, 48 responded for a response rate of 40%.

TABULAR SUMMARY OF QUESTIONNAIRE RESPONSES

Recipient	# Sent	# Completed and Returned	% Return
Advisory Committee	7	5	71%
Employers	27	17	63%
Faculty	11	10	91%
Students: 1st year	33	23	70%
2nd year	22	17	77%
Former Students	121	48	40%
TOTAL	**221**	**120**	**54%**

Former Students
Returned by Post Office (all years): 19
Former Students Non-Respondents: 54

As of November 16, 1990

QUESTIONNAIRE DATA

The following trends were noted in the questionnaire data:

1. **Advisory Committee:**

The Advisory Committee respondents indicated concerns regarding:

- the lack of specialization in the program (they point out that program graduates may be disadvantaged in competing for certain types of jobs which have traditionally gone to graduates of specialized technology programs of other institutes. This concern is echoed by employers as well as faculty.);
- program funding levels;
- articulation of the program with others in the province.

The Advisory Committee expressed satisfaction with:

- employment opportunities for graduates;
- the degree of preparation of students for the job market;
- the quality of instruction.

It ranked technical knowledge and problem solving skills as being the most important elements of a sound CADD Program. Organizational skills, math skills, and written communication skills were also seen to be important elements. It is interesting to note that the Advisory Committee valued administrative skills as being the least important while the employers expressed a mild dissatisfaction with the graduates on this count.

2. **Employers:**

Employers indicated the following concerns regarding the Cariboo College CADD graduates:

- writing skills;
- administrative skills.

They were very pleased with the following attributes:

- work habits;
- willingness to learn;
- dependability (ability to work independently).

The Program Review Committee found the subjective comments of the employer group very helpful in identifying the following need:

- **employers want improved communication with the CADD Program.**

It is interesting to note that although the employers are broadly satisfied with the generalist nature of the program, many have indicated a need to strengthen the specialist component by increasing emphasis on mechanical, civil, electrical, and architectural drafting.

3. **Faculty:**

Clarification of the concerns of the faculty survey was achieved by having the following staff appear before the Committee: Roland Cobb (Physics instructor), Lynda Earley (English instructor), Jim Totten (Math instructor), John Dumesnil (Drafting instructor), Ryszard Paweska (Computing instructor), and Gene Turney (CADD instructor).

The faculty indicated concern about the following:

- the funding level of the program;
- the paucity of time and resources for curriculum development;
- the condition of the facilities;
- the lack of articulation with other colleges;
- the insufficiency of support staff;
- the high attrition rate.

Although the faculty seemed united in their opinion that the program is developing appropriate job-related skills, the survey revealed a relatively large dispersion in their assessment of the effectiveness of some courses in meeting the program's objectives. The staff was nearly unanimous that they ought to be meeting regularly to discuss program curriculum, co-ordination of class assignments, and joint projects. The instructors were convinced that this would help in reducing the workload of the students. Some instructors suggested that the prerequisites for the program be adjusted to read "Physics 11 (C+ minimum) with Physics 12 recommended, and Math 12 (C+ minimum)". Ryszard Paweska suggested a revectoring of COMP 155 to a two-hour lecture, two-hour lab format.

4. **Current Students:**

a. First-Year Students:

The first-year students possessed a positive attitude towards the program, especially regarding the

availability of employment on graduation and the quality of instruction. Even though the students were only two months into their program at the time of survey, their written comments revealed they were already concerned about the workload. Some suggested that the level of prerequisites in Math and Physics be raised. The ventilation in the CADD computing room was another common concern, as well as the frustration over malfunctioning of plotters and printers. They seemed dissatisfied with the amount of time for hands-on learning in COMP 155. The Program Review Committee is pleased to report that steps are being taken to re-vector the course to allow for more lab time. The Program Review Committee also noted CADD students' general unawareness of the existence of counselling and other College services.

b. Second-Year Students:

These students expressed a strong dissatisfaction with the workload of the program but seemed to be highly motivated by the prospects of employment upon graduation. The high number of contact hours made it difficult for students to see instructors during office hours and to utilize tutorial services.

Complaints about air quality in the CADD computer room were echoed by this group. They also suggested better maintenance of the computer equipment. They seemed dissatisfied with the following first-year courses: COMP 155, TECH 162, and MATH 164. There was a broad dissatisfaction expressed about DRAF 258, DRAF 268, and DSGN 294, in all of which they were enrolled at the time of the survey.

Interviewed by the Committee, second-year CADD student Bob Fraser confirmed that his class had experienced problems with Mathematics, that Drafting and Design are time consuming, and that TECH 152/162 could be cut back. (Steps were taken by instructor John Dumesnil in Fall, 1990 to restructure TECH 152, and similar reconstruction is being carried out on TECH 162.)

5. **Former Students**:

The former students indicated a high level of satisfaction with their education at Cariboo College. However, they did suggest that CADD instructors use more instructional aids such as videos and demonstration devices. They also pointed out that the computing courses lacked a sensible balance between theory and practical experience.

Some of the former students have found that specialization is desirable, and have suggested that this be implemented at Cariboo College. Some favoured expanding the program to a fifth term. Many also suggested that more AUTOLISP (a computer language used in CADD) be taught. The former students found the ventilation in the CADD drafting room inadequate.

EMPLOYMENT PROSPECTS

Types of Employment:

Computer Aided Design & Drafting is changing rapidly. Originally, draftspersons were trained in technical drawing to develop working drawings (blueprints) or plans from sketches prepared by designers, engineers or architects. Some of this work is still done, but increasingly draftspersons now use computer programs (CAD) which undertake much of the basic and repetitive drawing work. This frees draftspersons to do more technical or specialized work. Typically, specialties may be in structural, civil, mechanical, electrical, or architectural drafting, or in shop drawings for fabricated items.

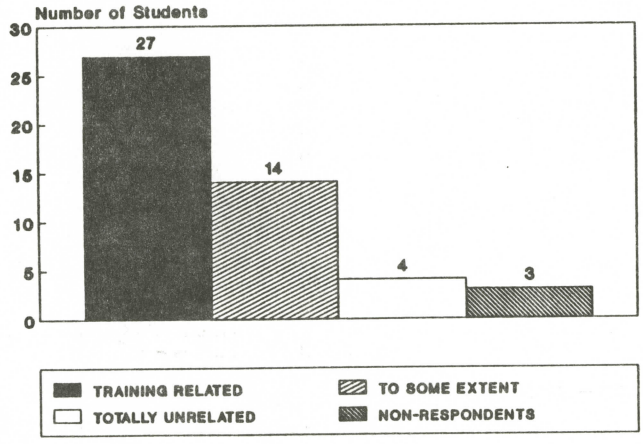
Cariboo College CADD graduates gravitate mainly into two areas of speciality: civil and mechanical. Returns show that of the last two years' graduating classes, each of these specialities attracted five students. Electrical, piping, and architectural attracted three each; only one was employed in general drafting duties.

Employment Rates:

Employment prospects for graduates are currently very good. For the last three years, CADD has been running very close to 100% employment of its graduates. For example, of 48 responding graduates between 1985 and 1990, 41 (or 85.4%) reported being employed full-time, and three (6.25%) part-time. This may ease off somewhat during a recession, but even in the years between 1982 and 1985, CADD graduates were reasonably successful in finding jobs.

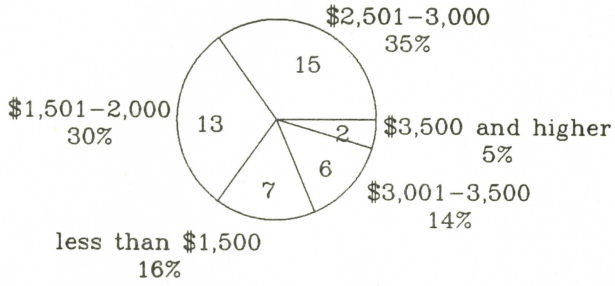
Of 45 respondents, 27 (60%) reported that their jobs are closely related to their training, 14 (31%) to some extent and only 4 (9%) not at all.

RELATIONSHIP BETWEEN TRAINING & JOB



Current Salaries:

Annual starting salaries range from $17,700 to $21,400 and may reach a high of $32,000 to $33,000 per year. In the supervisory categories, rewards are correspondingly higher. Cariboo College CADD former student respondents report a mode salary range of $2,500 to $3,000 per month; six respondents report earnings between $3,001 and $3,500, and two report making over $3,500 per month.



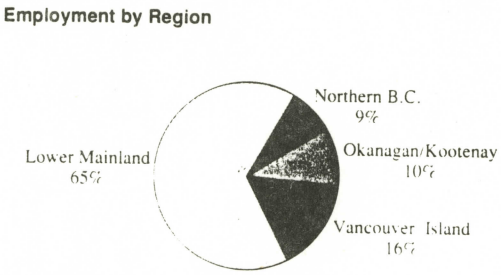
Job Opportunities Projection:

The projections based on recovery in construction, manufacturing and business services suggest that this occupation will grow at about the all-occupation average. In B.C., this would allow for 660 new jobs and 460 openings due to attrition in a fairly large occupational group. Total employment is expected to be 4,450 by 1995, a figure somewhat lower than the 1981 total (which, however, included CADD technologists **and** conventional draftspersons). It should also be noted that the projections do not adequately encompass all the technological changes taking place which are reducing the need for draftspersons for repetitive and basic work.

CADD personnel are employed throughout most industries, with concentrations in engineering (43%), manufacturing (16%), and forestry (5%).

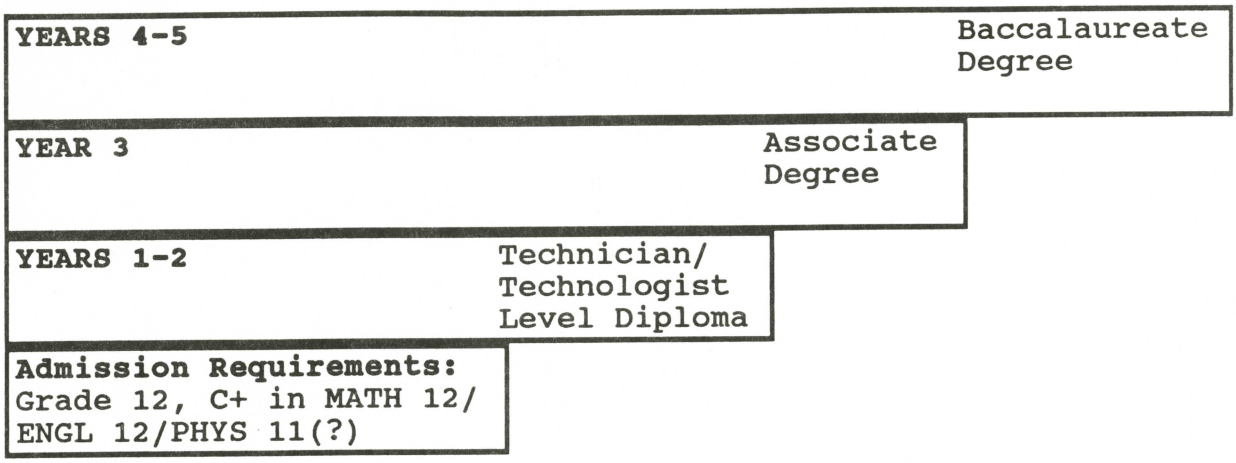
B.C. employment trends and projections:	**1981**	**1987**	**1995**
	5410	3780	4450

Annual growth 1987 - 1995: 2.0%



Further Education Opportunities:

At present, there are few opportunities, with the exception of short specialist and upgrading courses offered by B.C.I.T., for continuing beyond the CADD diploma. Cariboo College, however, plans to have associate degree in CADD Technology in place by 1993, which may "ladder" into an Applied Science and Technology degree by 1995 (as illustrated below).



STRENGTHS OF THE PROGRAM

The following strengths have been identified in the Computer Aided Design & Drafting Technology Program:

1. **Almost 92% of the respondents to the former students survey have achieved employment** either on a full or part-time basis, with 75% of the students reporting that their studies at Cariboo College contributed to their career success.

2. **Employers value the graduates of the program,** especially their work habits, their adaptability to different tasks, and their willingness to learn new skills. Employers indicate that graduates are particularly well prepared in the general drafting, AUTOCAD and DOS segments of the program. Clearly, the graduates of the program, through their job performance, are helping establish a **good reputation** for the CADD Program.

3. The fact that **20% of former student respondents have taken further courses** or degree work attests to the solid foundation and work ethic instilled in them by the program.

4. **The faculty of the program is a truly dedicated group of professionals.** It is a pleasure to point out that they have shown great willingness to remain current in their field (Gene Turney), to look to the future by developing new curriculum (Dennis Oldridge), and to suggest new methods of delivery (John Dumesnil). In recent years, the efforts of two supporting instructional staff--Lynda Earley (English) and Roland Cobb (Physics)--have been especially well received by the students. Both have made valuable contributions to the success of the program.

5. The program is recognized as being in the **forefront of CADD technology, and enjoys a high reputation provincially.**

AREAS WHICH CAN BE IMPROVED (WITH RECOMMENDATIONS)

This section highlights areas of the Computer Aided Design & Drafting Technology Program which the data suggest can be improved:

1. ADVISORY COMMITTEE:

From data gathered from the employers' survey, it appears that the CADD Advisory Committee needs to articulate more closely with past, present and potential employers of CADD graduates. The Advisory Committee currently does not have former student representation. Due to the changing nature of high-tech, programs such as CADD, the Advisory Committee should hold an annual meeting early in the Fall so as to allow adequate time for curriculum adjustments to occur for the next year. Accordingly, the Program Review Committee recommends:

a. that the CADD Advisory Committee immediately be reconstructed and revitalized by the appointment of new members, including at least one graduate from the CADD Program;

b. that the revitalized CADD Advisory Committee immediately survey past, present, and future employers to establish the present and future level of skills required by CADD graduates. The survey should address the following issues:

- **What are and will be the specific skills required by the industry?**
- **Should the emphasis of the CADD Program be on graduating CADD drafting technicians or CADD design technologists?**
- **Should specialization take place in particular Drafting disciplines, and if so, in which--civil, mechanical, electrical, architectural, shop drawing?**
- **Should the CADD Program be restructured to permit any or all of the following:**
  - **an early exit point;**
  - **the addition of a fifth semester;**
  - **delivery in co-operative education mode;**
  - **laddering into other technology or engineering programs?**

The Committee feels that until this information is secured, no major reconstruction of the CADD Program should take place.

c. that the CADD Advisory Committee establish and maintain a network of communication with employers;

d. that the CADD Advisory Committee determine if the need exists for provincial articulation with other similar programs, and examine other programs, both within and outside the province (e.g. the Humber College CADD Program) with a view to improving the Cariboo program;

e. that a special Advisory Committee meeting be held by Fall, 1991 to address the results of the employer survey so that changes can be implemented by September, 1992.

2. CURRICULUM:

Data extracted from the student surveys indicate that the student workload is excessive--in the region of 37-39 hours per week--and that the balance between theory and practice is not always maintained. Students also noted a lack of meshing between the various courses that constitute the CADD Program. Some students indicated that the program was in excess of their abilities and expectations.

The employer survey shows that writing and administrative skills could be improved. The same survey indicates that the length of the program might be inappropriate in relation to the depth of the curriculum.

The Committee questions the appropriateness of some course objectives and content in light of the overall program goals and objectives, and recommends:

a. that the CADD Department reconstruct a curriculum appropriate to the revised goals and objectives of the CADD Program (as submitted to the A.S.T.T.B.C. for the 1991 re-accreditation). The following criteria should be used in the process:

1. ensuring that the depth and range of core and service course objectives and curriculum are congruent with overall program goals;

2. streamlining the sequence of courses and deletion of unnecessary subject overlaps (e.g. vectors in Physics and Math);

3. **where possible, dropping the "block" system of scheduling and adopting semesterized, even annualized course structures to spread out learning and assignments, and improve retention;**

4. **meshing of courses by developing joint projects (e.g. integration of structural and piping and of structural and architectural drafting; and of bidding and estimating in TECH 152 with proposal writing in ENGL 155);**

5. **maintaining an appropriate balance between theory and practice;**

6. **emphasizing work simulation by promoting teamwork, insisting on presentation work to enhance communication skills, and incorporating basic office procedures and National Master Specifications (N.M.S.) into the curriculum.**

Although major reconstruction of the program must be delayed until the results of the employer survey (see 1b above) are analyzed, some of these suggestions--especially those involving course integration--can be implemented immediately.

b. **that the CADD Department aim at bringing student contact hours down to 30-33 hours per week either by reducing the program curriculum by 10-15% (especially in Math and Design), or by adding a fifth semester;**

c. **that the Department establish guidelines for assignments given in all courses of the program so as to maintain an appropriate workload for the students and co-ordinate a "staggered" schedule of major assignments to ensure a more equable semester workload;**

d. **that the CADD Department schedule a weekly one-hour seminar, the purpose of which will be to allow CADD students and faculty members to integrate the objectives and materials of the various courses of the program.**

3. **ATTRITION RATES:**

Typical enrolments in first-year CADD are 34 while the number is limited to 23 in the second year due to equipment constraints. This procedure guarantees a minimum attrition rate of 33%. During the 1985-1988 period, the average attrition rate in CADD was 50%. Although data from the

student surveys suggest that this attrition rate is due in part to excessive workload, dissonance between student and program objectives, student failure to utilize counselling and tutoring services, and the absence of instruction in time management and study skills, the Program Review Committee is of the opinion that any procedure that guarantees a minimum attrition rate of 33% is educationally unsound. Accordingly, it recommends:

a. **that the Dean, Applied Industrial Technology, ensure that the built-in attrition rate be reduced by adjusting first and second-year FTE allocations in CADD to more equable levels--say 30:28, 31:27 or 32:26;**

b. **that the CADD Department review the entrance requirements of potential students wishing to enter the CADD Program, with particular attention to the possibility of raising Math 12 and Physics 11 prerequisites to a C+ minimum (or requiring a pass in Physics 12);**

c. **that the Chairperson, CADD, or his designate, interview all potential students and implement a full orientation session in late Spring to introduce CADD students to College facilities and services;**

d. **that the Dean, Applied Industrial Technology, plan to implement a Spring or Summer Technology Preparation Program which would give prospective CADD and other technology students a "headstart" by offering introductory and upgrading courses such as MATH 100, Physics 110/120 or 113/123, and Computing 113 or 170;**

e. **that the CADD faculty initiate with the Counselling Department a joint review of the counselling and tutorial needs of CADD students.**

4. INTERNAL AND EXTERNAL COMMUNICATION:

The faculty survey and interviews clearly indicated that many faculty members teaching in the CADD Program are not aware of all program objectives. The Program Review Committee accordingly recommends:

a. **that the Chairperson, CADD, schedule a monthly meeting of CADD service and core course faculty to involve them in the program, familiarize them with its goals, schedule homework assignments, monitor student progress, and ensure that CADD objectives are met in each course;**

b. that the Public Relations Department work closely with the CADD faculty to develop an effective communication strategy, which would include the development of promotional materials for distribution to students and potential employers, and the improvement of recruitment and retention measures.

5. EQUIPMENT AND BUDGET:

The student and faculty surveys revealed that even though every effort has been made to maintain the currency of the CADD computing equipment, the present budget allocation does not permit the acquisition and maintenance of the equipment required to keep CADD at the forefront of today's technology. The student surveys also indicated unacceptable failure rates and excessive down-time of computing equipment. Therefore, the Program Review Committee recommends:

a. that the Dean, Applied Industrial Technology, secure the services of a hardware/software consultant to perform the following tasks on a one-time basis:

1. **ensure the functionality of existing CADD computing equipment;**

2. **establish, according to accepted industry standards, the current and future computing needs of the CADD Department (e.g. the use of printer plots);**

3. **suggest a schedule of preventative maintenance for CADD computing equipment;**

4. **establish acceptable down-time for <u>all</u> categories of equipment;**

b. that, budget permitting, the Director, Information and Facilities Services, designate a qualified technician to ensure the standards of maintenance established in a3 and a4;

c. that the Dean, Applied Industrial Technology, ensure that sufficient funds are allocated to the Equipment Maintenance and Repair section of CADD's Operating Budget to underwrite the suggested maintenance schedule (see a3 and a4);

d. that, on the completion of 5.a2 (above), the Chairperson, CADD, submit a comprehensive five-year capital equipment replacement plan to the Dean, Applied Industrial Technology;

e. **that the Chairperson, CADD, in conjunction with his Advisory Committee, investigate alternate ways of accessing CADD equipment (e.g. via gift, donation, lease, use of community and industrial resources, cost recovery training programs, etc.).**

6. FACILITIES:

Comments from both student and faculty surveys indicate that the computing lab facilities are not conducive to learning. Two types of problems were identified by the surveys: those that affect the operation of the computing equipment and those that affect the well-being of the students. The surveys suggested that most problems occur outside normal College hours, for example, at night and on weekends, when air-conditioning and heating operate a different settings than normal.

The Committee recognizes that these environmental problems increase the incidence of equipment failure and militate against the maintenance of a proper learning environment. Accordingly, it recommends:

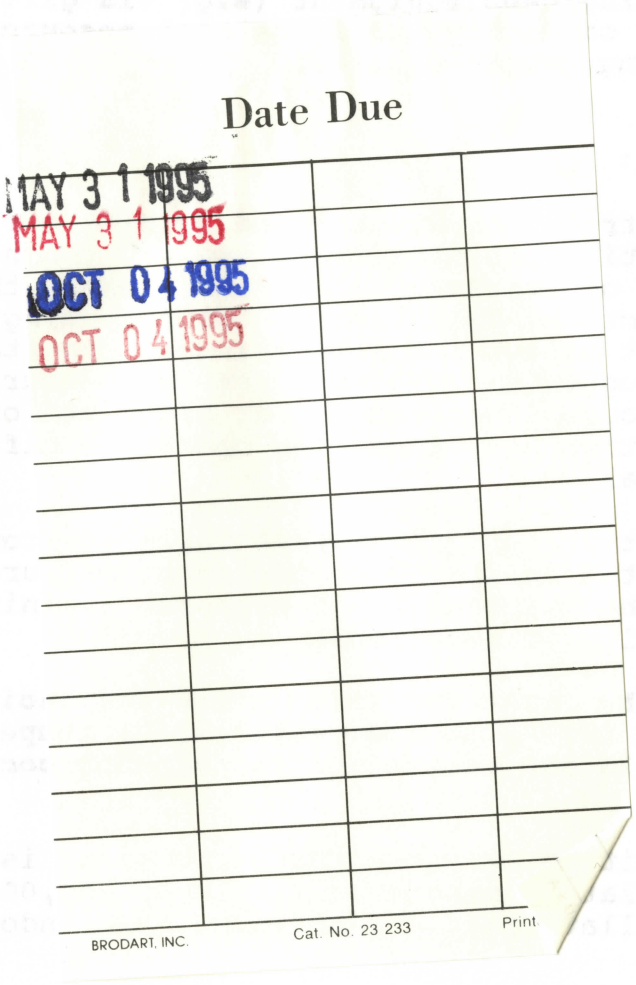
a. **that the Director, Information and Facilities Services, ensure that adequate ventilation, temperature and humidity controls are maintained in the CADD computer labs at all times;**

(The Committee is aware that a proposal is afoot to overhaul the ventilation system at a cost of $20,000, or $30,000 with the installation of a humidifier, and endorses the latter option.)

b. **that the Director, Information and Facilities Services, ensure that adequate anti-static measures be implemented, such as the grounding of all terminals, and the replacement of existing plastic chairs with those made of static-repellent material;**

c. **that the Director, Information and Facilities Services, ensure that a computer grade power distribution system be installed to supply the computing equipment;**

d. **that the Dean, Applied Industrial Technology, and the CADD faculty, ensure that CADD facility requirements are included in the plans for the Trades wing relocation/ expansion scheduled for completion in September, 1992.**



PROGRAM REVIEW REPORT ON THE