MINUTES OF THE MEETING
EDUCATION AND CULTURAL RESOURCES COMMITTEE
MONTANA STATE SENATE

January 28, 1985

The sixth meeting of the Senate Education and Cultural Resources Committee was called to order by the Chairman, Senator Chet Blaylock, at 1:03 p.m., in Room 402, State Capitol Building.

ROLL CALL: All committee members were present.

CONSIDERATION OF HOUSE BILL 80: REPRESENTATIVE STEVE WALDRON, District 58, sponsor of the bill, said this is a housekeeping bill which cleans up areas noted in the Legislative Auditor's reports, removes definitions that no longer fit, and generally clarifies the statutes relating to higher education and the Board of Public Education.

PROPONENTS:

IRVING DAYTON, Commissioner of Higher Education, presented his testimony in support of the bill (Exhibit #1).

HIDDE VAN DUYM, Executive Secretary to the Board of Public Education, expressed support for the bill.

There were no further proponents and no opponents to the bill. Representative Waldron closed.

CONSIDERATION OF HOUSE BILL 99: REPRESENTATIVE BRADLEY, District 79, sponsor of the bill, said the bill allows a person with engineering technology training to qualify for certification as an engineer-in-training. She said there is a difference between testing procedures for engineering graduates and engineering technology graduates. Engineers can take the engineer-in-training examination immediately after graduation, but engineering technologists have to wait four years after graduation to take the test, and after taking it, must wait another four more years to take the Professional Engineers test. Engineers draw the plans and models, technologists are out in the field implementing the designs and coordinating between the engineers and the craftsmen. She said the technologists want

to take the examination immediately upon completion of the academic training as the engineering students do. She said it is unfair for them to have to wait an additional four years before they are allowed to take the test and to have to work at a lower salary during that time.

PROPONENTS:

BOB DAILY, Mechanical Engineering Technology Student, MSU, presented his testimony to the committee in support of the bill (Exhibit #2).

WALTER HEINS, representing the ASMET, MSU, supported the bill (Exhibit #3).

THOMAS FLYNN, representing Technology Students at MSU, spoke in support of the bill (Exhibit #4). He presented a letter in support of the bill from Wayne Whitney, A.I.A. and presented responses to a questionnaire from past engineering graduates to the committee.

DAVID BARTZ, ASMET Club, MSU, presented his testimony in support of the bill (Exhibit #5).

RUSS LOCKREM, MSU student, said the technologists want to be construction managers and must have their EIT to apply for the position. When they graduate they can apply for GS7 level jobs if they have passed it.

MICHELLE WING, Associated Students of MSU, stated ASMSU supports the bill. She felt there is an inequity in this program when viewed against other fields such as accounting.

SENATOR PAUL BOYLAN, District 39, said he supports the students and the bill.

BILL OLSON, Secretary Manager of the Montana Contractors Association, said each year students (technologists) have been employed by contractors and they have performed very well. He said they are made to feel, in effect, second class, by having to wait to take the test. The field has changed a lot and it is essential they be provided the opportunity to take the examination.

FRANK LOCKE, JR., Dutton, is a parent of a technology student who will graduate this spring. He said some students will go to neighboring states such as Colorado to take their EIT's. He felt they shouldn't be penalized in this way.

There were no further proponents. The Chairman called for opponents to the bill.

OPPONENTS:

DAVID GIBSON, Dean of the College of Engineering at MSU, and a member of the Montana Board of Professional Engineers, presented his testimony in opposition to the bill (Exhibit #6). He said the Board feels the current process is fair. He also noted testing reciprocity with other states is doubtful.

A. T. KERSICH, Board of Professional Engineers and Land Surveyors, presented his testimony in opposition to the bill (Exhibit #7).

H.S. HANSON, representing the Montana Technical Council, said the public sector control lies in being able to take away the professional engineer's license. He said if you take a technologist's away it doesn't make any difference. He further remarked they have to take the Professional Engineers test in ten years or they lose the opportunity to take it.

There were no further opponents and after a brief discussion (clarification of testimony) Representative Bradley closed. She said having heard all the objections she still couldn't see why technologists shouldn't have the right to take the test. They still have to have their years of field experience and pass their professional engineers test. She said the bill does not infringe on engineer's rights or public safety. She felt technologists should have the opportunity to rise to the top of their field and felt this bill helps give them that opportunity.

ACTION ON HOUSE BILL 80:

SENATOR MAZUREK moved House Bill 80 BE CONCURRED IN. The motion carried unanimously. Senator Yellowtail will carry the bill.

ACTION ON HOUSE BILL 10:

SENATOR MAZUREK moved House Bill 10 BE CONCURRED IN. The motion carried unanimously. Senator Pinsoneault will carry the bill.

ACTION ON SENATE BILL 167:

SENATOR MAZUREK moved the amendments as per the attached standing committee report. The motion carried unanimously.

SENATOR PINSONEAULT moved SB 167 DO PASS AS AMENDED. The motion carried unanimously.

ADJOURN:

There being no further business to come before the committee, the meeting was adjourned.

Chet Blaylock
Senator Chet Blaylock, Chairman

jdr

ROLL CALL

SENATE EDUCATION AND CULTURAL RESOURCES COMMITTEE

49th LEGISLATIVE SESSION -- 1985 Date 1/28

NAME	PRESENT	ABSENT	EXCUSED
SENATOR PINSONEAULT	✓		
SENATOR BROWN	✓		
SENATOR REGAN	✓		
SENATOR SMITH	✓		
SENATOR HAFFEY	✓ 1:40 testifying elsewhere		
SENATOR YELLOWTAIL	✓		
SENATOR MAZUREK	✓		
SENATOR FARRELL	✓		
SENATOR McCALLUM	✓		
SENATOR BLAYLOCK, CHAIRMAN	✓		

VISITORS' REGISTER

SENATE AND HOUSE COMMITTEE _____

BILL HB 99 DATE 1/28/85

SPONSOR BRADLEY

NAME	REPRESENTING	RESIDENCE	SUPPORT	OPPOSE
WALTER K. HEINS	ENGINEERING TECHNOLOGY	BOZEMAN	✓	
H S Hanson	MT Tech. Council	HELENA		✓
A. T. Kersich	Bd of Engs & LS	Billings		✓
Thomas D Flynn	ASMcET	Dillon	✓	
J.B Kohoutek	ASMcET	Great Falls	✓	
DAVID BARTZ	ASMcET	LIVINGSTON	✓	
Bill Olson	MT. Contractors	Helena	✓	
Bob Daily	ASMcET	Butte	✓	
RUSS LOCKREM	AGC STUDENT CHAPTER	BILLINGS	✓	
DAVID SEESE	AGC StudentChap	BOZEMAN	✓	
Jeffrey Milam	ASMcET	Bozeman	✓	
Tom Freed	ASMcET	" "	✓	
Michelle E. Wing	AS MSU	Bozeman	✓	
Sheri Stevenson	AS MSU	Great falls / Bozeman	✓	
Les Stevenson		Great Falls	✓	
Lamar Gebhardt	ASMET V.P.	Roundup	✓	
Chad Nyhus	ASMET	BOZEMAN	✓	
Jeff K. Sipes	ASMET	Stevensville	✓	
Scott Boyle	Senator Story	Bzn	✓	
David J. Abbe	Bd of Engrs & LS	Boz		✓
Robert B. Morris		Helena		

IF YOU CARE TO WRITE COMMENTS, ASK SECRETARY FOR LONGER FORM.

PLEASE LEAVE PREPARED STATEMENT WITH SECRETARY

VISITORS' REGISTER

SENATE AND HOUSE COMMITTEE _____

BILL HB 99 DATE _____

SPONSOR Bradley

NAME	REPRESENTING	RESIDENCE	SUPPORT	OPPOSE
Frank Lochte Jr	Self	Dutton MT	X	

IF YOU CARE TO WRITE COMMENTS, ASK SECRETARY FOR LONGER FORM.

PLEASE LEAVE PREPARED STATEMENT WITH SECRETARY.

EXHIBIT #1
JAN. 28, 1985
ED. & CULT. RESOURCES
H.B. 80

HOUSE BILL 80

"An Act to Generally Clarify Certain Laws Relating to Higher Education and the Board of Public Education . . . . . ."

Explanatory Statement

This bill makes minor amendments to a number of sections of the statutes relating to higher education and the Board of Public Education. Most of the problems were identified in reports from the Legislative Auditor, although a few additional ones were found when the statutes were reviewed during preparation of this bill.

Section 1: The Commission on Federal Higher Education Programs (the so-called 1202 Commission) was set up by the state to oversee certain federally-funded programs. These programs have not been funded in the last few years, so the Commission has been inactive. The proposed amendment would make this section permissive, so that the Commission would be appointed and become active only if the federal programs were funded. The alternative would be to repeal this section, but then if federal funding became available it would be necessary to wait until the next legislative session to reinstate the Commission.

Section 2 and Section 4: These sections delete the requirement of specific meeting dates and places for the Board of Regents, Board of Public Education, and State Board of Education. There do not seem to be any statutory meeting dates for any comparable boards, and as a practical matter the meetings have to be scheduled when members are able to attend. The Board of Regents meets eight or nine times a year, the Board of Public Education meets eleven or twelve times a year, and the State Board of Education meets twice a year. Both the Board of Regents and the Board of Public Education hold the majority of their meetings in Helena, but the Regents also meet on University System campuses and sometimes at other locations, such as a community college. The Board of Public Education holds some meetings in Great Falls at the School for the Deaf and Blind, and also meets at public schools throughout the state. Good liaison between the two boards is accomplished by having the Executive Secretary of the Board of Public Education officed with the University System staff in Helena.

Section 3: This section changes "professional assistant" to "executive secretary" of the Board of Public Education to be consistent with the amendment which was made to Section 20-2-122 in 1983.

Section 5: This section deletes four paragraphs relating to the powers and duties of the Board of Regents.

The power to appoint an executive secretary should have been deleted in 1973 when the new constitution was implemented, since that office has been superseded by the office of Commissioner of Higher Education.

It seems unnecessary to specify the number of members in the Regents' budget committee. All Regents' committees consist of three members, although the Board generally deals with matters relating to the biennial budget while sitting as a committee of the whole.

The Board of Regents rotates its meetings among the campuses of the University System on a two-to three-year cycle. In addition, individual Regents visit campuses in connection with presidential search committees, inspections for the long-range building program, professional meetings, and cultural, social and athletic events. Under these circumstances, it is neither necessary nor practical for every Regent to visit every campus every year. The cost of these visits is not reflected in the way the Regents' budget is built, and additional funds for per diem and travel would be required if all the visits presently specified were actually made.

The last paragraph deleted duplicates paragraph (5), and also refers to the non-existent office of executive secretary.

Section 6: This section deals with reports on the use of federal Morrill-Nelson funds. The due date for the reports should have been changed at the time the end of the federal fiscal year was changed from June 30 to September 30.

Section 7 and Section 8: The Resident Student Financial Assistance Program Advisory Council set up by Section 2-15-1517 has never been appointed, and consequently has never met or functioned. It is replaced by the Guaranteed Student Loan Advisory Council set up by Section 2-15-1520, which has met regularly and has dealt with all aspects of student financial aid. There seems to be no need for two advisory councils covering the same general area.

Section 20-25-105 allows a person contributing $15,000 or more to establish an endowed professorship in the University System. This is a matter which should be handled administratively rather than by legislation, since special negotiations would usually be involved in each case. Some idea of how old this section is can be gained from the fact that the current cost of endowing a professorship would be in the range of a million dollars.

Section 9: Provides for an immediate effective date.

orm CS-34
79

~~EDUCATION~~
~~HB 99~~
HB 99
SEN. ED. & CULT. RESOURCES

NAME Bob Daly BILL NO. HB 99

ADDRESS 3751 S 19th Bozeman MT. DATE 1/28/85

WHOM DO YOU REPRESENT Mechanical Engineering Technology MSU

SUPPORT ✓ OPPOSE _____ AMEND _____

PLEASE LEAVE PREPARED STATEMENT WITH SECRETARY.

Comments:

The EIT ~~examination~~ is an 8-hr exam which covers all ~~of~~ fundamentals of engineering. Here is a review book for the exam. ~~I~~ My curriculum covers every subject listed here. The examination is also nationally written & distributed

The MET program at MSU is accredited by ABET, which is the accreditation board for engineering and technology and is also recognized by the American Society of Mech. Eng.

orm CS-34
79

EXHIBIT #3
JAN. 26, 1985
H. B. 99
SEN. ED. & CULT.
RESOURCES
COM.

NAME WALTER K. HEINS BILL No. HB 99

ADDRESS 8270 CHAPMAN ROAD DATE 1/28/85
BOZEMAN, MT 59715

WHOM DO YOU REPRESENT M.S.U., ASME-T

SUPPORT ✓ OPPOSE _____ AMEND _____

PLEASE LEAVE PREPARED STATEMENT WITH SECRETARY.

Comments:

THE FUNDAMENTALS OF ENGINEERING EXAMINATION IS DESIGNED TO BE ADMINISTERED IMMEDIATELY FOLLOWING A PERSON'S SCHOOL CAREER, FORCING A FOUR-YEAR WAIT BEFORE A TECHNICALLY EDUCATED PERSON MAY TAKE THE TEST IS IMPOSING AN UNDUE ROAD BLOCK IN HIS OR HER CAREER. SINCE THE EXAMINATION IS ONLY A MEASURE OF ACCOMPLISHMENT FOR THE STUDENT, IT CAN PROVIDE VALUABLE INFORMATION TO STRENGTHS AND DEFICIENCIES THAT MUST BE MADE UP. WITH OUT THIS INFORMATION ENGINEERING TECHNOLOGISTS ARE LEFT WITHOUT DIRECTION AS TO HOW AND WHERE TO PROCEED IN THEIR PROFESSIONAL CAREERS

The Fundamentals of Engineering Examination, more commonly called the engineer in training exam, or EIT, has one specific purpose. Its authors, a national group of engineers and educators, seek to measure each individual's grasp of engineering fundamentals as taught in college. They specifically and pointedly advise anyone wishing to take the exam to do so as soon as possible after graduation. This advise is based on the premis that the subject covered in the exam is broad and is not likely to be practiced from end to end ~~as it is in~~ in a person's career as it is in school. The exam is only to be used as a measure of competency and gives no one any specific legal rights to ~~be~~ approve an engineering project.

I think the key here is the intent

and design of the examination's authors. This test is ~~not~~ meant ~~to~~ to be taken ~~any time other than~~ shortly after a person's school career. ~~Any other time imposes a severe handicap~~ any waiting period, particularly one of several years, imposes a handicap on ~~to~~ the test taker.

Now, engineers and workmen have grown farther and farther apart. The engineering technologist was introduced to do what many engineers used to do, and that is to conduct field operations in accordance with design specifications. ~~Safety, and sound economy~~ We were meant to be part of a well-oiled machine together. The suppression of the engineering tech's career by the engineering profession is just spoiling many good chances for good teams of good men & women to work together.

Our opponents are quick to point out the academic differences between an engineering and an engineering technology curriculum. Gladly, I am quick to agree. Engineering graduates <u>are</u> better qualified to enter graduate schools or go on to be researchers and scientists. What our honorable doctors and masters of engineering seem to have forgotten is that there is another valid type of engineering: The engineering that takes place in the field where day to day decisions are made in construction and production based on sound engineering principles. This is the type of engineering that Engineering Technologists are

specifically educated to perform. Since it is also where engineering techs have displaced a few professional engineers and done their job well, you can imagine how the engineering profession feels about us. Are they really basing their opposition to House Bill # 99 on the issue of public safety? Or do they resent legitimate competition where there used to be monopoly?

Whatever our differences, what ever we are made out to be by our opposition, it must always return to the intent of the EIT's authors. A person should take the exam as soon as possible after graduation. All we are asking is is that ~~the~~ each individual have a fair chance to prove his or her competency without any undue roadblocks in the way. Our careers may well depend upon this proof of competency

And I can say that there are some competent individuals in our group, the engineering technologists.

I say that our opposition desires to judge us, as a group, guilty until proven innocent. Further, they suppress us from proving our innocence, or competence, until sufficient obstacles have insured that few will try. They cannot be allowed to continue! Let them prove us guilty, let them prove that we are a threat to the public safety and then we will let this matter rest.

Aren't we really talking about certain principles of honesty, fair play, and equality that are deeply rooted in America? ~~If one~~ One should never be judged unfairly. Judgement should come from an impartial jury. ~~One needn't be from any where. one is from it only matters what they can do.~~ Or this country, it doesn't matter ~~privilege to achieve in this society~~ One need only to prove his or her worth

and to compete according to the same rules for all

I implore you: lift our restriction. Let us take the EIT exam as soon as possible after graduation. No incompetent will ever survive ~~in practice~~ for four more years as a practicing engineer in training and then pass his or her Professional Engineer examination. ~~without proving competency right there on the proving grounds.~~

I ~~implore~~ asks you, please, give us a fair chance by recommending the passage of H.B. #99.

EXHIBIT # [illegible]
JAN. 28, 1985
H. B. 99
SEN. EDU. & CULT.
RES. COMM.

Form CS-34
79

NAME Thomas D Flynn BILL NO. HB99

ADDRESS 1209 South 5th DATE 1-28-85

WHOM DO YOU REPRESENT Montana State University Technology Student

SUPPORT X OPPOSE AMEND

PLEASE LEAVE PREPARED STATEMENT WITH SECRETARY.

Comments:

I support HB99 for many reasons particularly due to the fact that technology students are not allowed to take a competency exam of engineering principles upon their graduation. Many personel sacrifices go into a college education and I feel waiting four years has no justification towards becoming more educated ~~or~~ in the field of engineering. This exam is an assesment of our knowledge to allow us to know our strengths and weakneses upon graduation.

To prove our validity in todays industry copies of a return form of past graduates is included for the comm.

McET Questionnaire Instructions: Please answer only those questions which you feel do not invade your privacy. Additional comments are most welcome. I would appreciate your response as soon as convenience permits. Thank you for your consideration.

1) Name: GARY J. BERGMAN ('74)

2) Permanent Address:
(MAIL) BOX 2197 - DPC POUCH HOUSTON, TX 77252 (RESIDENT) BOX 2222 DUBAI, UAE

3) Current Employer & job title:
(9YR) CONOCO (Subsid. DUBAI PETROLEUM CO.) CHIEF PRODUCTION ENGINEER (SUPV. STAFF OF 16 ENGRS)

4) Previous Employer(s) & job title:
(1YR) DESIGNER - B.J. PUMPS, BORG WARNER CORP.

5) Salary: 5375 $/MO + 1942/MO BONUS/COLA

6) EIT &/or PE? E.I.T.

7) Affiliation w/ any professional societies? (Please list)
SOCIETY PETROLEUM ENGINEERS

8) Do you feel your supervisor would give you a good recommendation?
YES; APPRAISAL RANKINGS HAVE BEEN 1 PAST 3 YRS ON SCALE 1-5: P.S.- MY BOSS IS ALSO A McET! MGR OF ENGINEERING

9) Would you change the McET program? If so, how?
ADD: MICRO COMPUTER APPLICATIONS
VALVE/PIPING/PIPE STRESS, ETC APPLICATIONS & PRINCIPLES
PROJECT MANAGEMENT PRINCIPALS
TECHNICAL "BUSINESS" WRITING; IE ENGINEERING MEMOS, NOT REPORTS
DELETE: MACHINE SHOP PRACTICES

10) If you could "do it all over again" would you still choose Mechanical Engineering Technology? ABSOLUTELY & SO WOULD MANY OF MY PEERS & OF DIFFERENT DISCIPLINES!

11) Would you be willing to write a letter of support for the McET program? YES if you need more than the attached let me know.

Although I would like to use your name in connection w/ these findings, if you wish to remain anonymous please check here: ☐

Feel free to write additional comments on the back if you wish.

January 7,1985

To Whom It May Concern:

It has been brought to my attention that there is consideration being given to restrict or minimize development of the MSU Mechanical Engineering Technology program. Being an alumni of the Mech. Engr. Tech program and a successful member of the engineering profession today, this is very upsetting.

I have progressed through the engineering rank of my company quite rapidly and I give the majority of the credit to the EXCELLENT "practical" engineering education I received in the Mech. Engr. Tech. program at MSU. I am currently the Chief Production Engineer for Dubai Petroleum Co. (subsidiary of CONOCO) after 8 years of experience. I supervise a staff of 16 engineers of various disciplines and have responsibility for all design and operational support engineering. My 1985 project expenditure budget is $370 million of which my engineering staff is responsible for approximately 35%.

I am a strong advocate for the MSU Mech. Engr. Tech. program since it has provided me a valuable education on how to cope with the REAL engineering world, not the THEORETICAL engineering world. I have had my superiors request me to explain the MSU McET program to their sons during their high school years in order to help them find direction in their career choice. In all cases the student wanted to get an engineering education, but did not want a career of calculating numbers. They wanted a job which allowed them to apply engineering principles in the REAL world. I am quite proud that those students I had talked to in high school went on to the MSU McET program, graduated, found satisfactory jobs, and have personnaly thanked me for the help in their career direction.

I feel the strong point of the McET program is its emphasis on the practical application of engineering principles. The curriculum is also broad enough to give the engineer a wide experience base, which is very important in the multidiscipline industries of today.

My experience as an engineering supervisor of Mechanical Engineers has shown me that most engineers wish they had been able to take some practical courses in college, such as welding principles, surveying, electronics, etc rather than all the calculus and design courses because they never apply them in REAL life. I have been very thankful that my college education was practical and broad as I was able to adapt to the REAL world quickly.

Whatever the reasons are for considering restricting the MSU McET program, I would hope the decision makers look at the REAL world and acknowledge that type of training the industry is looking for. Today's college grads DON'T need more engineers

just as badly as it needs researchers. Lets not hinder the manpower pool which is keeping this country running. It is also important that MSU provide the type of curriculum that the student wants, as is evidenced by the current McET enrollment.

I hope these comments from someone who has been there will allow you to reconsider the thoughts of restricting development of the MSU McET Program.

Gary J. Bergman ('74)

McET Questionnaire Instructions: Please answer only those questions which you feel do not invade your privacy. Additional comments are most welcome. I would appreciate your response as soon as convenience permits. Thank you for your consideration.

1) Name: James L. URION (Jim)

2) Permanent Address: 1558 w. Windsor st
San Bernardino, CA
92407

3) Current Employer & job title:
United States Air Force / C-141B Pilot

4) Previous Employer(s) & job title:
Flodin Lumber Company (summers in college)
Green chain
dry chain
Planer head
Tail saw

5) Salary: $ 28,000

6) EIT &/or PE? NO

7) Affiliation w/ any professional societies? (Please list)
Air Force Association
ASMcET (Past President)

8) Do you feel your supervisor would give you a good recommendation?
Yes

9) Would you change the McET program? If so, how?
It's been so long, Marty, that I don't really know how you run it now. Keep the emphasis on industrial management that we had before. That, coupled with the technical training, is the secret.

10) If you could "do it all over again" would you still choose Mechanical Engineering Technology? Without question.

11) Would you be willing to write a letter of support for the McET program? Yes. Just let me know what you need.

Although I would like to use your name in connection w/ these findings, if you wish to remain anonymous please check here: ☐
Heavens. Use my name all you want to.

Feel free to write additional comments on the back of this sheet.

Good to hear from you, Marty, and Merry Christmas

By the way. I'm sorry to hear that the Engineering Department is up to it's old tricks again. It seems like we fought all these battles eight years ago. Underwriting the graduate program at the expense of the McET undergraduate students is at best dirty pool and at worst bad management of the school. Maybe it would be helpful to have the companies that hire McET's and are pleased with the product add their voice to the cause.

I'm not sure how valid my views as an Air Force Pilot are to the Engineering School since I'm not an "Engineer" Per se, but Feel Free to use my name and let Me know if I can be of any help. Say a big hello to Murph for Me, OK?

Jim

McET Questionnaire Instructions: Please answer only those questions which you feel do not invade your privacy. Additional comments are most welcome. I would appreciate your response as soon as convenience permits. Thank you for your consideration.

1) Name: Ronald Roberts

2) Permanent Address: 11357 SE. 212th LN Apt. 63, Kent, WA 98031

3) Current Employer & job title: Boeing CAC
Manu. Engr.

4) Previous Employer(s) & job title: Student

5) Salary: $26,000/yr

6) EIT &/or PE? no

7) Affiliation w/ any professional societies? (Please list)
ASME

8) Do you feel your supervisor would give you a good recommendation?
Yes

9) Would you change the McET program? If so, how?

Yes, I feel that the current Fluid Mechanics course (EM) is not up to the standards of other McET courses.

(over)

10) If you could "do it all over again" would you still choose Mechanical Engineering Technology? Yes

11) Would you be willing to write a letter of support for the McET program? Yes

Although I would like to use your name in connection w/ these findings, if you wish to remain anonymous please check here: ☐

Feel free to write additional comments on the back of this sheet.

Courses in N/C Programing and CAD/CAM should be offered for those interested in manufacturing.

McET Questionnaire Instructions: Please answer only those questions which you feel do not invade your privacy. Additional comments are most welcome. I would appreciate your response as soon as convenience permits. Thank you for your consideration.

1) Name: Robert K. Kerkes JR.

2) Permanent Address:
P.O. Box 81
Sand Coulee, MT. 59472

3) Current Employer & job title:
General Electric Field Engineer

4) Previous Employer(s) & job title:

5) Salary: 31,200 /yr.

6) EIT &/or PE?

7) Affiliation w/ any professional societies? (Please list)
No

8) Do you feel your supervisor would give you a good recommendation?
Yes

9) Would you change the McET program? If so, how?
No.

10) If you could "do it all over again" would you still choose Mechanical Engineering Technology? Yes

11) Would you be willing to write a letter of support for the McET program? Yes

Although I would like to use your name in connection w/ these findings, if you wish to remain anonymous please check here: ☐

Feel free to write additional comments on the back of this sheet.

5 x 4

McET Questionnaire Instructions: Please answer only those questions which you feel do not invade your privacy. Additional comments are most welcome. I would appreciate your response as soon as convenience permits. Thank you for your consideration.

1) Name: MARK FIX

2) Permanent Address:
P.O. Box 1054
SULTAN, WASHINGTON 98294

3) Current Employer & job title:
BOEING, SENIOR ENGINEER

4) Previous Employer(s) & job title:
HALLIBURTON, ENGINEER IN TRAINING

5) Salary: $29,700/YR

6) EIT &/or PE? NO

7) Affiliation w/ any professional societies? (Please list)

8) Do you feel your supervisor would give you a good recommendation?
YES

9) Would you change the McET program? If so, how?
NO

10) If you could "do it all over again" would you still choose Mechanical Engineering Technology? YES

11) Would you be willing to write a letter of support for the McET program? YES

Although I would like to use your name in connection w/ these findings, if you wish to remain anonymous please check here: ☐

Feel free to write additional comments on the back of this sheet.

McET Questionnaire Instructions: Please answer only those questions which you feel do not invade your privacy. Additional comments are most welcome. I would appreciate your response as soon as convenience permits. Thank you for your consideration.

1) Name: Greg Hietpas

2) Permanent Address: 4821 South David
Casper, Wy 82601

3) Current Employer & job title:
P.A Inc. Maintenance Mgr.

4) Previous Employer(s) & job title:

5) Salary: 29,000

6) EIT &/or PE? No

7) Affiliation w/ any professional societies? (Please list)
No

8) Do you feel your supervisor would give you a good recommendation?
yes

9) Would you change the McET program? If so, how?
No

10) If you could "do it all over again" would you still choose Mechanical Engineering Technology? Unsure

11) Would you be willing to write a letter of support for the McET program? yes

Although I would like to use your name in connection w/ these findings, if you wish to remain anonymous please check here: ☐

Feel free to write additional comments on the back of this sheet.

McET Questionnaire Instructions: Please answer only those questions which you feel do not invade your privacy. Additional comments are most welcome. I would appreciate your response as soon as convenience permits. Thank you for your consideration.

1) Name: JAMES BANYAI

2) Permanent Address: 1732 NE 24TH ST
RENTON WA 98056

3) Current Employer & job title: BOEING - SEATTLE
ENGINEER & AIRCRAFT HYDRAULIC SYSTEM ANALYSIS

4) Previous Employer(s) & job title:
NONE SINCE GRADUATION

5) Salary: >28,000/YR

6) EIT &/or PE? WORKING ON EIT

7) Affiliation w/ any professional societies? (Please list)
SPEEA - SEATTLE PROFESSIONAL ENGINEERING EMPLOYEES ASSOCIATION

8) Do you feel your supervisor would give you a good recommendation?
YES

9) Would you change the McET program? If so, how?
MORE MATH - NOT INTENSIVE THOUGH

10) If you could "do it all over again" would you still choose Mechanical Engineering Technology? KNOWING WHAT I DO NOW I WOULD LIKE TO BE A MACHINIST / WELDER

11) Would you be willing to write a letter of support for the McET program? YES

Although I would like to use your name in connection w/ these findings, if you wish to remain anonymous please check here: ☐

Feel free to write additional comments on the back of this sheet.

McET Questionnaire Instructions: Please answer only those questions which you feel do not invade your privacy. Additional comments are most welcome. I would appreciate your response as soon as convenience permits. Thank you for your consideration.

1) Name: PATRICK MCKELLY

2) Permanent Address:

2519 LARAMIE DR #105

ALLIANCE NE 69301

3) Current Employer & job title: BURLINGTON NORTHERN RAILROAD
CORPORATE MANAGEMENT TRAINEE/MECH. DEPT

4) Previous Employer(s) & job title:

DRESSER ATLAS DIV DRESSER INDUSTRIES
FIELD ENGINEER

5) Salary: BN TRAINING SALARY $2150/MO.
PREVIOUS DA: 2420 +/MO.

6) EIT &/or PE? NO

7) Affiliation w/ any professional societies? (Please list)
SOCIETY of PETROLEUM ENGINEERS

8) Do you feel your supervisor would give you a good recommendation?
YES

9) Would you change the McET program? If so, how?
NO REAL CHANGE IN "CORE" ENGINEERING COURSES BUT POSSIBLY PUSH MORE BUSINESS CLASSES (MGMT ACCTNG ECON.) AS HUMANITIES INSTEAD of the OLD STANDBYS PSYCH SOC GEOG.

10) If you could "do it all over again" would you still choose Mechanical Engineering Technology? YES

11) Would you be willing to write a letter of support for the McET program? YES

Although I would like to use your name in connection w/ these findings, if you wish to remain anonymous please check here: ☐

Feel free to write additional comments on the back of this sheet.

Hey Marty,

I would really hate to see the Down Grading of the MCET Dept. I Dont see how an Administration can Limit to an enrollment Number, if there are a large Number of student who are enrolled and are putting an effort out, the University should oblige and try and help them out.

There is a place for most everything and I feel MSU is not a place for a heavy Research / Graduate Curriculum, especially if they have to take away from the Undergraduate programs.

Many students are enrolled in the MCET program to get a "hands on" engineering education and dont want to sit at a desk designing or researching all the time.

A Recruiter told me once, that they like hiring from MSU because the students arent afraid to get out and work if they have to and students from other Big Universities think the World is one Big Skywalk from Building to Building.

Glad to see you are working for the Program and I would certainly write a letter to the Dean or ME Dept Head if needed.

Sincerely

Pat Kelly

McET Questionnaire Instructions: Please answer only those questions which you feel do not invade your privacy. Additional comments are most welcome. I would appreciate your response as soon as convenience permits. Thank you for your consideration.

1) Name: KEITH J. DEHN

2) Permanent Address: 11357 SE 212TH LN #63
KENT WA 98031 (206)854-4875

3) Current Employer & job title:
BOEING AEROSPACE Co. MECHANICAL TESTING ENGINEER

4) Previous Employer(s) & job title:
N/A

5) Salary: 25,500/YR

6) EIT &/or PE? NO

7) Affiliation w/ any professional societies? (Please list)
ASSOCIATE MEMBER ASME
STARTED AS STUDENT MEMBER ASMET MSU

8) Do you feel your supervisor would give you a good recommendation?
YES

9) Would you change the McET program? If so, how?
YES, I WOULD REQUIRE 1 MORE QTR IN COMPUTER PROGRAMMING, MORE SPECIFICALLY IN FORTRAN.

10) If you could "do it all over again" would you still choose Mechanical Engineering Technology? YES

11) Would you be willing to write a letter of support for the McET program? YES

Although I would like to use your name in connection w/ these findings, if you wish to remain anonymous please check here: ☐

Feel free to write additional comments on the back of this sheet.

McET Questionnaire Instructions: Please answer only those questions which you feel do not invade your privacy. Additional comments are most welcome. I would appreciate your response as soon as convenience permits. Thank you for your consideration.

1) Name: MARSHA B. COSTELLO

2) Permanent Address: 825 47TH ST. S.

3) Current Employer & job title: JOHNSON CONTROLS
ENGINEERING MANAGER

4) Previous Employer(s) & job title:
SAME EMPLOYER
APPLICATION ENGINEER
PROJECT MANAGER

5) Salary: $36,000/YR

6) EIT &/or PE? NO

7) Affiliation w/ any professional societies? (Please list) NO

8) Do you feel your supervisor would give you a good recommendation?
YES

9) Would you change the McET program? If so, how?
- MORE MANAGEMENT/BUSINESS CLASSES
- EMPHASIZE & DEVELOP PERSONAL QUALITIES THAT CONTRIBUTE TO SUCCESSFUL WORK HABIE- IE - INITIATIVE, GOOD PRESENTATION OF FACTS, NEATNESS TELEPHONE MANNERS

10) If you could "do it all over again" would you still choose Mechanical Engineering Technology? PROBABLY

11) Would you be willing to write a letter of support for the McET program?

Although I would like to use your name in connection w/ these findings, if you wish to remain anonymous please check here: ☐

Feel free to write additional comments on the back of this sheet.

McET Questionnaire Instructions: Please answer only those questions which you feel do not invade your privacy. Additional comments are most welcome. I would appreciate your response as soon as convenience permits. Thank you for your consideration.

1) Name: William F. Purdy

2) Permanent Address: 29521 184th ST. SE.

3) Current Employer & job title: Boeing
SENIOR ENGINEER

4) Previous Employer(s) & job title: Boeing.
Engineer

5) Salary: $32,000/year

6) EIT &/or PE? NO

7) Affiliation w/ any professional societies? (Please list)

None

8) Do you feel your supervisor would give you a good recommendation?
Yes

9) Would you change the McET program? If so, how? NO.

10) If you could "do it all over again" would you still choose Mechanical Engineering Technology? Yes

11) Would you be willing to write a letter of support for the McET program? Yes

Although I would like to use your name in connection w/ these findings, if you wish to remain anonymous please check here: ☐

Feel free to write additional comments on the back of this sheet.

Ex. 1

McET Questionnaire Instructions: Please answer only those questions which you feel do not invade your privacy. Additional comments are most welcome. I would appreciate your response as soon as convenience permits. Thank you for your consideration.

1) Name: JEFF APPLIN

2) Permanent Address: 4927 NO. MONTANA AVE.
HELENA, MT. 59601

3) Current Employer & job title: MONTANA HWY. DEPT. ← EMPL
CONSUCTANT DESIGN ← DEPT.
DESIGN TECHNICIAN II ← TIT

4) Previous Employer(s) & job title:
CONOCO INC. ← EMPLOYER
PRODUCTION ← DEPT.
MAINTENANCE OPERATOR ← TIT

5) Salary: CONOCO → #28,000/YR.
HWY DEPT. → #16,000/YR.

6) EIT &/or PE? NO

7) Affiliation w/ any professional societies? (Please list)
NO

8) Do you feel your supervisor would give you a good recommendation?
YES

9) Would you change the McET program? If so, how?
MORE HANDS ON CLASSES LIKE THE RABBIT CRAP ROTORY BUILT IN THE SPECIAL SENIOR PROJECT CLASS OF 1981.

10) If you could "do it all over again" would you still choose Mechanical Engineering Technology? YES

11) Would you be willing to write a letter of support for the McET program? YES

Although I would like to use your name in connection w/ these findings, if you wish to remain anonymous please check here: ☐

Feel free to write additional comments on the back of this sheet.
[illegible] Marty. If I do [illegible] I can do so. Jeff

Chevron U.S.A. Inc.
646 County Square Drive
P. O. Box 6917, Ventura, CA 93006
Phone (805) 658-4411

R. L. (Ron) Wilcox
Drilling Representative
Production Department
Southern California Division

Ex. 1

ructions: Please answer only those

l do not invade your privacy. Additional

ne. I would appreciate your response

as soon as convenience permits. Thank you for your consideration.

1) Name: Ronald L. Wilcox

2) Permanent Address: 4438 Leatherwood
Camarillo, CA 93010

3) Current Employer & job title: Chevron USA, Inc.
Drilling Representative

4) Previous Employer(s) & job title:
Continental Oil Co. - Engineering Technician
Arabian American Oil Co - Engineer

5) Salary: $50,800/yr plus 10% drilling bonus

6) EIT &/or PE? No

7) Affiliation w/ any professional societies? (Please list)
Society of Petroleum Engineers

8) Do you feel your supervisor would give you a good recommendation?
Present supervisor has only know me for 6 months -

9) Would you change the McET program? If so, how?
Add a petroleum option - it seems that many grads have gone into the industry.

10) If you could "do it all over again" would you still choose Mechanical Engineering Technology? Maybe. The Technology title gave me some problems when changing employers.

11) Would you be willing to write a letter of support for the McET program? Yes, although I hate writing!

Although I would like to use your name in connection w/ these findings, if you wish to remain anonymous please check here: ☐

Feel free to write additional comments on the back of this sheet.

Marty,

I have never met you, but Murph has spoken highly of you and has kept me informed on the ongoing "political" problems at MSU.

Hope you every success with this project. I was involved with the EIT fight while I was prsident - know the inertia of the system.

The curriculum has it place in the system, but I did find the technology degree always raised questions. Am sure it also failed to open a few doors when I was trying to return from Saudi Arabia. Every student should be made aware that in poor hiring years as we have just had, a "full" degree would mean another potential roadblock is removed.

Say hi to Murph - he has carried a real load and helped a lot of student. World needs more men like him!

Ronald L Wilson

Ex. 4

McET Questionnaire Instructions: Please answer only those questions which you feel do not invade your privacy. Additional comments are most welcome. I would appreciate your response as soon as convenience permits. Thank you for your consideration.

1) Name: WILLIAM D. MURRAY

2) Permanent Address: P.O. Box 35
EMPIRE, NV 89405

3) Current Employer & job title: EMPLOYER: UNITED STATES GYPSUM CO.
TITLE: PROJECT ENGINEER, ENG. DEPT.

4) Previous Employer(s) & job title:
THIS IS MY FIRST JOB SINCE RECEIVING MY DEGREE

5) Salary: $27,300

6) EIT &/or PE? NEITHER

7) Affiliation w/ any professional societies? (Please list)
MEMBER, A.S.M.E.

8) Do you feel your supervisor would give you a good recommendation?
IMMEDIATELY

9) Would you change the McET program? If so, how?
NOT IN ANY DRASTIC MANNER. I WOULD HAVE FOUND USE FOR COURSES IN THE FOLLOWING AREAS. PROJECT SCHEDULING / TIME LINE DEVELOPMENT, INDUSTRIAL FANS, USE OF THE PC IN ENGINEERING & ACCOUNTING APPLICATIONS, PROGRAMABLE CONTROLLERS, FEET REQUIRED MUST COVER THE BASICS THOROUGHLY BEFORE BECOMING A "SINK OR SWIM" PROPOSITION. BASIC SURVEYING SHOULD BE REQUIRED. TIME MANAGEMENT COURSES COULD BE HELPFUL

10) If you could "do it all over again" would you still choose Mechanical Engineering Technology? WITH A PHYSICS MINOR

11) Would you be willing to write a letter of support for the McET program? YOU BET

Although I would like to use your name in connection w/ these findings, if you wish to remain anonymous please check here: ☐

Feel free to write additional comments on the back of this sheet. ONE SUGGESTION WOULD BE THAT THE AREAS SHOULD BE EMPHASIZED WITH THE DEPARTMENT

DEAR MARTY –

I'M NOT SURE WHO ALL THE NEW PEOPLE ARE UP THERE BUT THEY ARE WRONG ABOUT CHASING THIS RESEARCH PIE-IN-THE-SKY. GRANTED, THE GYPSUM INDUSTRY ISN'T EXACTLY WHAT YOU'D CALL "HI TECH" BUT WE ARE BEGINNING TO COME AROUND A BIT. IF I WERE TO SIT DOWN AND COUNT THE TIMES I USED SOME FUNDIMENTAL ENGINEERING IDEA OR CONCEPT VS. SOME CONCEPT RIGHT ON THE BRINK OF TECHNOLOGY (OR RESEARCH, IN THIS CASE) THE NUMBERS WOULD BE IN THE 500 TO 1 RANGE, IF INDEED THAT LOW. I GUESS I CAN'T SAY ~~THAT~~ HOW IMPORTANT FUNDIMENTALS ARE OFTEN ENOUGH.

I BELIEVE THAT THE MCET PROGRAM IS SET UP TO LAY THE GROUNDWORK FOR AN EDUCATION IN ENGINEERING FUNDIMENTALS. I FIRMLY BELIEVE ELIMINATION OF THE MCET PROGRAM TO BOOST UP THE M.E. PROGRAM WOULD BE AS STUPID AS ELIMINATING THE M.E. PROGRAM TO BOOST UP THE MCET PROGRAM. BEING A MCET IS IN <u>NO WAY</u> A STEP BELOW BEING A M.E. ... IT IS INSTEAD ANOTHER ENGINEERING PATH TO UNDERSTANDING THE WORLD AROUND US, KEEPING IT RUNNING SMOOTHLY, AND LOOKING FOR WAYS TO MAKE IT RUN MORE SMOOTHLY & EFFICIENTLY. PLEASE QUOTE ME.

BEST WISHES

Bill

McET Questionnaire Instructions: Please answer only those questions which you feel do not invade your privacy. Additional comments are most welcome. I would appreciate your response as soon as convenience permits. Thank you for your consideration.

1) Name: Larry Price

2) Permanent Address: 417 E. 10th. St.
Berwick, Pa. 18603

3) Current Employer & job title: Bechtel Construction Inc.
Special Asst. to Project Field Engineer

4) Previous Employer(s) & job title:
I have worked for Bechtel since graduating -
Previous title Lead Mechanical Engineer.

5) Salary: $50,000

6) EIT &/or PE? No

7) Affiliation w/ any professional societies? (Please list)
None

8) Do you feel your supervisor would give you a good recommendation?
Yes

9) Would you change the McET program? If so, how?
No

10) If you could "do it all over again" would you still choose Mechanical Engineering Technology? Yes

11) Would you be willing to write a letter of support for the McET program? Yes

Although I would like to use your name in connection w/ these findings, if you wish to remain anonymous please check here: ☐

Feel free to write additional comments on the back of this sheet.
Thank You

I feel that the MCET program provides a more practical background than other fields and better prepares engineers for certain fields than a straight/standard engineering curriculum.

I was the Lead Mechanical Engineer for about 8 years on the construction of a double unit nuclear power plant (Susquehanna Steam Electric Station). My groups responsibilities included: installation, assembly/erection, HVAC maintenance, some start-up, and crane load testing. Design included temporary equipment.

During the course of the project I hired approximately 50 engineers. I feel that the people with a B.S. in engineering technology were, in general, the best suited ~~the~~ to this type of work.

Ex. 4

McET Questionnaire Instructions: Please answer only those questions which you feel do not invade your privacy. Additional comments are most welcome. I would appreciate your response as soon as convenience permits. Thank you for your consideration.

1) Name: Kelvin Edsall

2) Permanent Address:
P.O. Box 774645
Eagle River AK 99577

3) Current Employer & job title:
Conoco Inc Senior Foreman

4) Previous Employer(s) & job title:
—

5) Salary: $72,000

6) EIT &/or PE? No

7) Affiliation w/ any professional societies? (Please list)
Society of Petroleum Engineers

8) Do you feel your supervisor would give you a good recommendation?
yes

9) Would you change the McET program? If so, how?
No I believe McET prepared me adequatly for the type of job I am doing.

10) If you could "do it all over again" would you still choose Mechanical Engineering Technology? yes!!

11) Would you be willing to write a letter of support for the McET program? yes

Although I would like to use your name in connection w/ these findings, if you wish to remain anonymous please check here: ☐

Feel free to write additional comments on the back of this sheet.

Ex. D

McET Questionnaire Instructions: Please answer only those questions which you feel do not invade your privacy. Additional comments are most welcome. I would appreciate your response as soon as convenience permits. Thank you for your consideration.

1) Name: JOE E. MERHAR

2) Permanent Address: 702 CEDAR SHELBY, MT 59474

3) Current Employer & job title: CONOCO INC.
LEASE OPERATOR

4) Previous Employer(s) & job title:

5) Salary: $26,300.00/YEAR

6) EIT &/or PE? NOT YET

7) Affiliation w/ any professional societies? (Please list)
AMERICAN SOCIETY OF MECHANICAL ENGINEERS

8) Do you feel your supervisor would give you a good recommendation?
YES

9) Would you change the McET program? If so, how? NO

10) If you could "do it all over again" would you still choose Mechanical Engineering Technology? YES

11) Would you be willing to write a letter of support for the McET program? YES

Although I would like to use your name in connection w/ these findings, if you wish to remain anonymous please check here: ☐

Feel free to write additional comments on the back of this sheet.

MARTY,

I HOPE THAT THIS HELPS OUT. ACTIONS 2-5 ELEVATE MY BLOOD PRESSURE AS WELL AS TEMPERATURE. PLEASE FEEL FREE TO ASK FOR MY HELP AS I WILL HELP YOU OUT ANY WAY THAT I CAN. GOOD LUCK WITH THE CONTINUING PROBLEM OF THE ME DEPARTMENT TRYING TO SHUT DOWN AND/OR SHORT CHANGE THE MCET PROGRAM.

Joe Smith A FELLOW BELIEVER IN THE MCET PROGRAM!

MY ADDRESS IS

P.O BOX 63
LINCH, WY
82640

MY PHONE IS

307-437-9265

McET Questionnaire Instructions: Please answer only those questions which you feel do not invade your privacy. Additional comments are most welcome. I would appreciate your response as soon as convenience permits. Thank you for your consideration.

1) Name: Alan J. Wilson

2) Permanent Address: 21301 118th AVE E
GRAHAM, Wa. 98338

3) Current Employer & job title: THE BOEING COMP.
JOB TITLE. Senior TOOLENGR. COMP: P.O. BOX 3707
SEATTLE, Wa 98127

4) Previous Employer(s) & job title:
NONE

5) Salary: $31,800 /yr.

6) EIT &/or PE? NONE

7) Affiliation w/ any professional societies? (Please list)
NONE

8) Do you feel your supervisor would give you a good recommendation?
YES, HE IS A TREMENDOUS PERSON.

9) Would you change the McET program? If so, how?
I REALLY ENJOYED THE "HANDS ON" TYPE OF ENGR, AND McET PROGRAM HAS HELPED ME OBVIOUSLY IN PREPARING ME FOR THE FUTURE. I WOULD LIKE SEE A BIT MORE

10) If you could "do it all over again" would you still choose Mechanical Engineering Technology? YES

11) Would you be willing to write a letter of support for the McET program? YES

Although I would like to use your name in connection w/ these findings, if you wish to remain anonymous please check here: ☐

Feel free to write additional comments on the back of this sheet.

IN A PRACTICAL SENSE, I BELIEVE THE MEET PROGRAM HAS NOT ONLY HELPED ME IN MY PROFESSION BUT ALSO IN MY HOME LIFE. PROBLEMS ARE SOLVED EASIER, FASTER & NEATER THAN EVER BEFORE. SINCE I ALSO DO bodywork on cars, MEET HAS PREPARED ME IN MATERIAL TECHNOLOGY FOR BOTH HOME & WORK AT BOEING

SINCERELY,

Alan J. Wilson

ALAN V. WILSON
21301 118TH AVE
GRAHAM WA.
98338

P.S. ANYTHING I CAN DO TO KEEP MARTY. THANKS FOR THE LETTER OF CONCERN TO.

McET Questionnaire Instructions: Please answer only those questions which you feel do not invade your privacy. Additional comments are most welcome. I would appreciate your response as soon as convenience permits. Thank you for your consideration.

1) Name: BRUCE D ARTHUR

2) Permanent Address: P.O. Box 214
WINNETT, MT 59087

3) Current Employer & job title:
HILLTOP SERVICE-ARAC, INC V.P.

4) Previous Employer(s) & job title:

5) Salary: ———

6) EIT &/or PE?

7) Affiliation w/ any professional societies? (Please list)

No

8) Do you feel your supervisor would give you a good recommendation?

YES

9) Would you change the McET program? If so, how?

As I am not familiar with the present program I don't feel I could give a representative answer. The program in 1970 was very good.

10) If you could "do it all over again" would you still choose Mechanical Engineering Technology? "YES"

11) Would you be willing to write a letter of support for the McET program? If I could review the present program, it would be possible.

Although I would like to use your name in connection w/ these findings, if you wish to remain anonymous please check here: ☐

Feel free to write additional comments on the back of this sheet.

(over)

At the time Mech. Tech. was introduced, there were several M.E. students and others in the engineering field that transferred into Mech. Tech. When this occurred it was thought that there was a need for a curriculum with an engineering base but had more practical application of theories and also an emphasis on the business part of employment. The Mech. Tech. program of the past covered these areas very well and also the placement of graduates should prove the need for a balanced curriculum between engineering and business.

Bruce D. Arthur
Grad. Winter 1970

Ex. 1

McET Questionnaire Instructions: Please answer only those questions which you feel do not invade your privacy. Additional comments are most welcome. I would appreciate your response as soon as convenience permits. Thank you for your consideration.

1) Name: John Baune

2) Permanent Address: Rt. 1, Box 66
Sun River, MT 59483

3) Current Employer & job title: Self employed — own business of Gemology, silver & gold smithing.

4) Previous Employer(s) & job title:
Boeing - Research & Development Engineer, Tooling Engineer & Coordinator Project Planning & Engineering.

5) Salary:

6) EIT &/or PE?

7) Affiliation w/ any professional societies? (Please list)
S.P.E.A.

8) Do you feel your supervisor would give you a good recommendation?
He did!

9) Would you change the McET program? If so, how?
Couple courses on basic application & implementation of engineering technology in companies (funding, expediting etc) if it hasn't been added. And a course in technical writting.

10) If you could "do it all over again" would you still choose Mechanical Engineering Technology? Absolutely

11) Would you be willing to write a letter of support for the McET program? Yes

Although I would like to use your name in connection w/ these findings, if you wish to remain anonymous please check here: ☐

Feel free to write additional comments on the back of this sheet.

(over)

From what have seen in business the M.E.'s E.E.'s, C.E.'s etc limit themselves to a very restricted field where the McET's have the broad base to benifet their employer much more.

Its regretful that all the M.E.'s have their prejudice and bigotry, which severely handicapes them out in the business world and has limited their salaries. With exposiour, the McET grad. has more to offer and is desired by both smaller and large business.

Good luck in educating the educators on the important and unique place McET grad's have in this fast changing techaological business ~~dinat~~ society.

God's Great Blessings,

John Baune

McET Questionnaire Instructions: Please answer only those questions which you feel do not invade your privacy. Additional comments are most welcome. I would appreciate your response as soon as convenience permits. Thank you for your consideration.

1) Name: RICH BACHIK

2) Permanent Address: 4005 PALOMAR LA.
AUSTIN, TEXAS 78727

3) Current Employer & job title: MCC (MICROELECTRONICS & COMPUTER TECHNOLOGY CORPORATION)
SR. DEVELOPMENT ENGINEER

4) Previous Employer(s) & job title: LOCKHEED MISSILES & SPACE CORP.
SR. GROUP DESIGN ENGINEER

5) Salary: $50,000/YR

6) EIT &/or PE? NO.

7) Affiliation w/ any professional societies? (Please list)
ASME, ISHM (INTERNATIONAL SOCIETY FOR HYBRID MICROELECTRONICS)
IPC (INSTITUTE OF PACKAGING CIRCUITS)
ASSOCIATION OF OLD CROWS (ELECTRONIC WARFARE)

8) Do you feel your supervisor would give you a good recommendation?
YES, IT IS EXTREMELY DIFFICULT TO OBTAIN EMPLOYMENT WITH THIS ELITE OUTFIT!

9) Would you change the McET program? If so, how?
NO!

10) If you could "do it all over again" would you still choose Mechanical Engineering Technology? MOST DEFINITELY - IT IS ONE OF THE ONLY "HANDS-ON REAL WORLD" BACKGROUNDS

11) Would you be willing to write a letter of support for the McET program? YOU NAME THE TIME
YES,

Although I would like to use your name in connection w/ these findings, if you wish to remain anonymous please check here: ☐

Feel free to write additional comments on the back of this sheet.

MARTY –

LET ME KNOW WHAT IS GOING ON AND IF I CAN BE OF ANY HELP (SHORT OF SENDING MONEY) LET ME KNOW.

REGARDS,

Rick

P.S. THE GREEN "SIN BIN" STILL LIVES WITH AN ENGINE OVERHAUL @ 120K MILES ON IT. WHAT TIMES WE HAD, HUH?

McET Questionnaire Instructions: Please answer only those questions which you feel do not invade your privacy. Additional comments are most welcome. I would appreciate your response as soon as convenience permits. Thank you for your consideration.

1) Name: PATRICK J DEVINE

2) Permanent Address: 5002 NE 34th ST
TACOMA, WA 98422

3) Current Employer & job title: BOEING AEROSPACE CO.
MECH. FACILITIES ENGR

4) Previous Employer(s) & job title:
BOEING AEROSPACE CO.
MFG ENGR

5) Salary: $29,000/YR

6) EIT &/or PE? NO, INTEND TO TAKE EIT IN OCT '85

7) Affiliation w/ any professional societies? (Please list)
ASHRAE

8) Do you feel your supervisor would give you a good recommendation?
YES

9) Would you change the McET program? If so, how?
EXPAND THE PROGRAM TO OFFER MORE ELECTIVES IN MCET.

10) If you could "do it all over again" would you still choose Mechanical Engineering Technology? YES, I believe there is a high demand for McET's

11) Would you be willing to write a letter of support for the McET program? YES

Although I would like to use your name in connection w/ these findings, if you wish to remain anonymous please check here: ☐

Feel free to write additional comments on the back of this sheet.

Would be glad to obtain recommendations from several Boeing supervisors if it would be of assistance to you.

I HAVE FOUND MY DEGREE TO BE A GREAT ADVANTAGE. I WORKED FOR (4) yrs IN MFG ENGR. THE MFG BACKGROUND I WAS A (FROM MCET CLASSES) DEFINITE ADVANTAGE. MY KNOWLEDGE OF THE MFG PROCESSES WAS ~~NO~~ MORE THAN THAT OF MOST OF THE NEW HIRE ME'S. I DID FIND THAT IT WOULD HAVE BEEN BENIFICIAL TO HAVE SOME CLASS TIME IN THE STEPS INVOLVED IN PRODUCTION FROM DESIGN TO END PRODUCT. IE SCHEDULING, PROCURMENT, LEAD TIME, QUALITY CONTROL ETC. (TOOLING & MFG PROCESSES WERE VERY HELPFUL) IN APRIL '94 I TRANSFERED INTO THE FACILITIES GROUP AS A MECH ENGR. THE MCET ~~DEGT~~ DEGREE HAS PROVIDED ME WITH THE BACKGROUND NEEDED FOR THE POSITION. THE THERMODYNAMICS, BUILDING SYSTEMS, FLUIDS AND HEATING & AIRCONDITIONING CLASSES WERE VERY GOOD INFORMATION FOR THE POSITION.

GOOD LUCK WITH YOUR CAREER AT MSU

PATRICK J DEVINE

P.S. TELL MURPH HI!

I WOULD BE INTERESTED IN HEARING MORE ABOUT THE FUTURE OF THE MCET PROGRAM.

McET Questionnaire Instructions: Please answer only those questions which you feel do not invade your privacy. Additional comments are most welcome. I would appreciate your response as soon as convenience permits. Thank you for your consideration.

1) Name: *Jefferson D. Ayres*

2) Permanent Address: *23729 Strathern Street*
Canoga Park, CA 91304

3) Current Employer & job title: *Rocketdyne Division, Rockwell Int'l Member Tech. Staff Level 1; Developement Design Engineer, Space Shuttle Main Engine*

4) Previous Employer(s) & job title: *Pacific Western Systems--Elko, NV Mechanical Design Engineer*

5) Salary: *$28356.00 yearly*

6) EIT &/or PE? *E.I.T.*

7) Affiliation w/ any professional societies? (Please list)
None

8) Do you feel your supervisor would give you a good recommendation?
Yes

9) Would you change the McET program? If so, how?
No. It's scope, range and exposure was adequate for my needs.
(Maybe a senior project requirement could be enacted to more parallel other cirriculums/schools.)

10) If you could "do it all over again" would you still choose Mechanical Engineering Technology? *YES*

11) Would you be willing to write a letter of support for the McET program? *YES*

Although I would like to use your name in connection w/ these findings, if you wish to remain anonymous please check here: ☐

Feel free to write additional comments on the back of this sheet.

Ex. 21

McET Questionnaire Instructions: Please answer only those questions which you feel do not invade your privacy. Additional comments are most welcome. I would appreciate your response as soon as convenience permits. Thank you for your consideration.

1) Name: Rudd Ruana

2) Permanent Address:
5010 S. 73rd E. Ave #10
Tulsa, Oklahoma 74145

3) Current Employer & job title:
Unemployed (By choice)

4) Previous Employer(s) & job title:
Dowell - Schlumberger, Mechanical / R+D
Field Engineer Representative

5) Salary: $29,000 (Previous)

6) EIT &/or PE? EIT twice, 69/100 (70 passing, awaiting on results of second attempt)

7) Affiliation w/ any professional societies? (Please list) None

8) Do you feel your supervisor would give you a good recommendation?
Yes

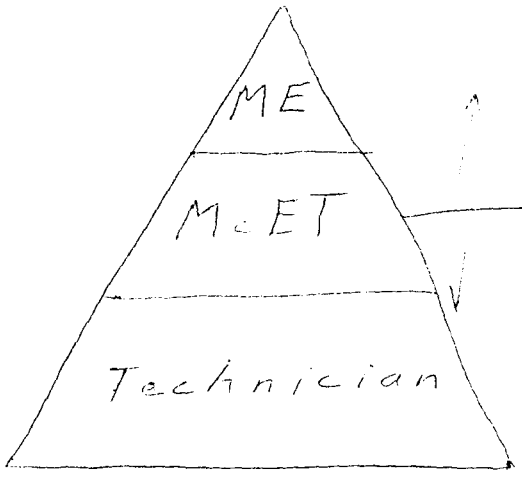
9) Would you change the McET program? If so, how?
Yes, Incorporate an introduction so as to define job possibilities (realistically) into the start of the curriculum.

10) If you could "do it all over again" would you still choose Mechanical Engineering Technology? Yes

11) Would you be willing to write a letter of support for the McET program? Yes

Although I would like to use your name in connection w/ these findings, if you wish to remain anonymous please check here: ☐

Feel free to write additional comments on the back of this sheet.



The Pay may not be as great as an M.E although it's still possible but the [redacted] - M.ET student seems to have more flexibility to survive in earning a comfortable living. In other words a M.ET student isn't as limited to the number of jobs he may work in as would be an M.E. I'm seeing too much specialization dead ending peoples careers. An individuals experiences in the working world are also key factors.

Ex. d

McET Questionnaire Instructions: Please answer only those questions which you feel do not invade your privacy. Additional comments are most welcome. I would appreciate your response as soon as convenience permits. Thank you for your consideration.

1) Name: JAMES A. McNICOL

2) Permanent Address:
P.O. BOX 191 KEMMERER, WY 83101

3) Current Employer & job title:
UTAH POWER AND LIGHT Co. ASSOCIATE ENGINEER (EFFECTIVE 12/31/84)

4) Previous Employer(s) & job title:
CADWELL CONSTRUCTION Co. CARPENTER

5) Salary: $27,720 / YR

6) EIT &/or PE? VERY MUCH PLAN TO TAKE AND PASS BOTH EXAMS.

7) Affiliation w/ any professional societies? (Please list)
A.S.M.E.

8) Do you feel your supervisor would give you a good recommendation?
YES.

9) Would you change the McET program? If so, how?
NOT MUCH, POSSIBLY MORE WORK IN
1) COMPUTERS
2) DYNAMICS
3) VACUUMS

10) If you could "do it all over again" would you still choose Mechanical Engineering Technology? YES.

11) Would you be willing to write a letter of support for the McET program? YOU BET!

Although I would like to use your name in connection w/ these findings, if you wish to remain anonymous please check here: ☐

Feel free to write additional comments on the back of this sheet.

FOUR OF THE COMPANIES I INTERVIEWED WITH WERE VERY FAMILIAR WITH THE MCBT PROGRAM AT MSU. (1) LAWRENCE LIVERMORE NATIONAL LAB
2) BOEING
3) CONOCO
4) UTAH POWER & LIGHT CO.)

ALL WERE HAPPY WITH THEIR MCBT EMPLOYEES, AND HAD MANY GOOD THINGS TO SAY ABOUT THE MCBT GRADUATES FROM MSU.

Tom Danielsen ARCO Oil and Gas Company

Ex. 4

Area of Resp
Wyo, Colo, Idaho,
Nev, Ore, Wash.
$40 million/year
budget

Division of AtlanticRichfieldCompany

Please answer only those
ıvade your privacy. Additional
ld appreciate your response
Thank you for your consideration.

1) Name: Tom Danielsen

2) Permanent Address: 4663 S. Quitman
Denver, Co 80236

3) Current Employer & job title: ARCO Oil & Gas Co.
Sr. Drilling Engineer

4) Previous Employer(s) & job title:
Continental Oil Co.
Drilling Foreman

5) Salary: $60,000/year plus car, bonus, benefits

6) EIT &/or PE? EIT 1974 (probably expired)

7) Affiliation w/ any professional societies? (Please list)
Society of Petroleum Engineers of AIME

8) Do you feel your supervisor would give you a good recommendation?
Definitely

9) Would you change the McET program? If so, how?

I have not reviewed curriculum since 1974,
not qualified to comment.

10) If you could "do it all over again" would you still choose Mechanical Engineering Technology? Yes

11) Would you be willing to write a letter of support for the McET program? Yes

Although I would like to use your name in connection w/ these findings, if you wish to remain anonymous please check here: ☐

Feel free to write additional comments on the back of this sheet.

McET Questionnaire Instructions: Please answer only those questions which you feel do not invade your privacy. Additional comments are most welcome. I would appreciate your response as soon as convenience permits. Thank you for your consideration.

1) Name: Patrick W. Bergman

2) Permanent Address: 1460 Quebrada Del Sur
Harvey, La. 70058

3) Current Employer & job title: Conoco Inc.
Supervising Production Engineer

4) Previous Employer(s) & job title:
Conoco Production Engineer
" Engineer
" Associate Engineer
" Engineer Tech.
" Roustabout

5) Salary: $55,800

6) EIT &/or PE? Neither (the Montana Board of Engineers would'tallow us to take the EIT when I graduated)

7) Affiliation w/ any professional societies? (Please list)
Society of Petroleum Engineers

8) Do you feel your supervisor would give you a good recommendation?
Yes

9) Would you change the McET program? If so, how?

10) If you could "do it all over again" would you still choose Mechanical Engineering Technology? Yes

11) Would you be willing to write a letter of support for the McET program? Yes

Although I would like to use your name in connection w/ these findings, if you wish to remain anonymous please check here: ☐

Feel free to write additional comments on the back of this sheet.

When I went through MET we had smaller classes than you have now. I feel that I learned more in that type of environment. Even though it's good to have a program grow I wonder if it doesn't lose something?

EXHIBIT #5
JAN. 28, 1985
H.B. 99
SEN. ED. & CULT.
RES. COMMITT.

orm CS-34
79

NAME DAVID BARTZ BILL NO. HB99

ADDRESS 1409 So 5th ~~E~~ Street DATE 1-28-85

WHOM DO YOU REPRESENT ASMET CLUB MSU

SUPPORT ✓ OPPOSE AMEND

PLEASE LEAVE PREPARED STATEMENT WITH SECRETARY.

Comments:

I want to distinguish that being able take the EIT exam does not give one a professional license but is only the first step. The EIT is exactly what it says "AN ENGINEER-IN-TRAINING" Taking the EIT does not change our course work in anyway. Once we take the EIT, we are still considered to be Mechanical Engineering Technologists, not Mechanical Engineers. We ~~are~~ (the technology club), are not asking that the standards be lowered nor that any special consideration be given. All we want to do is beable to use our education in our own state and not be penalized because we like to work with practical applications. We have support of an Architectural Firm in HELENA, By the name of Crossman-Whitney-Griffin. We are not fighting against the 5-year waiting period to become a professional engineer, we only request the opportunity to take the exam upon the completion of our studies

CROSSMAN-WHITNEY-GRIFFIN, P.C. ARCHITECTS AIA
650 POWER STREET • BOX 1198 • HELENA, MONTANA 59624 • 406/443-2340

1/24/85

January 23, 1985

HOUSE DISTRICT 45
Rep. Joan Miles
Box 105
Helena, MT 59624

Dear Joan,

I know you are busy, so this will be short.

Enclosed is a bill that provides mechanical engineering technology students the opportunity to take their in-training exam at completion of their required coursework. At present, they have to wait four years to take the test. I would like to see this bill passed. The McET students in-training exam would be taken at graduation similar to some other professional exams.

Thank you for your time.

Respectfully submitted,

Wayne W. Whitney

Wayne W. Whitney, A.I.A.

WWW/sf
Encl

E.I.T.

HB#____ is introduced at the request of the Mechanical Engineering Technology, (McET), students at M.S.U. At the present time these students are prohibited from taking their engineer-in-training exam until four years after they have completed their required coursework and graduated from M.S.U. The purpose of this legislation is to allow those students to take the engineering-in-training exam once they have completed the required coursework and are qualified to graduate.

The mechanical engineering technology program at M.S.U. is a four year bachelor of science engineering technology program which covers many aspects of engineering technology. The mechanical engineering technology program at M.S.U. is accredited by the Accredittation Board for Engineering and Technology, (ABET), and is officially recognized by the American Society of Mechanical Engineers.

The engineering-in-training examination is an eight hour examination covering all aspects of engineering. It is designed to measure an individual's level of knowledge, basic to the engineering sciences. This is a nationally written, approved and administered examination. Once an individual has passed the examination, he must then complete four years of in-service training to achieve the goal of becoming a professional engineer.

Under the present system in Montana, graduates of the four year mechanical engineering program may take the E.I.T. exam upon graduation and if they pass it, spend four years in training to become eligible to the Professional Engineering exam, (P.E.).

However, the present system in Montana does not treat mechanical engineering technology students in a similar manner. Those graduates of the four year mechanical engineering technology program must work four years before they are allowed to take the E.I.T. exam and then if they pass it, spend another four years of in-service training to become eligible to take their P.E. exam.

This discrepancy has caused some M.S.U. McET graduates to favor other states, which by allowing earlier admission to the exam offer more lucrative professional advancement possibilities. It is important to note that the E.I.T. exam in those other states is the same exam given here in Montana. Of further importance is the fact that some M.S.U. McET graduates have taken the E.I.T. exam in other states and successfully passed it.

The mechanical engineering technology students are not asking that standards be lowered nor that special consideration be given. We merely request the opportunity to take the national exam upon the completion of our studies and then let the results of the exam determine whether we are qualified to become an engineer-in-training. If our graduates can pass the exam, they are qualified and if they do not pass, they are not qualified.

We only ask that we be allowed to use our education upon graduation and in our homestate.

408 West Koch
Bozeman, MT 59715
January 25, 1985

Bob Brown
Senate Committee on Education & Cultural Research
Senate Chamber
State Capitol
Helena, MT 59620

Dear Mr. Brown:

This is written to express my concern with House Bill 99 relating to the admission of technology graduates to the Examination on Engineering Fundamentals which is the first examination required for registration as a professional engineer. I would like to have this letter entered as testimony against passage of this bill for several reasons which are discussed below.

The primary reason for requiring registration of engineers and other professionals is for the protection of the public. Since engineers are responsible for a variety of facilities used by the public it is essential that they be qualified to design these facilities so that they will not be a hazard to the users. Consequently, most states have established registration laws which are intended to provide a means for assessing the qualifications of the engineers that are responsible for seeing that these facilities function properly. As technology advances, it becomes ever more important that only qualified individuals be permitted to do this very important work because of the increasing complexity of the designs that are implemented.

In order to insure that practicing engineers are qualified, most Boards of Registration have adopted a many-layered system for evaluating the competency of engineers and insuring that these engineers work to maintain that competency throughout their professional careers. For an engineer to be considered competent to undertake the responsibilities of performing design of complex engineered facilities, it is necessary that the individual have education and experience that relates to the type of engineering work that he or she will be doing. Thus, the registration laws in most states require graduation from an accredited engineering curriculum as a first step in the process of becoming registered. Following the education of the engineer, an examination on engineering fundamentals is given and upon completion of this examination, the engineer is required to gain a specified amount of professional experience in engineering prior to being admitted to the professional engineering examination. Upon passing the professional engineering examination, the engineer obtains registration and is permitted to practice engineering within the limitations of his particular professional qualifications.

The examination on engineering fundamentals that is taken immediately after graduation from an engineering program is a short (8 hour) examination which is intended primarily to weed out those people who have not gained the basic minimum knowledge necessary to begin practice as an engineer. It is not intended as an examination to test the broad educational background in engineering that engineering graduates must attain in order to obtain their engineering degrees. The examination does not deal with many of the elements of design and other advanced topics that are covered in engineering programs. Consequently, merely passing the examination on engineering fundamentals does not qualify an individual to begin the practice of engineering since it is a very limited evaluation of the total four years of study leading to the engineering degree. Recognizing this, most Boards of Registration have concluded that only those graduates from accredited engineering programs should be admitted to the examination on engineering fundamentals. Graduates from other programs (technology, etc.) are required in many states to either gain additional education in engineering or work under the supervision of an engineer on engineering design for a certain period of time prior to being admitted to the examination on engineering fundamentals. This additional experience is intended to provide the additional breadth of background in engineering topics that will bring the individual to approximately the same educational level as the graduate from an accredited engineering program.

The technologists in engineering perform a very important role. Generally the technologists are responsible for implementing engineering designs to insure that the provisions of the design are met in the finished product. The technologists generally are not required to understand all of the specifics of how a particular engineering product is intended to work nor are they required to understand all of the conditions that the product may encounter throughout its service life. Consequently the technologist by virtue of educational background, is not introduced to the design of engineered products nor does he or she have the necessary background in mathematics and other fundamental engineering sciences to adequately perform the design function. In summary, as an engineering educator, I am in favor of the current Montana registration law which does not admit anybody to the engineering fundamentals examination until they have at least the equivalent educational background that comes from obtaining a degree in an accredited engineering program. Furthermore, since the Board of Registration is responsible for safety, I believe that it is not in the best interest of Montana to allow the legislature to enact legislation which may have repercussions on the safety of the public.

Very truly yours,

Fred F. Videon

Fred F. Videon, P. E.
Professor Civil Engineering

FFV/mem

EXHIBIT # 6
HB. 99

Although the program has an engineering and technical base, managerial aspects of industry are stressed with the result that graduates are qualified to enter the management field, often on their first job. Other students make use of the industrial and management engineering background to enter the field of technical sales or to pursue a career in engineering law. Many, of course, begin their careers in some phase of industrial engineering.

In all phases of the program emphasis is placed upon the amalgamation of the social sciences, the physical sciences, the management sciences, engineering design and economic decision making for the purpose of devising new management systems and/or improving existing systems. All academic work is oriented toward preparing the student to begin a career as a professional engineer and then to develop himself or herself for areas of broader responsibility.

Students in the upper half of their class at the end of their freshman year are eligible to join the cooperative education program offered in Industrial and Management Engineering. In this program, the student, during the sophomore and junior years, alternates between a quarter in school and a quarter working in industry. The industrial work consists of challenging assignments which contribute to the student's growth and development, and an appropriate salary is paid. Participation in the co-op program adds another year for the completion of the bachelor's degree but during that time the student gains two years of meaningful experience and can essentially pay his or her way through school.

The graduate program, leading to the Master of Science degree, provides for advanced study and research in modern industrial engineering and decision-making techniques, and is especially recommended for qualified individuals who wish to prepare themselves for advanced responsibilities in the field.

Curriculum in Industrial and Management Engineering.

Freshman Year	A	W	S
Chem 131, 132—General Chemistry	3	3	
Chem 135, 136—General Chemistry Lab	1	1	
CS 120—Intro to Sc Comp			4
IME 100—Intro to I&ME	1		
IME 131—Ind Org & Mgmt		4	
Math 181, 182, 183—Calc & Analytic Gmtry	4	4	4
ME 111—Engr Graphics	2		
Physics 227—Gen & Mod Physics			4
Electives	4	4	4
	15	16	16

Sophomore Year	A	W	S
EM 251, 252, 253—Solid Mechanics	4	4	4
IME 271—Industrial Computation	4		
Math 224, 225, 226—Calc & Diff Equation	4	4	4
ME 213—Materials Science	4		
ME 214—Materials Processing		4	
Physics 228, 229—Gen & Mod Physics		4	4
Elective			4
	16	16	16

Junior Year	A	W	S
IME 301—Seminar			1
IME 313—Methods & Standards	4		
IME 325—Engr Economy			4
IME 356—Probability in Engr	4		
IME 357—Variation in Engr Data		4	
IME 364—Linear Programming in O.R.	4		
IME 365—Optimization Tech in O.R.		4	
IME 366—Statistical Appl in O.R.			4
IME 373—Production Cost Analysis		4	
IME 477—Qual Assurance in Org			4
ME 334—Thermodynamics		4	
Electives	4		4
	16	16	17

Senior Year	A	W	S
EE 351—Prin of E.E.	4		
EE 352—Prin of Electronics		4	
EM 335—Mechanics of Fluids		4	
IME 443—Facilities Planning		4	
IME 444—Senior Design Project			4
IME 471—Computerized Prod Systems		4	
IME 475—Mgmt Control Systems	4		
Electives	8		12
	16	16	16

A minimum of 192 credits is required for graduation; 64 of these credits must be in courses numbered 300 and above.

*Electives must be approved by the department:

	Credits
Basic science elective	4
Humanities & social science electives	24
IME electives	8
General electives	8
	44

Minor in Industrial & Management Engineering (non-teaching)

Required Courses	Credits
IME 131—Indr Org & Mgmt	4
IME 313—Methods & Standards	4
IME 325—Engineering Economy	4
IME 474—Production Planning & Control	4
Plus three courses of IME at the 300 level or above	12
Supporting Course	
Math 170—Survey of Calc (or equivalent)	5
	33

Mechanical Engineering

Mechanical engineering is probably the most diversified field in engineering. Almost every industrial complex, including the private, government and academic sectors of society, employs mechanical engineers. On the job, mechanical engineers conceive, plan, design and direct the manufacture, distribution and operation of a wide variety of devices, machines and systems, including complex man-machine systems — for energy conversion, environmental control, materials handling and other purposes. Mechanical engineers are also involved in bioengineering, nuclear engineering, transportation and the aerospace fields.

Typically, graduates in mechanical engineering are sought after by more companies and government agencies than any other graduates at Montana State. Because of the diversification, many types of careers are open to the mechanical engineer, including those in research, development, design, testing, production, operations, maintenance, marketing, sales and administration. Graduates also become consulting engineers where they provide services for a fee. Numerous positions are available throughout the country for both men and women in the field of mechanical engineering.

The curriculum is carefully designed to provide the student with the knowledge necessary in industries dealing with heat, power, materials, machinery, energy conversion and manufacturing. It is necessary for students at first to acquire a sound foundation in mathematics and the basic sciences before they can move into the more applied areas of mechanics which include a study of solids, fluids and heat. Engineering design is emphasized throughout the curriculum, especially during the senior year. In the senior year, students can select professional electives to prepare them for specific areas of interest.

Students having a completed Bachelor of Science degree in engeering may take graduate work in mechanical engineering leading to the Master of Science or Doctor of Philosophy degrees. Advanced degrees are necessary for university teaching and are becoming more important in industry, particularly in the areas of new product development and research.

Curriculum in Mechanical Engineering

Freshman Year	A	W	S
Chem 131, 132—General Chem	3	3	
Chem 135, 136—General Chem Lab	1	1	
Engl 121—College Writing I		4	
Math 181, 182, 183—Calc & Analytic Gmtry	4	4	4
ME 108—Intro to Mech Engr	2		
ME 114—Engr Graph & Mech Drwng			4
Phys 227—Gen & Mod Physics			4
Electives*	8	4	4
	16	16	16

Sophomore Year	A	W	S
CS 120—Intro to Sci Programming			4
EM 251, 252, 253—Sol Mechanics	4	4	4
Math 224, 225, 226—Calc & Diff Equations	4	4	4
ME 213—Materials Science	4		
ME 214—Manuf Processes		4	
Phys 228, 229—Gen & Mod Physics	4	4	
Electives*			4
	16	16	16

Junior Year	A	W	S
EE 351—Prin of Elec Engr	4		
EE 352—Prin of Electronics			4
EM 335—Mechanics of Fluids I		4	
I&ME 325—Engr Economy		4	
ME 310—Design of Dynamic Sys	4		
ME 324—Mech Measurements			4
ME 331, 332—Thermodynamics	4	4	
ME 337—Design of Mech Structures		4	
ME 456—Heat Transfer			4
SpCm 301—Tech & Prof Comm	4		
Electives*			4
	16	16	16

Senior Year	A	W	S
ME 312—Mech Components Design	4		
ME 411, 412—Adv Mech Design		4	4
ME 424, 425—Mech Engr Lab	4	4	
ME 433—Energy Systems Design			4
ME 452—Seminar**	R		
Electives*	8	8	8
	16	16	12

A minimum of 192 credits is required for graduation; 64 of these credits must be in courses numbered 300 and above.

*Electives must be approved by the department:

	Credits
Basic sciences	4
Social sciences and humanities	24
Professional	12
General	6
	46

**Required, no credit

Mechanical Engineering Technology

This curriculum provides the education necessary for the mechanical engineering technologist to work with both the mechanical engineer and the craftsman and to provide a bridge between the two. Specifically, the mechanical engineering technologist provides the professional services needed in the transformation of the results of mechanical engineering endeavors into useful products and services.

The mechanical engineering technologist differs from the craftsman in his or her knowledge of scientific and engineering theory and methods, and from the mechanical engineer in his or her use of technical skills for the production of goods and services. The work of the mechanical engineering technologist may include aspects of design, manufacturing, operation, maintenance, service, sales, and administration.

The curriculum gives a well-rounded general, four-year technical university education culminating in a Bachelor of Science degree. It includes courses in humanities, social sciences, physical sciences, mathematics, and technical electives chosen by the student in consultation with his or her academic adviser. Training for craftsmanship is not included in the curriculum.

Curriculum in Mechanical Engineering Technology

Freshman Year	A	W	S
Engl 121—College Writing I			4
Math 140—Exp & Quad Equations	2		
Math 143—Matrices & Determinates	1		
Math 144—Exponent & Log Functions		1	
Math 145—Conic Sections		1	
Math 146—Series & Sequences		1	
Math 165—Trigonometry			5
ME 115—Graphics & Descript Gmtry	4		
McET 112—Engr Graphics		4	
Electives*	9	9	7
	16	16	16

Sophomore Year	A	W	S
CS 120—Intro to Sci Programming		4	
EM 205—Mechanics		4	
EM 215—Mechanics of Materials			4
Math 175, 176—Calculus for Tech	4	4	
McET 203—Machining Processes			4
Phys 205, 206, 207—College Physics	4	4	4
SpCm 104—Intro to Public Spkng	3		
Electives*	5		4
	16	16	16

Junior Year	A	W	S
EEET 341, 342, 343—Elec Engr Fund	4	4	4
EM 331—Applied Fluid Mechanics			4
McET 321, 322, 323—Mtrls & Processes	4	4	4
McET 341, 342—Thermodynamics	4	4	
McET 343—Elements of Heat Transfer			4
SpCm 301—Tech & Prof Comm	4		
Electives*		4	
	16	16	16

Senior Year	A	W	S
AET 324—Ind Welding	4		
I&ME 325—Engr Economy			4
I&ME 331—Law for Engrs & Archs			4
McET 403—Industrial Safety		4	
McET 411, 412—Mech Tech Lab	4	4	
McET 421—Kinematics	4		
McET 442—Design Technology		4	
Electives*	4	4	8
	16	16	16

A minimum of 192 credits is required for graduation; 64 of these credits must be in courses numbered 300 and above.

*Electives must be approved by the department:

	Credits
Basic sciences	8
Social sciences and humanities	24
Professional	12
General	10
	54

College of Letters and Science

Milton J. Edie, Acting Dean

William Dorgan, Acting Assistant Dean

Betty Schmitz, Acting Assistant Dean

The College of Letters and Science has a two-fold purpose: (1) to provide the opportunity for all University students to acquire a general education through courses not ordinarily included in their major subject areas; and (2) to offer professional preparation in the humanities and the mathematical, natural and social sciences.

The college offers baccalaureate programs in the following fields: biology, chemistry, earth science, economics, English, history, mathematical science, microbiology, modern languages, philosophy, physics, political science, psychology, sociology and speech communication.

Minors are available in most of the areas listed above. The selection of a minor provides students the opportunity to have a recognized second area of concentration.

Non-degree programs administered by the college include the Native American Studies Program and the Military Sciences.

Information on all the above programs is given on the pages immediately following this section.

EXHIBIT #6
11899

CS 120—Intro to Scientific Computing or Engl 121—College Writing I	4		
CS 120—Intro to Scientific Computing or Engl 121—College Writing I or Phys 227—General & Modern Physics		4	
CS 120—Intro to Scientific Computing or Engl 121—College Writing I or Phys 227—General & Modern Physics			4
Electives*	4	4	
	17	17	16

Sophomore Year	**A**	**W**	**S**
ChE 200—Sophomore Seminar			1
ChE 216, 217—Industrial Stoichiometry	3	3	
Chem 271, 272, 273—Organic Chemistry	3	3	3
Chem 274, 275—Organic Chemistry Lab	2	2	
Engl 221—College Writing II			4
Math 224, 225, 226—Calc & Diff Equations	4	4	4
Phys 228, 229—General & Modern Physics	4	4	
Electives*			4
	16	16	16

Junior Year	**A**	**W**	**S**
ChE 300—Junior Seminar		1	
ChE 304—Chem Engrng Computation	2		
ChE 322, 323, 324—Trans Proc & Unit Oper	4	4	4
ChE 361, 363—Industrial Inspection Trip	0		0
ChE 405, 406, 407—Thermodynamics	3	3	3
ChE 408—Materials			3
ChE 441, 442—Chem Engrng Lab		3	3
Chem 303, 304, 310—Physical Chemistry	3	3	3
Electives*	4	4	
	16	16	16

Senior Year	**A**	**W**	**S**
ChE 301—Chemical Process Industries or ChE 437—Polymers Technology			3
ChE 400—Senior Seminar	1		
ChE 402—Chemical Process Industries	3		
ChE 411, 412, 413—Design	4	2	2
ChE 414—Design Case Studies		3	
ChE 428, 429—Chemical Reaction Engnrg	3	3	
ChE 443—Chemical Engineering Lab	3		
ChE 451—Process Dynamics, Cntrl, & Inst			4
Chem 428—Advanced Analytical Chem			3
Electives*		9	4
	14	17	16

A minimum of 195 credits is required for graduation; 64 of these credits must be in courses numbered 300 and above.

*Electives:	Credits
Humanities & social studies	24
*Engineering sciences***	8
General electives	1
	33

***To be selected from EE 351, 352, EM 251, 252, ME 413, 414, 415.*

Petroleum Refining Option

Senior Year	**A**	**W**	**S**
ChE 301—Chem Process Industries or ChE 407—Polymers Technology			3
ChE 400—Senior Seminar	1		
ChE 402—Chemical Process Industries	3		
ChE 419, 420, 421—Petr Ref Design	4	2	2
ChE 414—Design Case Studies	3	3	
ChE 428, 429—Chemical Reaction Engnrg	3	3	
ChE 443—Chemical Engineering Lab	3		
ChE 451—Process Dynamics, Cntrl & Inst			4
Chem 428—Advanced Analytical Chem			3
Electives*		9	4
	14	17	16

A minimum of 195 credits is required for graduation; 64 of these credits must be in courses numbered 300 and above.

*Electives:	Credits
Humanities & social studies	24
*Engineering sciences***	8
General electives	1
	33

***To be selected from EE 351, 352, EM 251, 252, ME 413, 414, 415.*

Science Option

Senior Year	**A**	**W**	**S**
ChE 400—Senior Seminar	1		
ChE 411, 412, 413—Design	4	2	2
ChE 428, 429—Chem Reaction Engrng	3	3	
ChE 443—Chem Engrng Lab	3		
ChE 447, 449—Modelling & Transport Proc	4	3	
ChE 451—Proc Dynamics, Cntrl, & Inst			4
ChE 490—B.S. Thesis			3
Chem 428—Advanced Analytical Chem			3
Electives*		8	4
	15	16	16

A minimum of 195 credits is required for graduation; 64 of these credits must be in courses numbered 300 and above.

*Electives:	Credits
Humanities & social studies:	24
*Engineering sciences***	8
	32

***To be selected from EE 351, 352, EM 251, 252, ME 413, 414, 415.*

Civil Engineering

Civil engineering is the broadest, and has the greatest social impact, of all the engineering fields. The civil engineer designs and constructs large and important projects which improve the welfare and raise the standards of living of many people. These projects are relatively permanent and expensive; each one is unique, offering challenging opportunities for ingenuity and creative design.

Because his/her works affect the economic and social welfare of large groups of people, the civil engineer occupies an important position in our society. Civil engineering graduates enjoy splendid opportunities for employment in Montana and the Pacific Northwest, as well as nationally.

Civil engineering includes public health and environmental engineering; municipal engineering, water supply and sanitary engineering; transportation engineering for highways, railroads, airports and pipelines, hydroelectirc and irrigation project engineering; soils and foundation engineering; structural systems engineering for buildings, bridges and dams; urban planning; surveying, photogrammetry and mapping; and the construction necessary in all areas.

During the junior and senior years the student applies his/her fundamental background in engineering to the solution of civil engineering problems and develops individual competence in one or more of the general areas of civil engineering.

Students who have mastered a core of civil engineering concepts or who have demonstrated superior ability at any class level may submit proposals for a modified course of study leading to a special competence.

As the first step toward registration as a Professional Engineer, students are encouraged to take the national comprehensive examination on engineering fundamentals administered by the Montana Board of Professional Engineers and Land Surveyors at the end of their senior year. This examination is devised by the National Council of Engineering Examining Boards and is accepted nationwide through reciprocity with the Montana Board.

Students planning to take the comprehensive examination on surveying fundamentals as the initial step in becoming licensed as a Registered Land Surveyor should review the educational requirements for admission to this examination. The students will be required to take CET 201, 202, 203 CE 361, 362 and 464 in addition to the other courses related to land surveying topics. Students electing to fulfill the educational requirements for registration as a Land Surveyor and for the baccalaureate degree in civil engineering concurrently will normally need to enroll for a minimum of 13 quarters to complete the requirements for both objectives.

Graduate work leading to Master of Science and Doctor of Philosophy degrees is urged for qualified students desiring the highest professional attainment.

Curriculum in Civil Engineering

Freshman Year	**A**	**W**	**S**
Chem 131, 132—General Chemistry	3	3	
Chem 134—Fund of Org Chem or MB 101—Micro in Relation to Man			4
Chem 135, 136—General Chemistry Lab	1	1	
CE 100—Seminar	2		
CE 201—Civil Engrng Measurements			4
Engl 121—College Writing I or Engl 221—College Writing II	4		
Math 181, 182, 183—Calc & Analytic Gmtry	4	4	4
ME 111—Engineering Graphics	2		
ME 113—Descriptive Geometry		2	
Phys 227—General & Modern Physics			4
SpCm 104—Intro to Public Speaking		3	
Electives*		4	
	16	17	16

Sophomore Year	**A**	**W**	**S**
CE 209—Comp in Civ Eng & Engrng Tech			2
CS 120—Intro to Scientific Computing		4	
EM 251, 252, 253—Solid Mechanics	4	4	4
Geol 231—Geology for Engineers			4
Math 224, 225, 226—Calc & Diff Equations	4	4	4
Phys 228, 229—General & Modern Physics	4	4	
Electives*	4		3
	16	16	17

Junior Year	**Crs.**	**Qtr. Offered**
CE 314—Structural Design I	3	W,S
CE 315—Structural Design II	3	A,S
CE 316—Structural Project, Wood	1	W,S
CE 317—Structural Project, Masonry	1	A,S
CE 320—Soil Mechanics	4	A,S
CE 330—Water Resources Engrng	3	W,S
CE 350—Highway Trans Engrng	4	W,S
EM 313—Structural Mechanics	4	A,W
EM 324—Engineering Materials	4	W,S
EM 335—Mechanics of Fluids I	3	A,W
EM 336—Mechanics of Fluids II	3	W,S
I&ME 325—Engineering Economy	4	A,W,S
SpCm 301—Technical & Prof Comm	4	A,W,S
Electives*	8	
	49	

Senior Year	Crs.	Qtr. Offered
CE 400—Seminar	1	A,W,S
CE 404—Construction Engrng	4	A,W
CE 440—Prin of Environ Engrng	4	A,S
EE 351—Prin of Elec Engrng	4	A,W
I&ME 331—Law for Engrs & Archs	4	A,W,S
ME 334—Thermodynamics	4	W,S
Electives*	28	
	49	

A minimum of 196 credits is required for graduation; 64 of these credits must be in courses numbered 300 and above.

Electives (must be approved by the department):

	Credits
Professional electives	23
A minimum of 16 credits in the Department of Civil Engineering & Engineering Mechanics; one of these courses must be in engineering mechanics; not more than three courses in any of the sub areas of civil engineering or engineering mechanics; up to six credits of advanced ROTC may be used as professional electives.	
Humanities & social sciences	24
	47

Computer Science

Computer science is the study of the computer — its theory, design and application. It is a broad field, drawing from many other disciplines: mathematics, logic, electronics, linguistics, systems engineering and others. It is also a young field, still evolving, which continues to be one of the largest and most rapidly growing segments of the economy.

The computer science program at Montana State University prepares students for professional positions in the computer industry as contrasted to vocational schools which train students for positions as computer technicians.

Computer science students develop the background and tools necessary for the design and implementation of the complex information systems necessary in business, industry and government. Students also learn the essentials of making the computer operate most efficiently through the design and implementation of programming systems.

Each student must select a group of professional program electives which will provide an opportunity to learn how the computer can be used to help solve real-world problems. Typical professional program areas are biology, business, engineering and psychology. This list can be extended to suit the interests of each student with the intent being to build some expertise in an applied area on top of a firm foundation in computer science. Professional program electives are also used to provide an enhanced background for computer systems work. A handout is available which gives details of the professional program electives.

All computer science students use the central campus computer facilities which are accessable through terminals located at several sites on campus. In addition, students in computer science upper division and graduate courses have access to a VAX 11/750 computer with 24 terminals and several color-graphics work stations. The computer science program includes courses providing some hands-on experience in the operation of computers, and electives are available for those students wishing to learn more about the design of computers.

Graduate training is desirable for those wishing to do advanced research and development work or college-level teaching. The department offers graduate work leading to the M.S. degree in computer science.

Curriculum in Computer Science

Freshman Year	A	W	S
CS 151, 152, 153—Fund of Comp Sci	4	4	4
Engl 121—College Writing I		4	
Math 181, 182, 183—Calc & Analytic Geom	4	4	4
SpCm 104—Intro to Pub Speaking			3
Electives*	8	4	5
	16	16	16

Sophomore Year	A	W	S
CS 210—Discrete Math for Comp Sci	4		
CS 211—Data Structures		4	
CS 212—Algorithms			4
EE 201—Logic Circuits	3		
EE 232—Intro to Digital Computers		3	
Math 221—Intro to Matrix Theory	4		
Electives*	5	8	12
	16	16	16

Junior Year	A	W	S
CS 304, 305, 306—Comp Org & Sym Prog	4	4	4
CS 355—Design of Prog Lang			4
SpCm 301—Tech & Prof Comm		4	
I&ME 354 (or 6 credits of Stat 330 or above)	4-6		
Electives*	8-6	8	8
	16	16	16

Senior Year	A	W	S
CS 411—Operating Systems		4	
Electives*	16	12	16
	16	16	16

A minimum of 192 credits is required for graduation; 64 of these credits must be in courses numbered 300 and above.

Electives (must be approved by the department):

	Credits
Basic Sciences	12
Humanities and Social Sciences	24
General Electives	8
*Professional and CS Electives***	67
	111

***No more than four credits of CS 160 courses may be used for this requirement and no credit is allowed for courses numbered below CS 151. A minimum of 36 and a maximum of 44 credits must be in computer science or the following engineering courses:*

EE 226—Logic Circuits Laboratory
EEET 341—Electrical Engineering Fundamentals or EE 351—Principles of Electrical Engineering
EE 361—Microcomputer Software Engineering
EE 321—Logic Design
EE 486—Computer Systems
EE 488—Computer Architecture & System Organization

Construction Engineering Technology

The curriculum provides for a well-rounded, four-year, specialized university education culminating in a Bachelor of Science degree as a construction engineering technologist (CET). Knowledge of mathematics and physical sciences along with applied courses in business management, law and human relations form a background to move design, research or planning ideas to construction application. The CET has the training and skills provided by direct hands-on experience and has the additional knowledge and capabilities provided by theory and technological fundamentals.

The curriculum prepares the student to be largely responsible for the construction of all types of structures, utilities, transportation facilities, and water and wastewater systems. Emphasis is on current construction applications, surveying, maximizing production, estimating, scheduling, quality control, safety, testing and field analysis.

Graduates use their skills and abilities to construct transportation systems, utilities, buildings, dams, public health and environmental systems, irrigation, municipal and public works and also in surveying, mapping and support of engineering design. Building, heavy, and highway construction are emphasized with particular attention directed towards preparation for employment in management and supervisory positions in both field and office operations.

This curriculum provides the education necessary for the CET to work with engineers, architects, contractors, technicians and owners. The student in this curriculum can be employed as a field supervisor, estimator, scheduler, superintendent and move through a career progression to the highest levels of management in the construction arena such as project manager. Other possible positions are employment with consulting engineers and architects in support activities involving plans and planning, acquisition of design data, surveying, construction inspection for quantity and quality control, sales engineering, plant expansion and maintenance management activities.

Students planning to work toward registration as a Registered Land Surveyor are encouraged to take the comprehensive examination in surveying fundamentals administered by the Montana Board of Professional Engineers and Land Surveyors as the initial step toward licensure.

Curriculum in Construction Engineering Technology

Freshman Year	A	W	S
Chem 121—Intro General Chemistry	3		
Chem 125—Intro Gen Chem Lab	1		
CS 120—Intro to Scientific Computing			4
Engl 121—College Writing I or Engl 122—College Writing II	4		
Math 165—Trigonometry	5		
Math 175, 176—Calculus for Technology		4	4
ME 111—Engineering Graphics	2		
ME 113—Descriptive Geometry		2	
SpCm 104—Intro to Public Speaking		3	
Electives*		7	8
	15	16	18

Sophomore Year	A	W	S
CET 201—Plane Surveying	5		
CET 202—Route Surveys & Earthwork			5
CE 209—Comp in Civ Eng & Engrng Tech		2	
EM 205—Mechanics		4	
EM 215—Mechanics of Materials			4
Geol 231—Geology for Engineers			4
I&ME 373—Production Cost Analysis		4	
Phys 205, 206, 207—College Physics	4	4	4
Stat 216—Elementary Statistics	4		
Electives*	4	3	
	17	17	17

Junior Year	A	W	S
CE 306—Org & Admin of Const Projects	4		
CET 302—Soils & Aggregates		4	
CET 303—Highway Technology			4
CET 305—Concrete Technology			4
CET 311—Materials Science	4		
CET 312—Building Construction		4	
EM 331—Applied Fluid Mechanics	4		
I&ME 325—Engineering Economy			4
I&ME 331—Law for Engrs & Archs		4	
SpCm 301—Tech & Prof Comm		4	
Electives*	3		8
	15	16	18

Senior Year	A	W	S
AET 334—Farmstead Electrification	4		
CE 407—Estimating & Scheduling		4	
CE 408—Const Management			4
CET 404—Const Planning & Methods	4		
CET 411—Excavating & Foundation Const	3		
CET 412—Structural Elements		3	
I&ME 433—Human Relations in Industry			4
McET 445—Building Systems		4	
Electives*	6	5	8
	17	16	16

A minimum of 196 credits is required for graduation; 64 of these credits must be in courses numbered 300 and above.

*Electives (must be approved by the department):

	Credits
Minor (up to 8 credits of advanced ROTC may be substituted	9
Humanities & social sciences	24
Technical-professional area	17
	50

Electrical Engineering

Many challenging professional opportunities are open to graduates in electrical engineering. The electrical engineer has, within the discipline, numerous fields of specialization such as communications, microwave systems, control systems, computers, electrical machinery, power systems, circuit design, electronics and instrumentation.

The type of employment available covers a broad spectrum which includes design and applications engineering, advanced research and development, sales, engineering manufacturing, administration and teaching. In addition, electrical engineers traditionally have a key role in interdisciplinary efforts such as weather modification, aerospace systems, nuclear instrumentation, transportation systems, oceanography, biological instrumentation, ecology and other engineering applications having great social impact. The electrical engineer is a member of a respected profession in our technological society.

Many professional elective courses in the electrical engineering curriculum enable the student to study one or more of the following areas in depth: logical design, computers, power systems, electronic circuits, solid-state materials, integrated circuits, electromagnetic theory (including microwaves, antennas and transmission lines), control systems, communications systems and instrumentation. Students specializing in the electrical engineering computer engineering option study the design, selection, and use of computers as integral parts of larger systems including the interfacing of computer hardware with the real world. Technical electives available outside the department enable the student to broaden his or her background in other engineering or scientific disciplines.

Graduate training is desirable for those wishing to do advanced research and development work or college-level teaching. The department offers graduate programs leading to the M.S. and Ph.D. degrees.

Curriculum in Electrical Engineering

Freshman Year	A	W	S
Cs 120—Intro to Scientific Comp			4
EE 101, 102—Intro to Elec Fund		1	1
Math 181, 182, 183—Calc & An Gmtry	4	4	4
Phys 227, 228—General & Mod Physics		4	4
English or Speech Comm	4		
Electives*	8	7	3
	16	16	16

Sophomore Year	A	W	S
EE 201—Logic Circuits	3		
EE 212, 213—Linear System Analysis		3	3
EE 226—Logic Circuits Lab		1	
EE 227—Linear Systems Lab			1
EE 232—Intro to Digital Computers		3	
EM 251—Solid Mechanics	4		
Math 224, 225, 226—Calc & Diff Equations	4	4	4
Phys 229, 230—General & Mod Physics	4		4
Electives*		4	4
	15	15	16

Junior Year	A	W	S
EE 311—Linear System Analysis	3		
EE 309, 310—Electromagnetic Theory	3	3	
EE 313—EE Materials		3	
EE 317—Energy Conversion			4
EE 325, 326, 327—Elec Engrng Lab	2	2	1
EE 337, 338, 339—Electronics	3	3	3
EE 361—Micro Software Engrng			4
Electives*	6	6	4
	17	17	16

Senior Year	A	W	S
EE 418—Control Systems	4		
EE 466—Communication Systems		3	
I&ME 325—Engineering Economy	4		
SpCm 301—Tech & Profl Com			4
Electives*	8	13	12
	16	16	16

A minimum of 192 credits is required for graduation; 64 of these credits must be in courses numbered 300 and above.

*Electives (must be approved by the department):

	Credits
Basic sciences	8
Engineering sciences (selected from EM 252, 253, 335; ME 331, 332, 334)	8
Humanities and social sciences	24
I&ME (selected from 331, 354, 434)	4
Professional electives (professionally applicable)	24
A minimum of 15 in electrical engineering; a minimum of 8 outside of electrical engineering.	
General electives	7
	75

Computer Engineering Option

This option is designed for students who desire to specialize in digital logic systems, computer design and computer components. A study of typical applications includes the design, selection and use of minicomputers and microcomputers (microprocessors) as integral parts of larger systems. Computer logic design is emphasized, including the interfacing of computer hardware to real world applications. Each student in this option must take EE 321, 486 and 488 as part of his/her professional elective program. Optional courses recommended include CS 210, 211, 212 and 411.

Electrical and Electronic Engineering Technology

Current progress in engineering and related sciences may be attributed to a considerable extent to the efforts of highly coordinated research and production development teams. Teams may contain engineers and scientists, engineering technologists, engineering technicians, and craftsmen. The electrical and electronic engineering technologist (EEET) applies his/her education and training in support of engineering activities; he/she works in the occupational spectrum between the technician and the engineer at the end of the spectrum closest to the engineer. He/she is trained to apply technical skills in the real world application of electrical engineering design and methods.

The electrical and electronic engineering technologist is prepared to work closely with engineers and scientists in support of a broad spectrum of engineering activities. He/she may be employed in research, development, design, production, maintenance, test, sales, or management. Typical employment opportunities may be found in industrial and commercial electronic communications; automation; process control and instrumentation;

Table 1
State Requirements for Registration as a Professional Engineer

	Requirements to Sit for EIT Exam		Requirements to Sit for PE Exam	
State	*Degree*	*Experience*	*Status*	*Experience*
Alabama	BSET	2 years	EIT	4 years
Alaska	BSET	4 years	EIT	4 years
Arizona	BSET		EIT	4 years
Arkansas	BSET	2 years	EIT	4 years
California	BSET		EIT	4 years
Colorado	BSET		EIT	6 years
Connecticut	BSET	4 years	EIT	3 years
Delaware	BSET		EIT	8 years
Florida	Not admitted		Not admitted	
Georgia	BSET		EIT	7 years
Hawaii	Not admitted		Not admitted	
Idaho	BSET	2 years	EIT	4 years
Illinois	Not admitted		Not admitted	
Indiana	BSET	2 years	EIT	5 years
Iowa	BSET	2 years	EIT	4 years
Kansas	BSET	4 years	EIT	4 years
Kentucky	Not admitted		Not admitted	
Louisiana	BSET	4 years	EIT	4 years
Maine	BSET		EIT	6 years
Maryland	BSET	4 years	EIT	4 years
Massachusetts	BSET		EIT	4 years
Michigan	Not admitted		Not admitted	
Minnesota	Not admitted		Not admitted	
Mississippi	BSET	2 years	EIT	4 years
Missouri	Not admitted		Not admitted	
Montana	BSET	4 years	EIT	4 years
Nebraska	BSET	2 years	EIT	4 years
Nevada	BSET	2 years	EIT	4 years
New Hampshire	BSET	4 years	EIT	4 years
New Jersey	BSET	2 years	EIT	4 years
New Mexico	BSET	2 years	EIT	4 years
New York	BSET	4 years	EIT	4 years
North Carolina	BSET	4 years	EIT	4 years
North Dakota	Not admitted		Not admitted	
Ohio	BSET	4 years	EIT	4 years
Oklahoma	BSET	1 year	EIT	5 years
Oregon	BSET	2 years	EIT	4 years
Pennsylvania	BSET		EIT	4 years
Rhode Island	BSET	8 years	EIT	4 years
South Carolina	Not admitted		Not admitted	
South Dakota	BSET		EIT	5 years
Tennessee	Not admitted		Not admitted	
Texas	BSET	6 years	EIT	4 years
Utah	BSET	2 years	EIT	4 years
Vermont	BSET	8 years	EIT	4 years
Virginia	BSET	2 years	EIT	4 years
Washington	BSET	2 years	EIT	4 years
West Virginia	BSET	2 years	EIT	4 years
Wisconsin	BSET	1 year	EIT	4 years
Wyoming	BSET	2 years	EIT	4 years

NOTE: These requirements pertain only to graduates of ABET-accredited, four-year engineering technology programs. The degree can be either a Bachelor of Science (BSET) or a Bachelor of Technology (BET).

EXHIBIT #7
HB99
JAN. 28, 1985
SEN. ED. & CULT. RES

MEMORANDUM

TO: Senate Committee on Education and Cultural Resources:
Chet Blaylock, Chairman
Dick Pinsoneault, Vice-Chairman
Bob Brown
Jack Haffey
George McCallum
Ed Smith
William Farrell
Joe Mazurek
Pat Regan
Bill Yellowtail

FROM: A. T. Kersich, Representing the Board of Professional Engineers & Land Surveyors

DATE: January 28, 1985

With regard to House Bill #99, which would allow the graduates of an engineering technology curriculum to take the fundamentals of engineering examination in the same manner as graduates of engineers programs, the Board of Registration would like to present you with the following facts supporting their position of keeping the present law covering registration of engineers intact.

It is important to note that the registration of engineers is not for the benefit of the engineering profession. In every registration law throughout the United States it is noted that the regulation of the practice of engineering is in the public interest and is in order to safeguard the life, health and property of the public and promote public welfare. During the Sunset Review conducted by the legislature of this Engineering Board, two facts became evident: (1) the Sunset Review Committee was concerned that engineers might use the registration act as a method of limiting competition, and (2) that Board must take steps to insure that the public is protected with respect to their life, health and safety.

In each circumstance, the review indicated that the law which is the same then as now did a reasonable job. However, the legislative committee did admonish the board that under no circumstances was the board's duty any other than to regulate the profession in a manner which protected the public. The change instituted in House Bill #99 would defeat the purpose of public protection and allow individuals with little engineering training to attempt to become registered in the practice of engineering in the State of Montana.

Some other facts should be clarified are: Accreditation; a statement has been passed out to the legislators indicating that the engineering technology program is accredited by ABET. The committee should realize that ABET (Accreditation Board for Engineering Technology) does not accredit programs). Commissions of ABET, namely the Engineers Accreditation Engineering Commission, Technology Creditation Commission, do the actual accrediting. Engineering Technology schools, like that at Montana State University, are accredited by the

Technology Accreditation Commission, not by the Engineering Accreditation Commission. The accreditation is predicated under a set of standards which are much different than that which engineering programs are accredited under. Therefore, accreditation does not mean that the curriculum for the engineering technology students is equal to that of the engineering college. It means that the program meets minimum for technology engineering.

There are substantial differences between the curriculum of the technology program and the engineering program. The technology student is not required to understand all of the specifics of how a particular engineering product is intended to work, nor are they required to understand all of the conditions that the product may account throughout its service life. Consequently the technologisty by virtue of his educational background is not introduced to the design of engineered products nor does he or she have the necessary background in mathematics and other fundamental engineering sciences to adequately perform the design function.

The technologist's function in the engineering community is of a different level than that function performed by engineers and they are educated accordingly.

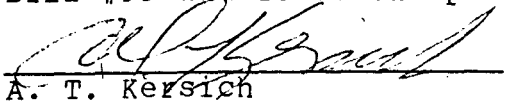
Note that a four year degree in the engineering technology program at MSU will not qualify the student to begin graduate work in the school of engineering until he has taken a number of additional courses and in effect gone back and received a bachelors of engineering in his chosen field of study.

Engineering technologists are successful in obtaining work in Montana. Probably more so than engineering graduates. In addition, their salary levels are quite comparable. Some years the average salary of the technology graduates will exceed that of the engineering graduates.

The lack of their professional registration is not a hinderance to their advancement as it is for graduate engineers who intend to practice engineering.

The registration process of professional engineers is a three-tiered process consisting of education, experience, and examination. Should any of these be deficient, the person should not be given a license to practice engineering upon an unsuspecting public. The Board of Registration, working in conjunction with the Legislature in the past as devised a system whereby engineering technologists can become registered but only if they apply themselves either through additional education or work experience to developing the necessary background and education in engineering matters.

We respectfully request that this committee vote against House Bill #99 and leave the present law intact.



A. T. Kersich

ACCREDITATION BOARD FOR ENGINEERING AND TECHNOLOGY, INC.

345 EAST 47TH STREET • NEW YORK, N.Y. 10017 • 212-705-7685

January 25, 1985

Albert T. Kersich, P.E.
HKM Associates
P.O. Box 31318
Billings, MT 59107

Dear Al,

These are my comments on the similarities and differences between the baccalaureate degree in engineering and the baccalaureate degree in engineering technology.

The similarities are easy to determine: (a) both are degrees in higher education; (b) both come from four-year academic programs; (c) both are in the field of "technology"; (d) both come from programs which contain requirements in broad areas such as mathematics and science.

Having listed those four similarities, I find it hard to come up with any others. The differences between the two are profound and distinct.

The engineering program is designed to provide an educational base for entry into the practice of engineering, opening the door for its graduates to eventually join the profession. It does not pretend to prepare a full-fledged professional engineer. This educational preparation gives the necessary understanding to the graduate who continues to learn through practical experience. It is only with the two that one will attain real professional competency. For this very reason, states require four years of practical experience after graduating from an accredited engineering program to qualify for the Professional Engineer examination.

A different discipline altogether, engineering technology prepares the person to add to the normal two-year technology program an additional two years of college level courses. The product of these programs is a better trained technologist. This allows the graduate to function in a technological setting at a fairly sophisticated level. However, a technologist is by definition limited in scope to functioning as the assistant and practical support to the engineer.

(cont.)

ACCREDITATION BOARD FOR ENGINEERING AND TECHNOLOGY, INC.
345 EAST FORTY-SEVENTH STREET, NEW YORK, NEW YORK 10017

It is true that many engineering technologists could take the Engineering Fundamentals Examination and score a passing grade. This can also be stated for all professions which require an examination for certification. There are many people who can pass an exam in a field where they have not received a degree. The exam by itself does not necessarily mean that the person is competent in the professional field; the requirement of education and practice attains this minimal proof of competency.

The differences between engineering and engineering technology are such that ABET handles the accreditation of each by a different independent commission. For engineering it's the Engineering Accreditation Commission and for engineering technology it's the Technology Accreditation Commission. The accreditation criteria used for each one are also developed independently. To avoid confusion all accreditation actions are taken by the individual commissions and not by ABET.

The enclosed chart indicates the differences between both programs. It also clarifies why graduates of engineering technology 4-year baccalaureate programs must take, on the average, a minimum of an additional two years of undergraduate education to complete an engineering bachelor's degree.

You will notice that the subject areas of engineering sciences and engineering design are not covered in engineering technology. As well, mathematics in engineering is at a different and more complex level than that in engineering technology. Those are just two examples of the many curricular differences between the two programs.

I hope that this helps. Please call on me if I can be of any more assistance.

Sincerely,

David R. Reyes-Guerra, P.E.
Executive Director

Enclosures

DRRG/drg

ENGINEERING OR ENGINEERING TECHNOLOGY?

THE DIFFERENCES IN A NUTSHELL

MINIMUM CURRICULUM REQUIREMENTS

Subject Matter	Engineering Bachelor's Degree		Engineering Technology Bachelor's Degree
	Years	Sem. Hrs.	Sem. Hrs
Mathematics (beyond Trigonmetry) and Basic Sciences	1	32	24
Mathematics	"Appropriate combination"		(12)
Basic Sciences			Not Spec.
Technical Courses	--	--	48
Engineering Sciences	1	32	--
Engineering Design	1/2	16	--
Humanities, Social Sciences, and Communications	--	--	24
Humanities & Social Sciences	1/2	16	Not Spec.
Communications	--	--	(9)
Total Specified by ABET	3	96	96
Total Program	4	Not spec.	124

ACCREDITATION BOARD FOR ENGINEERING AND TECHNOLOGY, INC.

345 EAST 47TH STREET • NEW YORK, N.Y. 10017 • 212-705-7685

DAVID R. REYES-GUERRA, P.E.
EXECUTIVE DIRECTOR

January 25, 1985

Albert T. Kersich, P.E.
HKM Associates
P.O. Box 31318
Billings, MT 59107

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Having listed those four similarities, I find it hard to come up with any others. The differences between the two are profound and distinct.

The engineering program is designed to provide an educational base for entry into the practice of engineering, opening the door for its graduates to eventually join the profession. It does not pretend to prepare a full-fledged professional engineer. This educational preparation gives the necessary understanding to the graduate who continues to learn through practical experience. It is only with the two that one will attain real professional competency. For this very reason, states require four years of practical experience after graduating from an accredited engineering program to qualify for the Professional Engineer examination.

A different discipline altogether, engineering technology prepares the person to add to the normal two-year technology program an additional two years of college level courses. The product of these programs is a better trained technologist. This allows the graduate to function in a technological setting at a fairly sophisticated level. However, a technologist is by definition limited in scope to functioning as the assistant and practical support to the engineer.

(cont.)

ACCREDITATION BOARD FOR ENGINEERING AND TECHNOLOGY, INC.
345 EAST FORTY-SEVENTH STREET, NEW YORK, NEW YORK 10017

It is true that many engineering technologists could take the Engineering Fundamentals Examination and score a passing grade. This can also be stated for all professions which require an examination for certification. There are many people who can pass an exam in a field where they have not received a degree. The exam by itself does not necessarily mean that the person is competent in the professional field; the requirement of education and practice attains this minimal proof of competency.

The differences between engineering and engineering technology are such that ABET handles the accreditation of each by a different independent commission. For engineering it's the Engineering Accreditation Commission and for engineering technology it's the Technology Accreditation Commission. The accreditation criteria used for each one are also developed independently. To avoid confusion all accreditation actions are taken by the individual commissions and not by ABET.

The enclosed chart indicates the differences between both programs. It also clarifies why graduates of engineering technology 4-year baccalaureate programs must take, on the average, a minimum of an additional two years of undergraduate education to complete an engineering bachelor's degree.

You will notice that the subject areas of engineering sciences and engineering design are not covered in engineering technology. As well, mathematics in engineering is at a different and more complex level than that in engineering technology. Those are just two examples of the many curricular differences between the two programs.

I hope that this helps. Please call on me if I can be of any more assistance.

Sincerely,

David R. Reyes-Guerra, P.E.
Executive Director

Enclosures

DRRG/drg

ENGINEERING OR ENGINEERING TECHNOLOGY?

THE DIFFERENCES IN A NUTSHELL

MINIMUM CURRICULUM REQUIREMENTS

Subject Matter	Engineering Bachelor's Degree		Engineering Technology Bachelor's Degree
	Years	Sem. Hrs.	Sem. Hrs
Mathematics (beyond Trigonmetry) and Basic Sciences	1	32	24
Mathematics	"Appropriate combination"		(12)
Basic Sciences			Not Spec.
Technical Courses	--	--	48
Engineering Sciences	1	32	--
Engineering Design	1/2	16	--
Humanities, Social Sciences, and Communications	--	--	24
Humanities & Social Sciences	1/2	16	Not Spec.
Communications	--	--	(9)
Total Specified by ABET	3	96	96
Total Program	4	Not spec.	124

STANDING COMMITTEE REPORT

January 28, 19 85

MR. PRESIDENT

We, your committee on EDUCATION AND CULTURAL RESOURCES

having had under consideration HOUSE BILL No. 30

third reading copy (blue color)

(Senator Yellowtail will carry the bill.)

CLARIFICATION OF CERTAIN LAWS RELATING TO EDUCATION

Respectfully report as follows: That HOUSE BILL No. 30

BE CONCURRED IN

~~DO PASS~~

~~DO NOT PASS~~

SENATOR CHET BLAYLOCK, Chairman.

STANDING COMMITTEE REPORT

January 29, 1935

MR. PRESIDENT

We, your committee on EDUCATION AND CULTURAL RESOURCES

having had under consideration HOUSE BILL No. 10

third reading copy (blue color)

(Senator Pinsoneault will carry the bill.)

GENERAL REVISION OF LAWS RELATING TO EDUCATION AND MINORS

Respectfully report as follows: That HOUSE BILL No. 10

BE CONCURRED IN

~~DO PASS~~

~~DO NOT PASS~~

SENATOR CHET BLAYLOCK, Chairman.

STANDING COMMITTEE REPORT

..... 19 85

MR. PRESIDENT

We, your committee on EDUCATION AND CULTURAL RESOURCES

having had under consideration..... SENATE BILL ..... No 167

first reading copy (white color)

ALLOW SCHOOLS TO CHARGE FEES FOR NONACADEMIC SCHOOL ACTIVITIES

Respectfully report as follows: That..... SENATE BILL ..... No 167

be amended as follows:

1. Page 1, line 11.
Following: "Fees."
Insert: "(1)"

2. Page 1, line 12.
Strike: "(1)"
Insert: "(a)"

3. Page 1, line 16.
Strike: "(2)"
Insert: "(b)"

4. Page 1.
Following: "line 19"
Insert: "(2) The fees collected pursuant to subsection (1) shall be deposited in a nonbudgeted fund as provided in 20-9-210, and such fees may be expended from such a fund only for the support of the course or activity from which the funds were derived."

AND AS AMENDED

DO PASS

~~DO NOT PASS~~

SENATOR CHET BLAYLOCK, Chairman.