UNIVERSITY OF

Miami

MEMORANDUM

TO: President Edward T. Foote II

FROM: William J. Whelan W/JW/ba
                       Chairman, Faculty Senate

DATE: June 2, 1992

SUBJECT: Faculty Senate Legislation #91016(B) -
                       Establishment of the BACHELOR OF SCIENCE IN
                       COMPUTER ENGINEERING Degree

The Faculty Senate, at its meeting of March 30, 1992, voted to approve Faculty Senate Legislation #91016(B) - Establishment of the BACHELOR OF SCIENCE IN COMPUTER ENGINEERING Degree. The text of the legislation is attached.

The legislation is now forwarded to you for your action.

6/3

WJW/b

Attachment

Bill,

cc: Provost Glaser   ✓ approve.
       Associate Dean Hecker, Graduate School
       Dean Becker, College of Engineering   Thanks.
       Dr. Young, Department of Electrical
           and Computer Engineering   TF

CAPSULE: Faculty Senate Legislation #91016(B) -
Establishment of the Bachelor of Science in Computer
Engineering Degree

RESPONSE BY THE PRESIDENT: DATE: 6/8/92

APPROVED: Yw   977

OFFICE OR INDIVIDUAL TO IMPLEMENT OR PUBLISH: Provost

EFFECTIVE DATE OF LEGISLATION: _____

NOT APPROVED AND REFERRED TO: _____

REMARKS (IF NOT APPROVED):_____

_____

_____

_____

Faculty Senate Legislation #91016
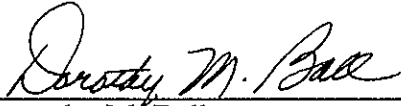
Class B Legislation

At its meeting of March 30, 1992, the Faculty Senate recognized the Computer Engineering Option Program offered under the Bachelor of Science in Electrical Engineering Degree as a separate program independent from the Electrical Engineering Degree Program and approved the BACHELOR OF SCIENCE IN COMPUTER ENGINEERING Degree in the Department of Electrical and Computer Engineering.

<u>**CERTIFIED EXTRACT OF MINUTES**</u>
AND
<u>**CERTIFICATE OF SECRETARY**</u>

I, the undersigned, Assistant Secretary of the **UNIVERSITY OF MIAMI,** a non-profit corporation duly organized and existing under the laws of the State of Florida, hereby **CERTIFY** that the following is a true and correct copy of a certain resolution passed by the Executive Committee of the Board of Trustees of the said corporation, in accordance with the Bylaws at and recorded in the minutes of a meeting of the said Executive Committee duly held on October 29, 1992, and not subsequently rescinded or modified:

<u>**ACTION**</u>: Upon a motion duly made, seconded and passed unanimously, the Executive Committee of the University of Miami Board of Trustees approved the following degree programs: Master of Fine Arts in Creative Writing; Ph.D. in Industrial Engineering; Bachelor of Science in Computer Engineering; and Ph.D. in Neuroscience.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the seal of the said corporation this 5th day of November, 1992, at Coral Gables, Dade County, Florida.

Dorothy M. Ball
Assistant Secretary of the University

(Corporate Seal)

UNIVERSITY OF Miami

BOARD OF TRUSTEES

SUBJECT: Bachelor of Science in Computer Engineering Degree	

PRESENTED BY: Luis Glaser, Provost

BACKGROUND/CURRENT STATUS/MATTERS REQUIRING ACTION/ FINANCIAL IMPLICATIONS:

President Foote, Provost Glaser and the Faculty Senate have approved a Bachelor of Science in Computer Engineering Degree and recommend Board approval.

Information on the program is attached.

BOARD RESOLUTION REQUESTED:

Recommend approval by the Executive Committee.

Proposal for a Ph.D. Degree in Industrial Engineering (First Reading)

Dr. Brass, chair of the ad hoc review committee, summarized the deliberations of the committee and their request for additional comparative statistics on the Ergonomics Program. They also requested a letter from the Dean and the Provost approving the budget and the expected expenditures. Such a letter was received prior to the meeting. Dr. Khalil responded to questions about the computer facilities available for the program, the definition of the scope of industrial engineering, and whether this is a new program or an extension of the existing Ph.D. degree in Ergonomics. A request was made to amplify the list of schools nationally offering similar programs, as well as correcting the list of library holdings.

Proposal for a B.S. Degree in Computer Engineering (Second Reading)

Dr. Kamal Yacoub explained that the option of Computer Engineering in Electrical Engineering has now become a program and should have a degree which reads "Bachelor of Science in Computer Engineering". Dr. Yacoub responded to questions about the curriculum and the general degree requirements. Dr. Brass, as Vice Chair and chair of the ad hoc committee to review the program, presented the proposal as a *motion* from the Senate Council, with their recommendation and that of the ad hoc review committee. The *motion carried.*

NIEHS Marine and Freshwater Biomedical Center
This item was deferred to a later meeting.

Ocean Pollution Research Center

Dr. Brass presented the proposal for the Ocean Pollution Research Center and requested approval of the name of the Center as a Sponsored Center (Bylaw VI, 6.6). It was *moved* and seconded to approve the name of the Center. The *motion carried.*
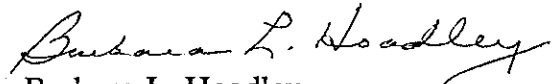
Voting Rights of Research and Educator Faculty (Second Reading)

After discussion of Senate Legislation #91003(A) - Voting Rights for Research Faculty, it was agreed to vote separately on the following six items: 1) use of "Tenured Regular Faculty" vs "Regular Faculty"; 2) through 6) are the items listed in the proposal for Legislation #91003(A). It was *moved* and seconded to amend the first paragraph by substituting "Regular" for "Tenured" faculty. The *motion to amend failed* by a vote of 8 in

Bachelor of Science Degree in Computer Engineering (First Reading)

Professor Yacoub introduced the proposal for an independent program in Computer Engineering. It was *moved* and seconded to approve the independent program and to award the Bachelor of Science degree in Computer Engineering. The *motion carried*.

The meeting adjourned at 7:25 p.m.

Barbara L. Hoadley
Secretary to the Faculty Senate

Center was already on its way. A letter from him to the general Faculty addressing his appointment system proposals and recommending the creation of the Teaching Faculty was being distributed.

Approval of the Minutes

The minutes of the November 25, 1991 and January 13, 1992 meetings were approved as distributed.

Voting Rights

Prof. Knoblock introduced the proposal on voting rights for Research Faculty and Educator Faculty. It was *moved* and seconded to extend voting rights for Research Faculty for a period up to five years with any extension to be renewed no later than five years. The *motion carried.* It was *moved* and seconded to apply the same language to Clinician-Educator Faculty. The *motion carried.* The proposal would be forwarded to the Senate.

Faculty Senate Retreat

The report of the Retreat on January 25 was mailed to all Senators. The Committee, chaired by Prof. Eckstein, which prepared the agenda, is now working on draft legislation.

New Academic Programs

The Chairman informed the Senate that Prof. Brass was chairing a Committee to study the proposal for a Ph. D. in Industrial Engineering. Another proposal for a Ph. D. in Neurosciences was expected. Senior Vice Provost Sugrue requested an extension for the presentation of this later program. It was *moved* and seconded that a Committee to study the proposal should be appointed and given material on the Neurosciences program in advance of external review which would take place in late February. The *motion carried with one vote against.*

It was reported that a program for a Master of Fine Arts in Creative Writing was to be discussed by the Graduate Council on February 12. A proposal from the Department of Electrical and Computer Engineering was introduced to change the name of the degree for those students graduating from the Computer Engineering program to "Bachelor of Science in Computer Engineering", while retaining the original name for those students graduating from the Electrical Engineering Program. It was *moved* and seconded to take action after verifying that the program had been sanctioned and then forward it to the Senate for approval. The *motion carried unanimously.*

2nd Reading

Proposal

To recognize the Computer Engineering Option Program presently offered under the Bachelor of Science in Electrical Engineering Degree as a separate program independent from the Electrical Engineering Degree program

And

To authorize the granting to its graduates of the new degree

Bachelor of Science in Computer Engineering

Department of Electrical & Computer Engineering
University of Miami

March 30, 1992

COMPUTER ENGINEERING PROGRAM

Background

- Originally the Department of Electrical Engineering offered the Degree of Bachelor of Science in Electrical Engineering (B.S.E.E.)

- The Electrical Engineering Program was originally accredited in 1963 by ABET then known as ECPD.

- As there was no separate accreditation in Computer Engineering the Computer Engineering curriculum appeared as an Option under Electrical Engineering. (Source 1971-72 Bulletin).

- In 1979, the Department was visited by a State Committee visiting all Computer Programs in the State. The Computer Engineering program at U.M. received praise from the visiting committee as the one program in South Florida that has the <u>Potential for Excellence.</u> As a result of this committee report, the department proposed and succeeded in receiving a State Contract in 1981. (The first engineering program supported by the State).

- In the early eighties as enrollment in Computer Engineering increased, the Department requested a change in its name to the Department of Electrical and Computer Engineering. (Source 1982-83 Bulletin).

As separate accreditation for Computer Engineering evolved in the eighties, the department sought and received a three year accreditation for its Computer Engineering program in 1988. In preparation for the accreditation visit the word option was dropped from the title of the Computer Engineering Curriculum (Source: 1987-88 Bulletin).

The Computer Engineering Program was again reaccredited for a full six year term in 1991, and the Computer Engineering faculty initiated the request for a change in the degree name.

BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING
(Computer Engineering Program)—125 credits

FRESHMAN YEAR

First Semester
MTH 111 *Calculus I* 4
CHM 111 *Principles of Chemistry I* 4
ENG 105 *English Composition I* 3
EEN 101 *Orientation Seminar* 0
**Humanistic Elective 3
—— 14

Second Semester
EEN 117 *PASCAL and Introduction to Software Engineering* 3
MTH 112 *Calculus II* 4
PHY 211 *University Physics I* 4
PHY 222 *University Physics Laboratory I* 1
ENG 107 *Writing about Science* 3
—— 15

SOPHOMORE YEAR

First Semester
EEN 201 *Electrical Circuit Theory* 3
MTH 210 *Vectors and Matrices* 3
MTH 317 *Data Structures* 3
PHY 212 *University Physics II* 4
PHY 236 *University Physics Laboratory II* 1
**Social Science Elective 3
—— 17

Second Semester
EEN 204 *Electrical Circuits Laboratory* 1
EEN 304 *Logic Design* 3
EEN 305 *Electronics I* 3
EEN 307 *Linear Circuits and Signals* 3
MTH 309 *Discrete Mathematics I* 3
MTH 311 *Ordinary Differential Equations* 3
—— 16

JUNIOR YEAR

First Semester
EEN 306 *Electronics II* 3
EEN 312 *Microprocessor* 4
EEN 315 *Digital Design Laboratory* 1
EEN 324 *Systems Programming* 3
IEN 311 *Applied Probability and Statistics* 3
**Humanistic Elective 3
—— 17

Second Semester
EEN 311 *Electronics Laboratory* 1
EEN 414 *Computer Organization and Design* 3
EEN 454 *Digital System Design* 4
IEN 380 *Engineering Economy* or Approved Electives 3
MEN 303 *Thermodynamics I* or....................................3
CEN 210 *Mechanics of Solids I* 3
**Social Science Electives 3
—— 17

SENIOR YEAR

First Semester
EEN 417 *Embedded Microprocessor System Design* 2
EEN 418 *Senior Project Planning* 0
EEN 514 *Computer Architecture* 3
EEN 521 *Computer Operating Systems* 3
Computer Engineering Tech. Elective 3
**Adv. Socio-Humanistic Elective 3
—— 14

Second Semester
EEN 419 *Computer Engineering Senior Project* 3
Computer Engineering Tech. Elective 3
Computer Engineering Tech. Elective 3
EEN 519 *Design of Computing Language* or
MTH 519 *Programming Languages* 3
**Adv. Socio-Humanistic Elective 3
—— 15

TABLE OF CONTENTS

ABSTRACT

It is proposed that the degree of Bachelor of Science in Computer Engineering be awarded to students who graduate under the existing Computer Engineering program in the department. The rationale and other relevant data are presented. This would enable us to be included in the lists of universities awarding bachelor's degree in Computer Engineering thus enhancing the visibility of our program with subsequent possible enhancement of recruitment of students seeking the degree. Since the program in Computer Engineering has been in existence for several years already, no new faculty, equipment, library books and journals, secretarial personnel or any other resources are needed to award the proposed degree.

SUMMARY

The Department of Electrical & Computer Engineering has currently two accredited programs: (1) Computer Engineering, (2) Electrical Engineering. However, the degree of Bachelor of Science in Electrical Engineering is awarded to students graduating in either of these two programs. It is proposed that the students graduating under the Computer Engineering program be awarded the degree of Bachelor of Science in Computer Engineering.

Computer Engineering has emerged as a full-fledged discipline in its own right in the last two decades and already there are nearly 78 universities awarding degrees, at bachelor's level, in Computer Engineering or similarly named engineering programs. Since 1988 the Computer Engineering program in the Department of Electrical & Computer Engineering has been accredited. The awarding of the proposed degree will require no additional faculty, library books, secretarial help or other resources. There is no university in South Florida awarding a degree in Computer Engineering or similarly named engineering program. It is expected that both Florida Atlantic University and Florida International

University will award the degree of Computer Engineering in the near future, possibly next year. Inclusion of our name in the lists of universities awarding a degree in Computer Engineering will enhance our visibility and our ability to attract students interested in Computer Engineering at no extra cost. The awarding of the proposed degree will be profitable to the university from all points of view.

CONCLUSION

The degree that a student receives after pursuing a program should clearly and accurately connote what the program pursued was all about. The ACM Council, the IEEE Board of Governors and nearly 78 universities have recognized that Computer Engineering is a full-fledged discipline and therefore it deserves a degree in its own name.

The Computer Engineering program in the department has been fully developed, established and accredited since 1988. The awarding of the proposed degree will require no additional faculty, library books and journals, equipment, secretarial help or any other resources.

When the proposal is approved, our Computer Engineering program will be included in the lists of universities awarding the degree of Bachelor of Science in Computer Engineering. This will enhance the visibility of the program and possibly enhance the recruitment of students seeking the degree. The university can only benefit from awarding of the degree with no addition to cost.

PROPOSAL

FOR

COMPUTER ENGINEERING

DEGREE PROGRAM

Department of Electrical & Computer Engineering
College of Engineering
University of Miami

October 1991

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ABSTRACT

It is proposed that the degree of Bachelor of Science in Computer Engineering be offered to students who graduate under the existing Computer Engineering program in the department. The rationale and other relevant data are presented. This would enable us to be included in the lists of universities offering bachelor's degree in Computer Engineering thus enhancing the visibility of our program with subsequent possible enhancement of recruitment of students seeking the degree. Since the program in Computer Engineering has been in existence for several years already, no new faculty, equipment, library books and journals, secretarial personnel or any other resources are needed to offer the proposed degree.

SUMMARY

The Department of Electrical & Computer Engineering has currently two accredited programs: (1) Computer Engineering, (2) Electrical Engineering. However, the degree of Bachelor of Science in Electrical Engineering is offered to students graduating in either of these two programs. It is proposed that the students graduating under Computer Engineering program be offered the degree of in Bachelor of Science in Computer Engineering.

Computer Engineering has emerged as a full-fledged discipline in its own right in the last two decades and already there are nearly 78 universities offering degrees, at bachelor's level, in Computer Engineering or similarly named engineering programs. Since 1988 the Computer Engineering program in the Department of Electrical & Computer Engineering has been accredited. The offering of the proposed degree will require no additional faculty, library books, secretarial help or other resources. There is no university in South Florida offering a degree in Computer Engineering or similarly named engineering program. It is expected that both the Florida Atlantic University and the Florida International University will offer the degree of Computer Engineering in

the near future, possibly next year. Inclusion of our name in the lists of universities offering a degree in Computer Engineering will enhance our visibility and our ability to attract students interested in Computer Engineering at no extra cost. The offering of the proposed degree will be only profitable to the university from all points of view.

RATIONALE

Abacus, the oldest computing device known to man (1000 to 2000 B.C.), Oughred's slide rule (1622), Pascal's add-subtract device (1642), Leibnitz's four-function device (1670), and Babbage's Analytical Engine (1822) that never worked during his life time were all made up of only mechanical components. The first electronic digital computer was built by John Atanasoff of Iowa State University in 1939. The contemporary contributions by Aiken, Mauchly and Von Neumann ushered us in the era of electronic digital computers, and led to the initiation of teaching, research and development of computers in many departments of Electrical Engineering as well as Mathematics. The increasing and widespread use of computers in defense, industry, commerce, and teaching and research in engineering science, mathematics and other disciplines spurred enhanced research activities to make computers more versatile, faster, easier to use and easier to program. Departments of Electrical Engineering in colleges and schools across the nation began offering degree programs heavily concentrated in hardware and software aspects of computers. University of Connecticut was most probably the first university to establish a department of Computer Science and Engineering in 1972. The University of Central Florida established a department of Computer

Engineering in 1974. In the Spring of 1988 the Association of Computer Machinery (ACM)* and the Computer Society* of the IEEE formed a Joint Task Force to develop a model for the design of undergraduate curricula in the discipline of computing [1]. The final report of the Joint Task was endorsed by the ACM Council towards the end of 1990 and the IEEE Board of Governors towards the beginning of 1991 [4]. The action of these two large professional bodies was tantamount to the recognition of the fact that computing had already graduated as a full-fledged discipline with computer engineering and computer science as two specialties or tracks. The report [1] concluded that Computer Engineering & Computer Science are very strongly connected disciplines with "Computer Science focusing on analysis and abstraction, Computer Engineering on abstraction and design".

Appendix I shows names of about 78 universities offering degrees in Computer Engineering or similarly named engineering programs. Appendix II shows Computer Engineering and similarly named engineering programs which are accredited by ABET in 1990 [3]. (Whereas Computer Science

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* Both ACM & IEEE Computer Society have members from professionals who are involved in the areas of Computer Science and/or Computer Engineering. The former has more members from computer science and the latter has more members from engineering. (Computer Society is the largest society in IEEE).

program exist in engineering and other colleges (schools) on the continent, none of them is included in these lists).

The Computer Engineering program which was initiated in our department recently has been accredited since 1988. The students currently graduating under this program receive a degree in Electrical Engineering. We propose that these students be offered a degree in Computer Engineering in order to follow the growing nation-wide and world-wide trend.

COMPARISON WITH OTHER COMPUTER ENGINEERING

DEGREE PROGRAMS

For status of program criteria, the 1990 ABET Annual Report [3] lists IEEE as the responsible participating body for Computer Engineering program. The Computer Society of IEEE recommended a detailed outline of the courses taught in a Computer Engineering program. The computer engineering program in our department which has been accredited since 1988 follows these recommendations very closely. Computer engineering programs across the nation also follow the same recommendations. Hence our program is comparable to those offered elsewhere in the state and the nation.

NO NEED FOR ADDITIONAL RESOURCES

The Computer Engineering program has been fully developed and established for quite some time and has been accredited since 1988. No additional resources in terms of faculty, laboratory equipment, secretarial help, computing power, technical books and journals, and space are needed for offering the proposed degree.

Faculty resumes and laboratory equipment are given in Appendix III and Appendix IV respectively for the sake of completeness of the proposal.

CONCLUSION

The degree that a student receives after pursuing a program should clearly and accurately connote what the program pursued was all about. The ACM Council, the IEEE Board of Governors and nearly 78 universities have recognized that Computer Engineering is a full-fledged discipline and therefore it deserves a degree in its own name.

The Computer Engineering program in the department has been fully developed, established and accredited since 1988. The offering of the proposed degree will require no additional faculty, library books and journals, equipment, secretarial help and other resources.

When the proposal is approved, our Computer Engineering program will be included in the lists of universities offering the degree of Bachelor of Science in Computer Engineering. This will enhance the visibility of the program and possibly enhance the recruitment of students seeking the degree. The university can only benefit from offering of the degree with no addition to cost.

References:

1) Peter Denning, Douglas Comer, David Gries, Michael Mulder, Allen Tucker, A. Joe Turner, and Paul Young, "Computing as a Discipline: A Special Report", IEEE Computer, February 1989, pp. 63-70.

2) Engineering Education (Undergraduate Programs in Engineering and Engineering Technology), American Society for Engineering Education, November 1990.

3) 1990 Annual Report (for the year ending September 30, 1990), Accreditation Board for Engineering & Technology, Inc.

4) Telephonic Conversation Between Dr. Michael Mulder & Dr. M.A. Tapia, Tuesday, October 8, 1991. (Dr. Michael was one of the principal authors of the report referred to in [1]).

UNIVERSITY OF
Miami

MEMORANDUM

February 7, 1992

To: Dr. W.J. Whelan
                    Chair, Faculty Senate

From: Dr. Tzay Y. Young
                    Chair, Electrical & Computer Engineering

Subject: Proposal to change the name of the degree to Bachelor of
                    Science in Computer Engineering

The Department of Electrical & Computer Engineering offers two programs, Electrical Engineering and Computer Engineering. Both programs are offered under the traditional degree "Bachelor of Science in Electrical Engineering". The department is proposing to change the name of the degree for those students graduating from the Computer Engineering program to "Bachelor of Science in Computer Engineering", while retaining the original name for those of our students who graduate from the Electrical Engineering program.

This proposal request was forwarded to you through the Provost Office after it received the following approvals:

Faculty of the Department of Electrical & Computer Engineering on November 15, 1991
College of Engineering Council on December 11, 1991.
College of Engineering Faculty on January 22, 1992.

Thank you for your cooperation.

TYY/mp

cc: Dr. J. Masterson, Vice Provost
       Dr. M. Becker, Dean CoE
       Dr. S. Lee, Associate Dean

COMPUTER ENGINEERING PROGRAM

Background

-   Originally the Department of Electrical Engineering offered the Degree of Bachelor of Science in Electrical Engineering (B.S.E.E.)

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The Computer Engineering Program was again reaccredited for a full six year term in 1991, and the Computer Engineering faculty initiated the request for a change in the degree name.
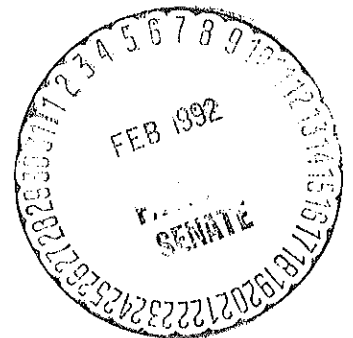
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M**iami** UNIVERSITY OF

Executive Vice President and Provost

FEB 1992
SENATE

M E M O R A N D U M

February 4, 1992

FAXED
2-5-92

TO: Dean Martin Becker
        College of Engineering

FROM: John T. Masterson
        Vice Provost for
          Undergraduate Affairs

SUBJECT: B.S. in Computer Engineering

Dr. Glaser has asked me to assist you in gaining formal
university approval of your proposal for the B.S. in Computer
Engineering. Accordingly, I have submitted the proposal to the
Senate in time for it to be placed on the agenda of the next
Senate Council meeting. If all goes smoothly there, it will go
to the full Senate where two readings are required. Thus, you
can anticipate approval no earlier than the March meeting of the
Senate.

Your senators, particularly the one appointed to the Council
should be helpful in moving the proposal along from here. Let me
know how I can be helpful.

JTM:sk
cc: Luis Glaser
     William Whelan

UNIVERSITY OF Miami

MEMORANDUM

February 7, 1992

Pls. check #91016 for this info. Be sure the letters are on file also.

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FEB 1992
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<u>Proposal</u>

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Bachelor of Science in Computer Engineering

Department of Electrical & Computer Engineering
University of Miami

March 30, 1992

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BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING
(Computer Engineering Program)—125 credits

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MTH 111 *Calculus I* 4
CHM 111 *Principles of Chemistry I* 4
ENG 105 *English Composition I* 3
EEN 101 *Orientation Seminar* 0
**Humanistic Elective 3

14

Second Semester
EEN 117 *PASCAL and Introduction to Software Engineering* 3
MTH 112 *Calculus II* 4
PHY 211 *University Physics I* 4
PHY 222 *University Physics Laboratory I* 1
ENG 107 *Writing about Science* 3

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SOPHOMORE YEAR

First Semester
EEN 201 *Electrical Circuit Theory* 3
MTH 210 *Vectors and Matrices* 3
MTH 317 *Data Structures* 3
PHY 212 *University Physics II* 4
PHY 236 *University Physics Laboratory II* 1
**Social Science Elective 3

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EEN 304 *Logic Design* 3
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MTH 309 *Discrete Mathematics I* 3
MTH 311 *Ordinary Differential Equations* 3

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First Semester
EEN 306 *Electronics II* 3
EEN 312 *Microprocessor* 4
EEN 315 *Digital Design Laboratory* 1
EEN 324 *Systems Programming* 3
IEN 311 *Applied Probability and Statistics* 3
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EEN 311 *Electronics Laboratory* 1
EEN 414 *Computer Organization and Design* 3
EEN 454 *Digital System Design* 4
IEN 380 *Engineering Economy* or Approved Electives 3
MEN 303 *Thermodynamics I* or....................................3
CEN 210 *Mechanics of Solids I* 3
**Social Science Electives 3

17

SENIOR YEAR

First Semester
EEN 417 *Embedded Microprocessor System Design* 2
EEN 418 *Senior Project Planning* 0
EEN 514 *Computer Architecture* 3
EEN 521 *Computer Operating Systems* 3
Computer Engineering Tech. Elective 3
**Adv. Socio-Humanistic Elective 3

14

Second Semester
EEN 419 *Computer Engineering Senior Project* 3
Computer Engineering Tech. Elective 3
Computer Engineering Tech. Elective 3
EEN 519 *Design of Computing Language* or
MTH 519 *Programming Languages* 3
**Adv. Socio-Humanistic Elective 3

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ABSTRACT

It is proposed that the degree of Bachelor of Science in Computer Engineering be awarded to students who graduate under the existing Computer Engineering program in the department. The rationale and other relevant data are presented. This would enable us to be included in the lists of universities awarding bachelor's degree in Computer Engineering thus enhancing the visibility of our program with subsequent possible enhancement of recruitment of students seeking the degree. Since the program in Computer Engineering has been in existence for several years already, no new faculty, equipment, library books and journals, secretarial personnel or any other resources are needed to award the proposed degree.

SUMMARY

The Department of Electrical & Computer Engineering has currently two accredited programs: (1) Computer Engineering, (2) Electrical Engineering. However, the degree of Bachelor of Science in Electrical Engineering is awarded to students graduating in either of these two programs. It is proposed that the students graduating under the Computer Engineering program be awarded the degree of Bachelor of Science in Computer Engineering.

Computer Engineering has emerged as a full-fledged discipline in its own right in the last two decades and already there are nearly 78 universities awarding degrees, at bachelor's level, in Computer Engineering or similarly named engineering programs. Since 1988 the Computer Engineering program in the Department of Electrical & Computer Engineering has been accredited. The awarding of the proposed degree will require no additional faculty, library books, secretarial help or other resources. There is no university in South Florida awarding a degree in Computer Engineering or similarly named engineering program. It is expected that both Florida Atlantic University and Florida International

University will award the degree of Computer Engineering in the near future, possibly next year. Inclusion of our name in the lists of universities awarding a degree in Computer Engineering will enhance our visibility and our ability to attract students interested in Computer Engineering at no extra cost. The awarding of the proposed degree will be profitable to the university from all points of view.

CONCLUSION

The degree that a student receives after pursuing a program should clearly and accurately connote what the program pursued was all about. The ACM Council, the IEEE Board of Governors and nearly 78 universities have recognized that Computer Engineering is a full-fledged discipline and therefore it deserves a degree in its own name.

The Computer Engineering program in the department has been fully developed, established and accredited since 1988. The awarding of the proposed degree will require no additional faculty, library books and journals, equipment, secretarial help or any other resources.

When the proposal is approved, our Computer Engineering program will be included in the lists of universities awarding the degree of Bachelor of Science in Computer Engineering. This will enhance the visibility of the program and possibly enhance the recruitment of students seeking the degree. The university can only benefit from awarding of the degree with no addition to cost.
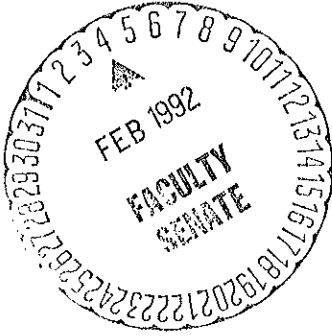
COMPUTER ENGINEERING PROGRAM

Background

-   Originally the Department of Electrical Engineering offered the Degree of Bachelor of Science in Electrical Engineering (B.S.E.E.)

-   The Electrical Engineering Program was originally accredited in 1963 by ABET then known as ECPD.

-   As there was no separate accreditation in Computer Engineering the Computer Engineering curriculum appeared as an Option under Electrical Engineering. (Source 1971-72 Bulletin).

-   In 1979, the Department was visited by a State Committee visiting all Computer Programs in the State. The Computer Engineering program at U.M. received praise from the visiting committee as the one program in South Florida that has the Potential for Excellence. As a result of this committee report, the department proposed and succeeded in receiving a State Contract in 1981. (The first engineering program supported by the State).

-   In the early eighties as enrollment in Computer Engineering increased, the Department requested a change in its name to the Department of Electrical and Computer Engineering. (Source 1982-83 Bulletin).

As separate accreditation for Computer Engineering evolved in the eighties, the department sought and received a three year accreditation for its Computer Engineering program in 1988. In preparation for the accreditation visit the word option was dropped from the title of the Computer Engineering Curriculum (Source: 1987-88 Bulletin).

The Computer Engineering Program was again reaccredited for a full six year term in 1991, and the Computer Engineering faculty initiated the request for a change in the degree name.

PROPOSAL

FOR

COMPUTER ENGINEERING

DEGREE PROGRAM

Department of Electrical & Computer Engineering
College of Engineering
University of Miami

October 1991

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It is proposed that the degree of Bachelor of Science in Computer Engineering be offered to students who graduate under the existing Computer Engineering program in the department. The rationale and other relevant data are presented. This would enable us to be included in the lists of universities offering bachelor's degree in Computer Engineering thus enhancing the visibility of our program with subsequent possible enhancement of recruitment of students seeking the degree. Since the program in Computer Engineering has been in existence for several years already, no new faculty, equipment, library books and journals, secretarial personnel or any other resources are needed to offer the proposed degree.

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The Department of Electrical & Computer Engineering has currently two accredited programs: (1) Computer Engineering, (2) Electrical Engineering. However, the degree of Bachelor of Science in Electrical Engineering is offered to students graduating in either of these two programs. It is proposed that the students graduating under Computer Engineering program be offered the degree of in Bachelor of Science in Computer Engineering.

Computer Engineering has emerged as a full-fledged discipline in its own right in the last two decades and already there are nearly 78 universities offering degrees, at bachelor's level, in Computer Engineering or similarly named engineering programs. Since 1988 the Computer Engineering program in the Department of Electrical & Computer Engineering has been accredited. The offering of the proposed degree will require no additional faculty, library books, secretarial help or other resources. There is no university in South Florida offering a degree in Computer Engineering or similarly named engineering program. It is expected that both the Florida Atlantic University and the Florida International University will offer the degree of Computer Engineering in

the near future, possibly next year. Inclusion of our name in the lists of universities offering a degree in Computer Engineering will enhance our visibility and our ability to attract students interested in Computer Engineering at no extra cost. The offering of the proposed degree will be only profitable to the university from all points of view.

RATIONALE

Abacus, the oldest computing device known to man (1000 to 2000 B.C.), Oughred's slide rule (1622), Pascal's add-subtract device (1642), Leibnitz's four-function device (1670), and Babbage's Analytical Engine (1822) that never worked during his life time were all made up of only mechanical components.   The first electronic digital computer was built by John Atanasoff of Iowa State University in 1939.   The contemporary contributions by Aiken, Mauchly and Von Neumann ushered us in the era of electronic digital computers, and led to the initiation of teaching, research and development of computers in many departments of Electrical Engineering as well as Mathematics.   The increasing and widespread use of computers in defense, industry, commerce, and teaching and research in engineering science, mathematics and other disciplines spurred enhanced research activities to make computers more versatile, faster, easier to use and easier to program.   Departments of Electrical Engineering in colleges and schools across the nation began offering degree programs heavily concentrated in hardware and software aspects of computers. University of Connecticut was most probably the first university to establish a department of Computer Science and Engineering in 1972.   The University of Central Florida established a department of Computer

Engineering in 1974. In the Spring of 1988 the Association of Computer Machinery (ACM)* and the Computer Society* of the IEEE formed a Joint Task Force to develop a model for the design of undergraduate curricula in the discipline of computing [1]. The final report of the Joint Task was endorsed by the ACM Council towards the end of 1990 and the IEEE Board of Governors towards the beginning of 1991 [4]. The action of these two large professional bodies was tantamount to the recognition of the fact that computing had already graduated as a full-fledged discipline with computer engineering and computer science as two specialties or tracks. The report [1] concluded that Computer Engineering & Computer Science are very strongly connected disciplines with "Computer Science focusing on analysis and abstraction, Computer Engineering on abstraction and design".

Appendix I shows names of about 78 universities offering degrees in Computer Engineering or similarly named engineering programs. Appendix II shows Computer Engineering and similarly named engineering programs which are accredited by ABET in 1990 [3]. (Whereas Computer Science

_____

* Both ACM & IEEE Computer Society have members from professionals who are involved in the areas of Computer Science and/or Computer Engineering. The former has more members from computer science and the latter has more members from engineering. (Computer Society is the largest society in IEEE).

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program exist in engineering and other colleges (schools) on the continent, none of them is included in these lists).

The Computer Engineering program which was initiated in our department recently has been accredited since 1988. The students currently graduating under this program receive a degree in Electrical Engineering. We propose that these students be offered a degree in Computer Engineering in order to follow the growing nation-wide and world-wide trend.

COMPARISON WITH OTHER COMPUTER ENGINEERING

DEGREE PROGRAMS

For status of program criteria, the 1990 ABET Annual Report [3] lists IEEE as the responsible participating body for Computer Engineering program. The Computer Society of IEEE recommended a detailed outline of the courses taught in a Computer Engineering program. The computer engineering program in our department which has been accredited since 1988 follows these recommendations very closely. Computer engineering programs across the nation also follow the same recommendations. Hence our program is comparable to those offered elsewhere in the state and the nation.

NO NEED FOR ADDITIONAL RESOURCES

The Computer Engineering program has been fully developed and established for quite some time and has been accredited since 1988. No additional resources in terms of faculty, laboratory equipment, secretarial help, computing power, technical books and journals, and space are needed for offering the proposed degree.

Faculty resumes and laboratory equipment are given in Appendix III and Appendix IV respectively for the sake of completeness of the proposal.

CONCLUSION

The degree that a student receives after pursuing a program should clearly and accurately connote what the program pursued was all about. The ACM Council, the IEEE Board of Governors and nearly 78 universities have recognized that Computer Engineering is a full-fledged discipline and therefore it deserves a degree in its own name.

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When the proposal is approved, our Computer Engineering program will be included in the lists of universities offering the degree of Bachelor of Science in Computer Engineering. This will enhance the visibility of the program and possibly enhance the recruitment of students seeking the degree. The university can only benefit from offering of the degree with no addition to cost.

References:

1) Peter Denning, Douglas Comer, David Gries, Michael Mulder, Allen Tucker, A. Joe Turner, and Paul Young, "Computing as a Discipline: A Special Report", IEEE Computer, February 1989, pp. 63-70.

2) Engineering Education (Undergraduate Programs in Engineering and Engineering Technology), American Society for Engineering Education, November 1990.

3) 1990 Annual Report (for the year ending September 30, 1990), Accreditation Board for Engineering & Technology, Inc.

4) Telephonic Conversation Between Dr. Michael Mulder & Dr. M.A. Tapia, Tuesday, October 8, 1991. (Dr. Michael was one of the principal authors of the report referred to in [1]).

APPENDIX I

Universities Offering Degrees in Computer Engineering or

Similarly Named Engineering Programs [2]: (Computer Science Programs

offered in school or college of engineering are not included in this list.)

Legend: Computer Engineering (1)

Computer Science & Engineering (2)

Computer Engineering & Science (2)

Computer Systems Engineering (3)

Computer & Information Engineering Science (4)

Computer (5)

Computer & System Engineering (6)

Computer Systems Engineering (7)

(1)   University of Alberta

(3)   Arizona State University

(1)   University of Arizona

(2)   University of Arkansas

(1)   Auburn University

(1)   Boston University

(1)   University of Bridgeport

(1)   California Polytechnic State University, San Luis Obispo

(1)   California State University, Chico

(1)   California State University, Long Beach

(1)   California State University, Sacramento

(2)   University of California, Davis

(2)   University of California, Los Angeles

(1) University of California, San Diego

(1) Case Western Reserve

(2) Catholic University of America

(1) University of Central Florida

(1) University of Cincinnati

(1) Clemson University

(1) Concordia University

(2) University of Connecticut

(1) Ecole Polytechnique de Montreal

(1) University of Evansville

(1) Florida Institute of Technology

(4) University of Florida

(1) George Washington University

(1) University of Hartford

(7) Howard University

(1) University of Idaho

(1) University of Illinois at Chicago

(1) University of Illinois at Urbana-Champaign

(1) Iowa State University

(1) Kansas State University

(5) University of Kansas

(1) Lehigh University

(1) University of Maine

(1) University of Manitoba

(1) Michigan State University

(1) University of Michigan

(2) Milwaukee School of Engineering

(1) Mississippi State University

(1) University of Missouri - Columbia

(2) University of Nebraska - Lincoln

(1) New Jersey Institute of Technology

(1) University of New Mexico

(1) North Carolina State University

(2) Northern Arizona University

(1) Norwich University

(1) University of Notre Dame

(1) Oakland University

(1) Old Dominion University

(1) Oregon State University

(1) University of the Pacific

(1) Pennsylvania State University

(2) University of Pennsylvania

(1) Polytechnic University, Brooklyn

(2) Universite du Quebec a Chicoutimi

(6) Rensselaer Polytechnic Institute

(1) San Jose State University

(1) Santa Clara University

(2) University of South Florida

(1) Southeastern Massachusetts University

(1) Southern Methodist University

(1) University of Southwestern Louisiana

(1) Syracuse University

(2) Texas A&M University

(2) University of Texas at Arlington

(2) University of Toledo

(1) Tulane University

(1) University of Utah

(1) Valparaiso University

(1) Villanova University

(1) University of Washington

(1) Wayne State University

(1) West Virginia University

(1) Western Michigan University

(1) Wright State University

APPENDIX II

Universities that Offer Accredited Programs in Computer

Engineering & Similarly Named Engineering Programs [3]

Computer & Information Engineering Sciences
University of Florida

Computer & Sytems Engineering
Rensselaer Polytechnic Insitute

Computer Engineering
University of Arizona
Auburn University
Boston University
University of Bridgeport
California State University, Chico
California State University, Sacramento
University of California, Santa Cruz
Carnegie-Mellon University
Case Western Reserve University
University of Central Florida
University of Cincinnati
Clemson University
Florida Institute of Technology
George Washington University
University of Illinois at Chicago
University of Illinois at Urbana-Champaign
Iowa State University
Lehigh University
Louisiana State University
University of Miami
University of Michigan
Milwaukee School of Engineering
University of Minnesota
Mississippi State University
University of Missouri - Columbia
University of New Mexico

North Carolina State University at Raleigh
Oakland University
Old Dominion University
Oregon State University
University of the Pacific
Rochester Institute of Technology
Santa Clara University
University of South Florida
Southeastern Massachusetts University
Southern Methodist University
Stevens Institute of Technology
Syracuse University
University of Texas at Austin
Valparaiso University
Virginia Polytechnic Institute and State University
University of Washington
Wright State University

Computer Engineering Option in Electrical Engineering
Tufts University

Computer Science
University of California, Berkeley

Computer Science and Engineerig
California State University, Long Beach
University of California, Davis
University of California, Los Angeles
University of Connecticut
Massachusetts Institute of Technology
Northern Arizona University
University of Texas at Arlington
University of Toledo
Washington University

Computer Systems Engineering
Arizona State University
University of Massachusetts at Amherst
Western Michigan University, Kalamazoo Campus

APPENDIX III

Computer Engineering Curriculum

BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING
(Electrical Engineering Program)— 123 credits

FRESHMAN YEAR

First Semester
ENG 105 *English Composition I* 3
MTH 111 *Calculus I* 4
CHM 111 *Principles of Chemistry I* 4
EEN 117 *PASCAL and Introduction to Software Engineering* 3
EEN 101 *Orientation Seminar* 0
                                                            14

Second Semester
ENG 107 *Writing about Science* 3
MTH 112 *Calculus II* 4
MTH 210 *Vectors and Matrices* 3
PHY 211 *University Physics I* 4
PHY 222 *University Physics Laboratory I* 1
                                                            15

SOPHOMORE YEAR

Third Semester
EEN 201 *Electrical Circuit Theory* 3
MTH 311 *Ordinary Differential Equations* 3
CEN 210 *Mechanics of Solids I* 3
PHY 212 *University Physics II* 4
PHY 236 *University Physics Laboratory II* 1
**Humanistic Elective 3
                                                            17

Fourth Semester
EEN 204 *Electrical Circuits Laboratory* 1
EEN 305 *Electronics I* 3
EEN 307 *Linear Circuits and Signals* 3
EEN 304 *Logic Design* 3
MTH 312 *Vector Analysis* 3
**Humanistic Elective 3
                                                            16

JUNIOR YEAR

Fifth Semester
EEN 301 *Electromagnetic Field Theory*...............................3
EEN 303 *Computer Aided Circuit Design* 1
EEN 315 *Digital Design Laboratory* 1
EEN 311 *Electronics Laboratory* 1
EEN 306 *Electronics II* 3
PHY 360 *Introduction to Modern Physics*   or 3
**Social Science Elective 3
                                                            15

Sixth Semester
EEN 302 *Electrical Machine Theory* 3
EEN 308 *Linear Control Systems* 3
EEN 310 *Electrical Machine Laboratory* 1
IEN 311 *Applied Probability and Statistics* 3
EEN 312 *Microprocessor* 4
**Social Science Elective 3
                                                            17

SENIOR YEAR

Seventh Semester
EEN 404 *Communication Systems* 3
*Electrical Design Elective 3
EEN 505 *Solid-State Electronics* 3
EEN or Approved Elective 2-3
**Adv. Soci-Hum Elective 3
                                                            14/15

Eighth Semester
EEN 416 *Electrical Design*..3
EEN or Technical Elective 6
MEN 303 *Thermodynamics I* 3
**Adv. Soc-Hum Elective 3
                                                            15

BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING
(Computer Engineering Program)—125 credits

FRESHMAN YEAR

First Semester
MTH 111 *Calculus I* 4
CHM 111 *Principles of Chemistry I* 4
ENG 105 *English Composition I* 3
EEN 101 *Orientation Seminar* 0
**Humanistic Elective 3
                                                            14

Second Semester
EEN 117 *PASCAL and Introduction to Software Engineering* 3
MTH 112 *Calculus II* 4
PHY 211 *University Physics I* 4
PHY 222 *University Physics Laboratory I* 1
ENG 107 *Writing about Science* 3
                                                            15

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* Electrical Design Elective: Choose one (EEN 409, 516, 535, 542, 555)
** Humanities, Social Science, and Soci-Humanistic Electives are to be selected from a list maintained by the Chairman of the student's degree department.

SOPHOMORE YEAR

First Semester
EEN 201 *Electrical Circuit Theory* 3
MTH 210 *Vectors and Matrices* 3
MTH 317 *Data Structures* 3
PHY 212 *University Physics II* 4
PHY 236 *University Physics Laboratory II* 1
**Social Science Elective 3
                                                                    ——
                                                                    17

Second Semester
EEN 204 *Electrical Circuits Laboratory* 1
EEN 304 *Logic Design* 3
EEN 305 *Electronics I* 3
EEN 307 *Linear Circuits and Signals* 3
MTH 309 *Discrete Mathematics I* 3
MTH 311 *Ordinary Differential Equations* 3
                                                                    ——
                                                                    16

JUNIOR YEAR

First Semester
EEN 306 *Electronics II* 3
EEN 312 *Microprocessor* 4
EEN 315 *Digital Design Laboratory* 1
EEN 324 *Systems Programming* 3
IEN 311 *Applied Probability and Statistics* 3
**Humanistic Elective 3
                                                                    ——
                                                                    17

Second Semester
EEN 311 *Electronics Laboratory* 1
EEN 414 *Computer Organization and Design* 3
EEN 454 *Digital System Design* 4
IEN 380 *Engineering Economy* or   Approved Electives 3
MEN 303 *Thermodynamics I* or 3
CEN 210 *Mechanics of Solids I* 3
**Social Science Electives 3
                                                                    ——
                                                                    17

SENIOR YEAR

First Semester
EEN 417 *Embedded Microprocessor System Design* 2
EEN 418 *Senior Project Planning* 0
EEN 514 *Computer Architecture* 3
EEN 521 *Computer Operating Systems* 3
Computer Engineering Tech. Elective 3
**Adv. Socio-Humanistic Elective 3
                                                                    ——
                                                                    14

Second Semester
EEN 419 *Computer Engineering Senior Project* 3
Computer Engineering Tech. Elective 3
Computer Engineering Tech. Elective 3
EEN 519 *Design of Computing Language* or
MTH 519 *Programming Languages* 3
**Adv. Socio-Humanistic Elective 3
                                                                    ——
                                                                    15

SPECIAL OPTIONS WITHIN THE ELECTRICAL ENGINEERING PROGRAM

The Electrical Engineering program includes two technical electives, and one approved elective. Special options in Electrical Engineering could be formulated by proper choice of these electives. The following table lists the suggested electives for those students interested in any one of the following special options: Electrical Engineering with Biomedical Engineering Option; Electrical Engineering with Ocean Engineering Option; Electrical Engineering with Pre-Medical Option. Other option programs could be formulated in consultation with a faculty advisor. Electrical Engineering with Engineering Administration Option may be earned by completion of the following Business courses MKT 301 (3), MGT 301 (3), BSL 212 (3). However, these courses may not be used to satisfy technical elective course requirement.

SUGGESTED TECHNICAL AND SCIENCE ELECTIVES IN SPECIAL ELECTRICAL ENGINEERING OPTIONS

Regular Program	Biomedical Engineering	Ocean Engineering	Pre-Medical Engineering
PHY 360 (3)	CHM 112 (4)	MSC 301 (3)	CHM 112 (4)
Tech.Elec. (6) Appr.Elect. (3)	CHM 201 (3) BME 501 (6) BME 502 (3)	MPO 503 (3) AMP 531 (3) AMP 535 (3) Opt.Elec. (3)	CHM 201 (3) CHM 202 (3) CHM 203 (2) BIL 111 (4) BIL 112 (4)

MINOR IN ELECTRICAL ENGINEERING

Students minoring in Electrical Engineering should satisfy a 15 credit requirement specified as follows:
1. A core of seven credits consisting of EEN 201, EEN 204, and EEN 305.
2. Eight or more credits of Electrical Engineering Electives. It is recommended that these elective credits be taken from one of the following sets of EEN courses:

   a. *Digital* (EEN 117, 304, 306, 307, 311, 312, 414, 417)

   b. *Systems* (EEN 307, 308, 508, 518)

   c. *Communication* (EEN 306, 307, 311, 404, 534, 536)

   d. *Electronics* (EEN 306, 307, 311, 516, 535, 542, 555)

APPENDIX IV

Computer Engineering Laboratory

Facilities & Equipment

Measurement and Electronics Laboratory
Room 404

A.   This facility is used mainly to teach two laboratory courses. These are:

    EEN 204 -   Electrical Circuits Lab
    EEN 311 -   Electronics Laboratory

In addition, it is occasionally used in conjunction with two other courses. These are:

    EEN 516 -   Linear Integrated Circuits and
    EEN 542 -   Digital Integrated Circuits

B.   This laboratory was completely updated using funds form an undergraduate improvement grant ($50,000) in the summer of 1988. The overhall consisted of a new lab space, new lab furniture, and new lab equipment. It is a modern laboratory which consists of ten workstations for two students per station. Each station is equipped with the following instruments:

    a)   Oscilloscope - Tektronix 2225
    b)   DVM - HP3468A
    c)   Function generator - HP3312A
    d)   Power supply - HP235A
    e)   Frequency counter - HPP5314A

In addition to the instruments at each station, the laboratory is equipped with various special purpose equipment, namely:

    a)   Curve trace - Tektronix 577 and 575 camera
    b)   RLC bridge - HP4216A
    c)   Oven - Blue M.

Other special purpose equipment (such as modulation analyzer, spectrum analyzer, etc.) are moved to this lab from Rm 402 as needed.

C.   All the equipment in this laboratory is new (except for the oven and the curve tracer).

D.   The present laboratory space is adequate for our needs. The equipment is new and of excellent quality.

E.   The general type of equipment used in this lab has a fairly long life time (5 to 8 years). The main problem in the future is with equipment failure.

F.   With proper maintenance this general type of equipment should last its expected lifetime. Any item that breaks down is going to be sent immediately to the manufacturer for repair and calibration. Every year the laboratory manuals given to the students are renewed and updated. The experiments in the manuals are continuously improved, and new ones are added as needed.

XIII.B LABORATORY FACILITIES

Electrical Machine Laboratory
Room 146 (360 sq. ft.)

A.   This facility is used mainly to teach one laboratory course, EEN 310 Electrical Machine Laboratory. In addition, it is occassionally used in conjunction with another course. EEN 502 Power Electronics.

B.   This laboratory offers the possibility of performing all experiments required in small size machines, but large enough to obtain realistic characteristics and results. It consists of three workstations for three or four students per station.

   Each of the three stations consists of a Hampden model ACWM100 station, with enough individual components to perform all experiments required in this lab.

   Two control units, one in DC model
   DCC100 and the other in AC model
   ACC100 can be used with any of the equipment in any of the three station available.

   In addition to the self contained panel instruments these are other portable instruments to be used in the experiments.

C.   N/A

D.   Present laboratory space is adequate for our needs. The number of sections required then is a fraction of the number of students.

E.   Because of the increased importance of the application of "Power Electronics" into Electrical Machines, we will include in the near future experiments of controls and applications in this area.

   We already have an AC Motor Speed Control, parajust, from parametrics, used in demonstrations in our course of "Power Electronics". Other equipment in this area is to be developed through our Senior Electronic Project.

F.   The equipment is maintained by constantly replacing worn or damaged components. Mr. Antonio Valido, our lab technician and Messrs. Abel Mallo and Srijib Mukherjee, graduate students are responsible for the maintenance of this lab.

XIII.B LABORATORY FACILITIES

RF and Microwave Laboratory
Room 402

A. The equipment in the laboratory is used in association with projects and demonstration in several undergraduate courses, including:

EEN	416 -	Electrical Design
	525 -	Radiation and Antennas I
	535 -	Communication Electronics
	555 -	Microwave Transistor Amplifier Design

This laboratory is equipped to handle a variety of measurements at RF and microwave frequencies. The following instruments are available in this laboratory:

B1. For RF and Microwave electronic measurements:

a) Network Analyzer (2) - General Radio 1710RF
b) Network Analyzer - HP8505A
c) S-parameter test set - HP8503A
d) Storage normalyzer - HP8501A
e) Modulation analyzer - HP8901A
f) Signal generator - Marconi 2022
          HP8668, HP86635A, HP86603A, Alfred 654CK - S1
g) Oscilloscope HP1715A
h) Digital storage scope - Tektronic 2221
i) Spectrum analyzer - HP8590B
j) Various frequency counters, power supplies, and signal generators.

B2. For transmission-line measurements:

In addition to the network analyzers and signal generators in Part 1, we have:

a) Slotted coaxial-transmission-liner- General Radio
b) VSWR meter - HP415B
c) Power meter - HP430C, HP431B
d) Mixers and amplifiers - General Radio 1216A
e) Signal generators - General Radio 1218A, 1361A, 1215B, 1203B, 1209B

B3. For waveguide measurements:

a) A complete set of X-band devices (i.e., waveguider, attenuator, directional couplers, slotted line, frequency meter, etc.)

B4. For antenna measuremts:

a) Marconi X-band Antenna Test Bench - 6452A/2

C. From the equipment listed in Part B, the following equipment was adquired since the last ABET visit: 1(b), 1(c), 1(d), 1(e), 1(h), and 1(i), and 1(f) [except for the Alfred 654K-S1].

D. The next step in the development of this laboratory is to obtain the following state-of-the-art equipment: (a) HP8510 Network Analyzer, (b) HP85150B - Microwave Design System, and (c) HP8970S/TU Noise Figure Measurement System. We are actively seeking funds or a grant to purchase this equipment.

E. This laboratory is fairly well equipped for RF and microwave experiments and design below 10 GHz. The present laboratory size is suitable for its purposes.

F. If the equipment in these laboratories breaks-down it is sent to the manufacturer for repair and calibration. Part of the department budget is set apart for these purposes. Minor repairs are done by either graduate students, by Mr. Valido (the School of Engineering Technician) and by Profs. Gonzalez and Lask.

XIII.B   LABORATORY FACILITIES

Digital and Analog Filter Laboratory

A.   This laboratory supports the following courses:

EEN 409 - Introduction to Filtering and Signal Processing
       507 - Active Filter Design
       536 - Digital Signal Processing
       607 - Advance Active Filter Design
       610 - Advance Passsive Filter Design
       636 - Advance Digital Filter Design
       710 - Master Thesis
       730 - Doctoral Dissertation

This laboratory and research facility is divided into 3 areas and houses:

Signal Processing/Filtering Research Office: Secure research office equipped with desks, chairs, cabinets, and book cases. It also contains 2 CRT's which communicate with the Department and campus VAX's and the digital filter area.   It accomodates 8 Ph.D. and M.S.E.E. students.

Digital Filter Laboratory: 4 work stations equipped with 386-PC's include A/D and D/A interfaces for real-time programming and testing of digital filters. Also contains laser printer and modem driven by 4 386-PC's. This lab accommodates 12 students.

Active/Passive Filter Labortory: 4 work stations and 12 chairs for testing passive and active filters.   2 work stations and 4 chairs for building prototyping hardware and using refernce books. This lab accommodates 16 students.

B.   The equipment and instrumentation includes:

Research office:

       4 desks/chairs
       2 book cases
       2 file cabinets
       1 storage cabinet
       2 CRT terminals to VAX's and Digital Filter Laboratory

Digital Filter Laboratory

       1 U-shaped desk for 386 PC's (12 chairs)
       4 386-PC's
       1 laser printer with software
       1 9600 baud modem
       4 TEK2213A 2-channel oscilloscopes (0-50 MHz)
       4 HP209T signal generators (sine, square)

4 HP400D digital voltmeters having dB scale
2 HP5382A frequency counters

Active/Passive Filter Laboratory

1 bench (2.5' x 27') divided into 4 work stations (12 chairs)
1 bench (2' x 17') for prototyping and studying reference books (4 chairs)
4 TEK2213A 2-channel oscilloscopes (0-50 MHz)
4 HP209T signal generators (sine, square)
4 HP400D digital voltmeters having dB scale
4 HEATH2718 +/- 15 V power supplies
4 HP5382A frequency counters
Miscellaneous op amps/ R's/ C's/Vector boards

C.   New Equipment and Instrumentation

The laboratory including all the equipment and instrumentation listed in part B is new since the last ABET visit.

D.   Critical needs:

2 book cases
2 file cabinets
1 storage cabinet
2 spectrum analyzer (0-100 KHz)
2 hp5382A frequency counters

This office equipment is budgeted for 1990-91. This equipment is budgeted for 1990-92.

E.   Update and Development of Laboratory

This laboratory supports the EEN 400-700 level courses listed in VIIIA. Each course has a semester project which is implemented in this laboratory. The projects are reviewed on an annual basis and updated as required. Fortunately this laboratory is almost fully-equipped now and will not require large funding or additional space over the next five years. Software will be continuously acquired over the next five years to meet our needs.

F.   Maintenance and Service

The COE technician maintains the electronics hardware listed in Section VIII.A The graduate students maintain the software. They also order and install new hardware and software.

XIII. B LABORATORY FACILITIES

Electrical Design Laboratory
Room 424 (285 sq. ft.)

A.   This facility is used mainly to teach one laboratory course, EEN 416 Electrical
     Engineering Senior Project.

B.   This laboratory was created in 1987 with new lab equipment. It consists of four stations,
     each equipped with the following instruments:

Oscilloscope - Tektronix Model 2213A
Try-Power Supply, Heath Model 2718
Functin Generator, Circuitmate Model FG2
Digital Multimeter, Fluke, Model 8010A

There are also three Circuit Design Trainer, Heathkit model ET-1000, to be used in any of
the above stations. Other special purpose equipment are moved to this lab from other labs
as needed.

C.   All the equipment in this laboratory is new.

D.   The present laboratory space is adequate. The quality of the equipment is very good.

Since this lab is open a minimum of 8 hours per day, it is sufficient for the needs of the
students in their Senior Projects. A "library" of catalogs and specifications of components
is available in the lab shelves.

E.   At the end of the life of the equipment used, it must be replaced.

If student populations in these labs increases, new stations and more space will be needed.

F.   Our lab technician takes care of minor repairs, any instrument that breaks down is
     going to be sent to the manufacturer for repair and calibration.

XIII.B LABORATORY FACILITIES

Computer Vision and Image Processing Laboratory

Description of Current Status

The image processing and computer vision laboratory is equipped with a Gould FD5000 image acquisition and display system; currently this system handles 512 x 512 images with up to 16 bit resolution and image processing hardware capabilities. The laboratory also contains a CID2710 digitizer by CIDTEC, which handles 512 x 480 images. Also, a Gould Model 11-80 color graphic system with 1480 x 1024 resolution is available. A MicroVax II computer is dedicated to use with the imaging systems forementioned; it contains standard scientific libraries and compilers for all relevant high level languages.

Since the last ABET visit, the laboratory has acquired a Sigma I Neurocomputer Workstation for high speed Neural Network development and applications, and a Daedal positioning and orientation apparatus which is used for precise measurement of three-dimensional orientation and rotation of objects in space. In addition, a Newport Computer Vision Experimental Workstation Bench Model V-TCS is available; this work bench is used for precise mounting of optical equipments (such as a camera) to obtain precision alignment of sequence of images under point source controlled lighting conditions.

Two Ph.D. students, Wasim Shomar and Wei-Zhao Zhao, are responsible for the maintenance and service of the equipment.

Future Plans

Major needs in the near future include a Sparc1 workstation by Sun Microsystems along with expert systems as well as image processing software packages; this workstation is expected to be mainly dedicated for an expert system for the three-dimensional reconstruction of polyhedral and quadratic surfaced objects from single perspective views. The Sun workstation and the MicroVax II will be connected to a Local Area Ether Network of the department of Electrical and Computer Engineering, which provides a gateway to the University of Miami Network and to DECNET. Also, for applications to real-time image processing, a Mercury MC3200 Array Processor for the MicroVax II is needed, which provides supercomputing power and capabilities to the computer user by implementing the latest software and hardware techniques at the board level.

For equipment to be purchased in the long run, we need to replace the MicroVax II Input/Output controller card and drivers with faster ones such as the KDA50 model by DEC. Such I/O controllers are approximately 12 times faster than the ones in the laboratory today. Also, the random access time could be cut in almost half by upgrading the hard disk to a faster one. A real-time Image Processing Hardware by Innovision would be essential for any real-time applications. Such system can handle most Image Processing routines and algorithms such as convolution masks (i.e., filtering, Laplacian, edge detection, etc.), transforms, correlation, segmentation, etc.

A Symbolic Machine would significantly simplify and accelerates the development of the Artificial Intelligence applications used in the laboratory, such as expert systems. A symbolic machine is also many order of magnitudes faster than any machine available to us today.

XIII.B LABORATORY FACILITIES

Microelectronics Laboratory

Description of Current Status:

The Microelectronics Lab. is equipped with a state-of-the-art ionized cluster beam thin film deposition system designed and built to study cluster size as well as produce high quality films. The ICB System consists of a source, power supplies and a vacuum system. In addition, there are several furnaces, a spinner, small dc spottering system, ellipsometer, and a mercury probe.

Future Plans:

The future plans for this lab are on temporary hold because Dr. Frank Urban is leaving this summer and two new solid state faculty are joining us next fall. They are Dr. Unlu and Dr. Dunn.

XIII.B LABORATORY FACILITIES

Digital Design Laboratory

Description of Current Status:

The digital design laboratory consists of eleven (11) fixed stations. Each of these stations is equipped with the following instruments:

(1) ET-1000 Circuit Design Trainer (Heath Kit Educational Systems)
(2) TTL/CMOS logic probe.
(3) Wire cutter/stripper.

In addition to the standard equipment at each station, this laboratory is equipped with general purpose equipment such as:

(1) Tektronix 1241 Logic Analyzer with (2) 18-channel cards for actual hardware testing.
(2) Tektronix 2213A dual trace oscilloscope.
(3) Function generator.
(4) Frequency counter.
(5) Two (2) variable power supplies.
(6) An IC-tester.
(7) An IDS AT-compatible personal computer, equipped or interfaced with the following:

    (a) SHOOTER EPROM programmer.
    (b) Data-I/O UNISITE-40 universal logic programmable, capable of programming practically every programmable logic device currently available in the market, or in the process of development.
    (c) Mouse-driven Altera System Computer-Aided-Design that is capable of drawing, minimizing and simulating hardware designs, as well as actually implementing them inside EPLD and PLD ICs for compactness and economy.

Several tools are available for the students upon request. These include wire-wrapping tools, a temperature-controlled soldering iron, and other tools relevant for wiring and soldering.

The lab equipment also includes an assortment of the most common SSI and MSI TTL packages, as well as some linear ICs relevant to digital design, such as VCOs, 555 timers, and one-shots. A small range of values for resistors and capacitors is also available.

Needs:		Quantity
1.	Trainer kits	5-10
2.	Logic analyzer	2
3.	Oscilloscope	2
4.	Function Generator	2
5.	PCs.	5
6.	Upgrade Unisite for programming, square package chips.	
7.	Printer for the PCs.	

MICROPROCESSOR LABORATORY

Description of Current Status:

This laboratory supports EEN 312 - Microprocessors course. The Microprocessor Laboratory is divided into six (6) fixed stations. Each of these stations is equipped with the following instruments:

1. The Intel SDK-86 system design list (complete single board 8086 microcomputer system)
2. IBM PC
3. Digi-Board
4. Power Supply

In addition to the standard equipment at each station, this laboratory is equipped with Intel SDK-85 microcomputers, NS 32000 Development Systems, general purpose equipment such as an oscilloscope, digital multimeter, power supply, eprom programmer, eprom eraser, modem and logic probes. An assortment of SSI, MSI and LSI circuits are available to provide the necessary hardware for each laboratory project. A variety of software pacakges such as 8085,. 8086 and 32000 assemblers and simulators, for program development, are available. In addition, 6 new SDK-86's were purchased recently.

All of the above equipment are maintained in excellent working conditions. Two graduate teaching assistants are responsible for the laboratory.

Needs:

Plans include updating the laboratory by 32-bit single board computers and some RISC based single board computers. ($25,000.)

XIII.B LABORATORY FACILITIES

VAX COMPUTER LABORATORY

Users:

The VAX 11-750 is the department's general use minicomputer. Supporting under-
graduate, graduate, office, and faculty users working in the following areas:

undergraduate classes
graduate classes
faculty and office word processing
graduate research

Hardware:

8 megabytes main memory
24 ports
456 Mbyte drive (RA81)
164 Mbyte drive (RA80)
1600 bpi tape drive (TU80)
Printronix printer (P300)
QMS laser printer (Lasergrafix 800)

Software:

VMS operating system
Pascal
Fortran
C
Ada
Spice
TEX
Palasm
OPS development system
National Semiconductor 32000 development system
IMSL (statistical and math libraries)
Plot software for both printers
various student written software packages

ELECTRONIC DESIGN AUTOMATION/COMPUTER AIDED SOFTWARE ENGINEERING (EDA/CASE) LABORATORY

(Founder: Mansur R. Kabuka)

The EDA/CASE Lab features state-of-the art engineering design tools and software. It consists of Local Area Network of Apollo workstations running an educational donated software system from the Mentor Graphics Corporation. Mentor Graphics is the world's leading Electronic Design Automation company that offers a complete line of design tools for design, analysis, verification, testing, documentation and packaging of almost every major IC technology which includes both semi-custom as well as full-custom ICs. In addition to this, they also provide CASE (Computer Aided Software Engineering) tools that can enable a designer to directly obtain system specificatons from system requirements, analyze and design software systems. The software is currently installed over a network of 16 workstations, which will soon be upgraded to a total of twenty. The Lab is organized to include the following design stations:

A. Idea Station

The Idea Station provides a complete design capture capability for the creation of very large digital designs. as well as developing customized symbols. It offers easy-to-use, sophisticated software that gives the designer great flexibility. In addition, it includes a powerful simulation software for the intensive simulation and test of the final design as well as the intermediate stages of the design. The performed simulation ensures not only the correct performance of the design but also the optimization of its parameters along the design stages. It also includes a fault simulation software that is capable of spotting the potential design flaws by employing rigorous testing procedures. Moreover, the station provides an advanced design documentation software that incorporates the figures entered through the design capture software along with the documentation of the design.

B. Chip Station

The Chip Station features fully customized chip design for IC layout engineers. The graphic entry software Chipgraph presents a very user friendly interface with popup menus and strokes, plus the option of customizing the editing techniques. The Station supports hierarchical design methods thus allowing for bottom-up implementation using customized cells. The user can edit up to 200 layers simultaneously on top of one another. Advanced Design Rule Checking (DRC) techniques allow for detecting any violation of design rules set by the layout engineer. The final database can be translated to the industrial standard GDSII format to provide a gateway to other IC layout systems. The system is also capable of accepting a GDSII file as the initial input. Finally, the technical publication software supplied with the station serves as an excellent documentation tool for the design.

C. Gate Array Station

This station provides a streamlined gate array design cycle with an integrated set of software tools that help make the best use of the available gates. The tools combine interactive control with the speed and efficiency that come with proven design automation techniques. The

automatic tools use high performance algorithms for placement and routing and allow layout of complicated designs with up to 20,000 gates. The tools of this station provide the necessary foundation for design of a major technology in semi-custom ICs. Instead of just simple library support, the set of tools provides full physical design support of a wide variety of gate arrays.

D. Standard Cell Station

Since standard cells can integrate many different functional elements on a single chip, they provide an excellent way to reduce the cost of complex circuitry. However, to be designed effectively, the tools required have to be flexible and sophisticated. This station offers a completely integrated set of tools that combine the control of interactivity with the efficiency of automatic tools. This unique combination for standard cells design allows the placement and routing of up to 7,500 cells - not only standard or multiple height cells in the chip core area, but also large cells, like PLAs, RAMs, ROM, and microprocessors. It also provides the designer with the ability to reduce chip size interactively, while maintaining a correct-by-construction editing environment.

E. PCB Layout Station

The PCB layout station provides a powerful suite of PCB design tools capable of handling even the most advanced board technologies, such as large multi-layer boards. The station's user interface combines graphic simplicity with technical depth, so it is easy to master, yet provides both the speed and accuracy required to cope with complex PCB technologies. Further, this station is a limitless environment when it comes to the number of components, pins, layers, holes, and automatic routing algorithms it can manage. It also provides simplified part building and library generation with multi-window graphics assist.

F. Analog Station

The analog station offers a complete solution for analog IC and PCB designers. It includes an analog and optional analysis for manufacturing variability. An integrated analog library offers a comprehensive, high-value library to provide simulation components for analog PCB designs. The simulation software not only provides superior convergence performance that easily handles large circuit designs, bistable circuits, and analog PCB designs but also allows the designer to analyze dependencies on component values, key parameters, or ambient temperature and provides him with graphical output of the results. The analog station combines the power of simulation and analysis with schematic capture and document preparation for a fully integrated solution to analog design needs, including variability analysis, integration with PCB layout, and waveform interchange with digital simulation.

G. Computer Aided Software Engineering (CASE) Station

The CASE station is a high, automated design environment developed for the use of software designers. It is capable of real-time systems analysis and has found applications in a wide variety of fields ranging from factory automation to telecommunications. The station comprises of a number of integrated analysis and design tools that support the popular structured and hierarchical design methodologies. These methodologies provide means for direct translation of system requirements to software development specifications. The station's flexibility also allows for easy modification of these specifications at user's discretion. It also supports the reverse engineering process for source code verification by converting it to design

diagrams. Finally, the documentaion software provided with the CASE station enables the user to professionally present his/her design using the integrated text and graphics capabilities of the system.

H. Application Specific Integrated Circuits (ASIC) Station

This station provides the main ICs design tools in which the associated contradicting requirements of increased functionality and reduced size, or faster speed and lower power consumption are resolved. This is achieved through a friendly user interface that provides the designer with design editing functions as well as display modification functions accessible through pull down menus. The design editing functions include the ability to use over 200 layers of Boolean editing operations which promote flexible and productive creation of complex geometries. Also, a graphical ruler allows rapid dimensional measurements at any time.

I. Package Station

The electronic packaging station electronically assembles a product before its actual physical assembly. The product is then subjected a number of real-world testing situations. These test procedures include geometic modelling, drafting, thermal analysis, flow modelling, and automatic mesh generation. The product is analyzed for critical clearances and possible thermal breakdown, among other things. Re-positioning and rerunning the analysis usually solves a problem and provides cost-effective solutions by elimination of unnecessary components like fans and heat sinks. The packaging station also possesses the interfacing capability with other mechanical and electronic applications.

The novel technique of design implementation will serve as great motivation and inspire the student to work harder and explore further. Without the use of design automation tools, today's students will not be adequately prepared for the industrial environment that they will soon enter.

XIII.B LABORATORY FACILITIES

VLSI DESIGN LABORATORY

Description of Current Status: The VLSI Design Laboratory is equipped with three workstations to support VLSI system design, layout and simulation. There are two sets of CAD tools 'Magic' and 'VIVID' of academic origin. This laboratory supports course VLSI chip designs in EEN 532-VLSI Systems. Student VLSI chip designs are being fabricated by NSF/MOSIS. One of the workstations is a donation from Sun Microsystems.

Needs: To increase the productivity of students, commercial CAD tools are required. To test VLSI chips a commercial grade tester is required for functional testing. Some students have started designing complex VLSI chips as their senior projects. This puts heavy burden on the current resources. An extra workstation is needed. To maintain the effectiveness of the laboratory, the following equipments are needed.

First phase:	Commercial grade tester	$20,000
First phase:	Workstation	$30,000
Second phase:	Commercial grade VLSI CAD Tools	$100,000
	TOTAL	$150.000

XIII.B LABORATORY FACILITIES

SOFTWARE APPLICATION LABORATORY

Description of current status:

The Software Application Laboratory is equiped with a heterogeneous local area network which consists of five SUN and four APOLLO workstations with a total of 1 giga bytes of disk space. Software support for this laboratory includes UNIX, DOMAIN and PC DOS operating systems, ADA, C++, Lisp and Prolog compilers, and software tools for compiler construction (IDL), computer network simulation (OPNET/B) and desktop publishing (FRAMEMAKER). This laboratory is mainly used to support research and teaching. So far research conducted on this laboratory involve those fields in artificial intelligence, computer networks and communications, compilers and computer languages, databases, and software engineering. Some of research topics are interdisciplincary, and this laboratory provides an ideal environment for it. The laboratory also provides an environment for preparing students to involve in the research activities mentioned above. Courses that are using or planning to use this laboratory includes EEN 547 (Expert System for Computer and Electrical Engineering), EEN 534 (Telecommunications Networks), EEN 694 (Translator Design), and EEN 414 (Computer. Organization).

Currently the downtime of the system is quite high. This is mainly due to the inexperience of the personnel for maintaining the system. However, the configuration of the system also aggravates the problem. Currently the majority of the workstations do not have dedicated hard disks and are vulnerable to the network system crash. To increase the reliability of the system, each workstation should be equiped with a hard disk and the whole network must have a convenient backup system. Currently, the budget for maintaining the system can only be used to hire a part-time undergraduate student. Therefore, the mobility of the maintenance personnel is high which contributes to the insufficient serviceability of the system.

Needs:

Future needs are set to improve the above mentioned problems so that the system can be used more productively. They are listed as following:

1. Install high capacity and automatic back-up system ($5000).

2. Install a dedicated hard disk for each diskless workstations ($15,000).

3. Set aside annual budget for the maintenance personnel ($10,000/year).

APPENDIX V

Computer Engineering Faculty Resumes

XV.D. FACULTY CURRICULUM VITAE

1. NAME AND DATE OF BIRTH

    Tzay Y. Young
    January 11, 1933

2. ACADEMIC RANK (state whether full-time or part-time, and if part-time indicate non-academic activity and percent of time devoted to it).

    Professor
    Full time

3. DEGREES WITH FIELDS, INSTITUTIONS AND DATES

    B.S.E.E., National Taiwan University, 1955
    M.S.E.E., University of Vermont, 1959
    D. Eng., Johns Hopkins University, 1962

4. NUMBER OF YEARS SERVICE ON THIS FACULTY INCLUDING DATE OF ORIGINAL APPOINT-MENT AND DATES OF ADVANCEMENT IN RANK.

    Sixteen years
    August 1974 - initial appointment
    August 1974 - Professor

5. OTHER RELATED EXPERIENCE - TEACHING, INDUSTRIAL, ETC. (responsibility, location, dates)

Teaching

    Teaching Assistant, Johns Hopkins University, 1961-1962
    Assistant Professor, Carnegie Mellon University, 1964-1968
    Associate Professor, Carnegie Mellon University, 1968-1974
    Professor, University of Miami, 1974-present

Industrial

    Research Associate (Computer processing of electrocardiograms),
    Johns Hopkins University, 1962-1963

    Member of Technical Staff (research on signal processing),
    Bell Laboratories, 1963-1964.

    Senior Postdoctoral Fellow (research on radar signal processing),
    NASA GSFC, 1972-1973

6. CONSULTING, PATENTS, ETC.

Consulting

Compunetics, Inc., 1969-present
Technology Service Corp., 1976-1979

7. STATE IN WHICH REGISTERED

None

8. PRINCIPAL PUBLICATIONS OF LAST FIVE YEARS (Give titles and references)

BOOK:

T.Y. Young and K.S. Fu, Eds., Handbook of Pattern Recognition and Image Processing, Academic Press, Orlando, FL, 1986.

PAPERS:

W.J. Shomar, G. Seetharaman and T.Y. Young, "An Expert System for Recovering 3D Shape and Orientation from a Single View", Computer Vision, Graphic and Image Processing, to appear.

W.-Z. Zhao, F.-H Qi and T.Y. Young, "Dynamic Estimation of Optical Flow Using Objective Functions", Image and Vision Computing, vol. 7, pp. 259-267, 1989.

Y.-S. Li, T.Y. Young and C. -C. Huang, Noncontact Measurement Using Line Scan Cameras: Analysis of Positioning Error", IEEE Trans. on Industrial Electronics, vol IE-36, pp. 545-551, 1989.

M. Cohn, M. Trefler and T.Y. Young, "Enhancement and Compression of Digital Chest X-Rays", Journal of Thoracic Imaging.

T.Y. Young, S. Gunasekaran and W.-Z. Zhao, "Analysis and Extraction of Three Dimensional Motion Information from an Image Sequence", Advances in Artificial Intelligence Research, vol 1, M.B. Fishman, Ed., JAI Press, Greenwich, Conn., pp. 209-223, 1989.

S. Gunasekaran and T.Y. Young, "A Region Correspondence Approach to the Recovery of 3D Motion and Structure in Dynamic Scenes", in Image Understanding in Unstructured Environment, S. Chen, Ed., World Scientific Series, pp. 75-123, 1989.

H.H. Liu, T.Y. Young and A. Das, "A Multilevel Parallel Processing Approach to Scene Labelling Problems", IEEE Trans. on Pattern Analysis and Machine Intelligence, vol. PAMI-10, pp. 586-590, 1988.

T.Y. Young, Y.S. Li and J.A. Magerl, "Noncontact Measurement Using Line Scan Cameras with Subpixel Accuracy", Iron and Steel Engineer, vol. 65, no. 6, pp. 40-46, 1988.

Y.S. Li, T.Y. Young, and J.A. Magerl, "Subpixel Edge Detection and Estimation with a Microprocessor-Controlled Line Scan Camera", IEEE Trans. on Industrial Electronics, vol. IE-35, pp. 105-112, 1988.

T.Y. Young and S. Gunasekaran, "A Regional Approach to Tracking 3D Motion in an Image Sequence", in Advances in Computer Vision and Image Processing, vol. 3, T.S. Huang, Ed., JAI Press, Greenwich, Conn., pp. 63-99, 1988.

R.N. Nelson and T.Y. Young, "Determining Three-Dimensional Object Shape and Orientation from a Single Perspective View", Optical Engineering (Special issue on Applications of Artificial Intelligence), vol. 25, pp. 394-401, 1986.

T.Y. Young and P.S. Liu, 'VLSI Array Architecture for Pattern Analysis and Image Processing", in Handbook of Pattern Recognition and Image Processing, T.Y. Young and K.S. Fu, Editors, pp. 471-495, Academic Press, Orlando, 1986.

RECENT CONFERENCE PAPERS

S.R. Yhann and T.Y. Young, "A Multiresolution Approach to Texture Segmentation Using Neural Networks", Proc. Int. Conf. Pattern Recognition, June 1990.

T.Y. Young, S.R. Yhann and W.-Z Zhao, "Application of Neural Networks to Computer Vision and Image Processing", Proc. Southcon, pp. 396-401, Mar. 1990.

S.R. Yhann, and T.Y. Young, "Texture Analysis Using Neural Networks", Proc. FLAIRS, April 1989.

T.Y. Young, S. Gunasekaran and W.Z. Zhao, "Estimation of Three-Dimensional Motion and Initial Orientations: A Region Analysis Approach", Proc. Conf. on Pattern Recognition for Advanced Missile Systems, pp. 271-284, Nov. 1988.

T.Y. Young, G. Seetharaman and W.J. Shomar, "A Multistage Segmentation System for Computer Integrated Manufacturing", Proc. PROCIM Conf., Nov. 1988.

M.C. Cohn, M. Treffler and T.Y. Young, "Compression and Enhancement of Chest X-Rays", Proc. Scientific Meeting on Digital Imaging Management and Communication, June 1988.

W.J. Shomar, S. Gunasekaran and T.Y. Young, "Applications of Expert Systems for Recovering 3D Shapes from a Single Perspective View", Proc. Conf. on Recent Advances in Robotics, pp. 55-56, May 1988.

E.T. Lee, T.Y. Young and W.J. Shomar, "Pictorial Knowledge and Its Application to Space Object Identification", Proc. FLAIRS, pp. 36-40, Mar. 1988.

T.Y. Young, S. Gunasekaran and W.Z. Zhao, "Analysis and Extraction of Three-Dimensional Motion Information from an Image Sequence", Proce. FLAIRS, pp. 213-217, Mar. 1988.

T.Y. Young, S. Gunasekaran, and W. Shomar, "A Rule Based System for 3-D Shape Recovery from a Single Perspective View", Proc. 6th Annual Conf. on Applications of Artificial Intelligence, pp. 294-302, April 1988.

D. Ergener, S. Gunasekaran, M. Trefler, and T.Y. Young, "Sequential Analysis of Angiograms by an Expert System", Proc. SPIE Conference on Medical Imaging, January 1988.

T.Y. Young, W.Z. Zhao, F.H. Qi, and D. Ergener, "Computation of Image Velocity Field Using Linear and Nonlinear Objective Functions", Proc. IEEE Workshop on Computer Vision, pp. 342-344, 1987.

Y.S. Li, T.Y. Young, and J.A. Magerl, "Subpixel Edge Detection and Estimation with a Line Scan Camera", Proc. IECON, pp. 667-675, 1987.

T.Y. Young, Y.S. Li, and J.A. Magerl, "Noncontact Measurement using Line Scan Cameras with Subpixel Accuracy", AISE Annual Convention Record, p. 45, 1987.

S. Gunasekaran and T.Y. Young, "Estimation of 3-D Motion and Initial Orientation from Shape Changes in an Image Sequence", Proc. IASTED, 1987.

T.Y. Young and S. Gunasekaran, "Three-Dimensional Motion Analysis Using Shape Change Information", Proc. 3rd Annual Conf. on Applications of Artificial Intelligence, pp. 318-326, April 1986.

9.   SCIENTIFIC AND PROFESSIONAL SOCIETIES OF WHICH A MEMBER

IEEE (Computer Society, and Information Theory Group)
Member of Advisory Board, IEEE Trans. on Pattern Analysis and Machine Intelligence, 1984-present
Member of Editorial Committee, IEEE Trans. on Pattern Analysis and Machine Intelligence, 1979-1984.
Associate Editor for Pattern Recognition and Artificial Intelligence, IEEE Trans. on Computers, 1974-1976.
Member, Technical Committee on Machine Pattern Analysis, IEEE Computer Society, 1974-present
General Chairman, IEEE Computer Society Workshop on Computer Architecture for Pattern Analysis and Image Database Management, Nov. 1985.
Chairman, Technical Program, IEEE Global Communications Conference, Dec. 1982.

10.   HONORS AND AWARDS

Fellow, IEEE
Sigma Xi
American Men and Women of Science

11. SUBJECTS OR COURSES TAUGHT THIS YEAR BY TERMS (Give hours per week of lecture, recitation, and laboratory and number of sections if more than one. Designate day, evening, or graduate)

Spring Semester 1989-1990

   EEN 653 Pattern Recognition and Neural Network, 3 credits, lecture, evening class, graduate

Fall Semester, 1990-1991

   EEN 538 Introd. to Digital Image Processing, 3 credits, lecture, evening class, undergraduate/graduate

12. OTHER ASSIGNED DUTIES PERFORMED DURING THE ACADEMIC YEAR, WITH AVERAGE HOURS PER WEEK. INDICATE WHICH CARRY EXTRA COMPENSATION.

   Acting Chairman, July 1988 - present.

13. SPECIFIC PROGRAMS IN WHICH FACULTY MEMBER HAS PARTICIPATED TO IMPROVE TEACHING AND PROFESSIONAL COMPETENCE.

   Research projects on computer vision and neural networks supported by NSF and Florida High Technology and Industry Council.

14. SPECIAL DUTIES OF CO-OP FACULTY (coordinators)

   Not applicable

XV.D. FACULTY CURRICULUM VITAE

1.   NAME AND DATE OF BIRTH

Philip Liu
November 19, 1945

2.   ACADEMIC RANK (state whether full-time or part-time, and if part-time indicate non-academic activity and percent of time devoted to it).

Full time Professor

3.   DEGREES WITH FIELDS, INSTITUTIONS AND DATES

Ph.D. (Computer Engineering), Purdue University, 1975.
M.S.E.E. (Electrical Engineering), Purdue University, 1972.
B.S.E.E. (Electrical Engineering), University of Wisconsin, 1970.

4.   NUMBER OF YEARS SERVICE ON THIS FACULTY INCLUDING DATE OF ORIGINAL APPOINT-MENT AND DATES OF ADVANCEMENT IN RANK.

Fifteen years
Assistant Professor -   August 16, 1975 - Original appointment
Associate Professor -   1979
Full Professor -   1985

5.   OTHER RELATED EXPERIENCE - TEACHING, INDUSTRIAL, ETC. (responsibility, location, dates)

MTS, Advanced Technology Group, Bell Laboratories, Denver, 1982-1983.

6.   CONSULTING, PATENTS, ETC.

None

7.   STATE IN WHICH REGISTERED

None

8. PRINCIPAL PUBLICATIONS OF LAST FIVE YEARS (Give titles and references)

P.S. Liu and J. Data, "A Pipeline Approach to Problem Size Independent Processor Arrays", Int. Journal on Micro and Minicomputers, pp. 89-93, January 1990.

B. Furht and P.S. Liu, "Interfacing and Communication Experiments," IEEE Transactions on Education,pp. 124-128, April 1989.

P.S. Liu, "Problem Size Independent VLSI Processor Array," Proc. Int. Conference on Mini and Microcomputers, pp. 147-150, Dec. 1988.

P.S. Liu, "Optimal and Broadcasting VLSI Processor Arrays", Proc. 1987 Miami Int. Technicon, pp. 212-216, Oct. 1987.

T.Y. Young and P.S. Liu, "VLSI Architecture for Pattern Recognition and Image Processing", in Pattern Recognition and Image Processing Handbook, Academic Press, pp. 471-496, 1986.

P.S. Liu, "An Approach to Automatic Generation of Globally Area-Time Efficient VLSI Processor Array Design", Proc. Automation 86, pp. 101-105, March 1986. (plenary session).

P.S. Liu, "I/O Bandwidth and Data Broadcasting in VLSI Array Design", Proc. International Conference on Computer Design - VLSI in Computers, (ICCD), pp. 607-611, Oct. 1985.

P.S. Liu, "Pipelined Data Broadcasting in VLSI Processor Array Design", Proc. Fourth Annual International Phoenix Conference on Computers and Communications, pp. 115-120, 1985.

T.Y. Young, P.S. Liu and H.H. Liu, "Applications of VLSI to Pattern Recognition and Image Processing", VLSI Handbook, edited by N.G. Einspruch, Academic Press, pp. 785-799, 1985.

9. SCIENTIFIC AND PROFESSIONAL SOCIETIES OF WHICH A MEMBER

IEEE Computer Society
The Institute of Electrical and Electronics Engineers Inc., Senior Member
Association for Computing Machinery
Eta Kappa Nu

10. HONORS AND AWARDS

University Research Equipment grant 1989.
NSF VLSI chip fabrication award, 1989-1990
NSF supercomputer research grant for undergraduate program, 1988
Sun Microsystem research equipment grant, 1987.
University academic computing grant, 1985.

11. SUBJECTS OR COURSES TAUGHT THIS YEAR BY TERMS (Give hours per week of lecture, recitation, and laboratory and number of sections if more than one. Designate day, evening, or graduate)

Summer Semester 1989
EEN 312   Microprocessor, 8 hours of lecture, day class.
EEN 514   Computer Architecture, 8 hours of lecture, day class.

Fall Semester 1989
EEN 532   VLSI Systems, 3 hours of lecture, day class
EEN 514   Computer Architecture, 3 hours of lecture, day class.
EEN 419   Computer Engineering Senior Project, 2 hours of lecture, day class

Spring Semester 1990
EEN 614   Advanced Computer Architecture, 3 hours of lecture, evening, graduate class
EEN 532   VLSI Systems, 3 hours of lecture, day class
EEN 419   Computer Engineering Senior Project, 2 hours of lecture, day class.

12. OTHER ASSIGNED DUTIES PERFORMED DURING THE ACADEMIC YEAR, WITH AVERAGE HOURS PER WEEK. INDICATE WHICH CARRY EXTRA COMPENSATION.

Computer Engineering Curriculum Committee, 10 hrs/week
Student advising 5 hours/week
Thesis supervision 3 hours/week

13. SPECIFIC PROGRAMS IN WHICH FACULTY MEMBER HAS PARTICIPATED TO IMPROVE TEACHING AND PROFESSIONAL COMPETENCE.

1. Technical program committee, International Conference on Database, Parallel Architecture, and Applications (PARBASE), March 1990.
2. IEEE VLSI Education Committee, 1989.
3. Program committee, International Conference on Micro and Minicomputers, 1988.
4. Program committee, Miami Int. Technicon, 1987.

14. SPECIAL DUTIES OF CO-OP FACULTY (coordinators)

Not applicable

XV.D. FACULTY CURRICULUM VITAE

1.   NAME AND DATE OF BIRTH

         Moiez A. Tapia
         November 17, 1935

2.   ACADEMIC RANK (state whether full-time or part-time, and if part-time indicate non-
      academic activity and percent of time devoted to it).

         Professor
         Full time

3.   DEGREES WITH FIELDS, INSTITUTIONS AND DATES

         B.S.E.E.,   University of Poona (India), 1960
         M.S.E.E.,   University of Illinois (Urbana), 1962
         Ph.D. (EE) University of Notre Dame (Indiana), 1966

4.   NUMBER OF YEARS SERVICE ON THIS FACULTY INCLUDING DATE OF ORIGINAL APPOINT-
      MENT AND DATES OF ADVANCEMENT IN RANK.

         Sixteen years
         August 1974 - May 1981   Associate Professor
         May 1981   - Present   Professor
         Sept. 1987- July 1988   Graduate Coordinator

5.   OTHER RELATED EXPERIENCE - TEACHING, INDUSTRIAL, ETC. (responsibility, location,
      dates)

         May '82-Aug '82   ASEE - Navy Summer Research - Fellow
                                  Naval Air Development Center, Warminster, Pa.
         June '72-May '74   American Society for Engineering Education -
                                  Ford Foundation Resident Fellow
                                  Computer Division
                                  NASA Langley Research Center
                                  Hampton, Va. 23665
         Sept. '68 -Aug '72   Assistant Professor
                                  Georgia Institute of Technology
                                  Atlanta, Georgia, 30332
         Sept. '67-June '68   Assistant Professor
                                  University of Miami

Sept. '66-Aug. '67	Assistant Professor Georgia Institute of Technology Atlanta, Georgia 30332
Sept. '60-Aug. '67	Assistant Lecturer S.B. Polytechnic Institute Bhavanagar, India
Jan. '60 - Aug. '60	Junior Engineer Koyna Hydroelectric, Bombay, India

6. CONSULTING, PATENTS, ETC.

> None

7. STATE IN WHICH REGISTERED

> None

8. PRINCIPAL PUBLICATIONS OF LAST FIVE YEARS (Give titles and references)

(31) "Boolean Integral Calculus for Digital Systems", IEEE Computer Transactions, Vol. C-34, No. 1, pp. 78-81, Jan. 1985.

(32) "A Class of Fault-Tolerant Distributed Multiple Processor Architectures", presented at Mini/Micro West-85, Los Angeles, Ca. Feb. 5-7, 1985.

(33) "Minimal Synthesis of Multivalued Logic Circuits", co-author T.A. Guima, ISMM. Proc. of International Symposium Mini and Micro-computers, Austin, Texas, November 10-12, 1986.

(34) "Minimal Realization of Multivalued Logic Networks", co-author T.A. Guima, Proc. of 1987 International Symposium on Multivalued Logic. (Refereed Selection of paper).

(35) "Differential Calculus for Fault Detection in Multivalued Logic Networks", co-author T.A. Guima, Proc. of 1987 International Symposium on Multivalued Logic. (Refereed Selection of paper).

(36) "Minimization of Partially Specified Multivalued Logic Functions", co-author T.A. Guima, 1987 Southeastern Symposium on System Theory, Clemson, S.C., March 15-17, 1987.

(37) "Multivalued Differential Calculus and Its Application in Fault Analysis", co-author T.A. Guima, Special Issue on Multivalued Logic Systems, International Journal of Electronics, 1987, Vol. 63, No. 2, pp. 185-196.

(38) "Minimization of Mutlivalued Logic Functions", co-author T.A. Guima, Special Issue on Multivalued Logic Systems, International Journal of Electronics, 1987, Vol. 63, No. 2, pp. 171-183.

(39) "Boolean Integral Calculus", Journal of Applied Mathematics & Computations", co-author J.H. Tucker and A.W. Bennet.   Vol. 26, pp 201-236, 1988.

(40) "A New Approach to Enhance Speed and Accuracy of Computation", co-author A.S. Boujarwah, Proc. of IEEE, Miami Technicon '87, Miami, FL., October 28-30, 1987.

(41) "Simplification of Boolean Functions Using Sum-Difference Mapping", co-author Deming Lee, Proc. of IEEE, Miami Technicon '87, Miami, FL., October 28-30, 1987.

(42) "Introduction of a New Data Type to a High-Level Language to Improve Accuracy of Computation", (Refereed Selection), co-author A.S. Boujarwah, Proc. of Phoenix Conference on Computers & Communications, March 16-18, 1988.

(43) "Supercomputers with Superaccuracy", co-author A.S. Boujarwah, Proc. of Third International Conference on Supercomputing, 1988, Boston, Mass. (Refereed selection).

(44) "A Heuristic Algorithm for Simultaneous Minimization of a Set of Boolean Functions with Common Arguments", co-authors D. Lee and X. Zhao, Proc. of ISMM International Mini & Microcomputers, Dec. 14-16, 1988, Miami Beach, FL.

(45) "Integral Calculus for Multivalued Logic Algebra" co-authors T.A. Guima and A. Katbab, The Eighteenth International Symposium on Multiple-Valued Logic, May 24, 26, 1988, pp. 186-193, Palma de Mallorca, Spain. (Refereed Selection).

(46) "Superaccurate Computing", co-author A.S. Boujarwah, Proc. of ISMM International Conference on Mini & Microcomputers, Dec. 14-16, 1988, Miami Beach, FL.

(47) "A Layered Network for Data & Voice Integration", co-author M. Peyravian, accepted for presentation at, and inclusion in the Proc. of Hawaii International Conference on System Sciences, Jan. 1989.

(48) "Simulation & Modeling of Tightly Coupled Multiprocessor Architectures", co-authors G. Spicker & B. Furht, Proc. of Wescon 88, Anaheim, Ca., Nov. 17-18, 88.

(49) "Analysis of Tightly Coupled Multiprocessor Architectures", co-author G. Spicker and B. Furht, Proc. of 21st Southeastern Symposium on System Theory, Tallahassee, FL, March 26-28, 1989.

(50) "Solutions of Multivalued Logic Algebra Equations", Proc. of IEEEE Southeast 89, April 9-12, 1989, Columbia, S.C.

(51) "Merging of Cubes of Distinct Weights to Minimize a Multivalued Logic Function", co-author T. Guima, Proc. of IEEE Southeastcon 89, April 9-12, 1989, Columbia, S.C.

(52)   "Analysis of Tightly Coupled Multiprocessor Architectures", co-authored by
       G. Spicker, B. Furht, Proc. of 21st Southwestern System Theory Symposium,
       Tallahasse, FL, March 26-28, 1989.

(53)   "Comparative Analysis of Algorithms for the Minimization of Multivalued Logic
       Functions", co-authored by Alexander E. Perez-Pons, Proc. IEEE TENCON
       Conference, Nov. 22-24, 1989, Bombay, India.

(54)   "Solution & Applications of Simultaneous Equations in a Multi-valued Logic Algebra
       System", International Journal of Electronics, Vol. 67, No. 5, pp. 717-725, 1989.

(55)   "Symmetric Multivalued Logic Functions: Characterization and Synthesis",
       International Journal of Electronics, 1989, Vol. 67, No. 5, 703-715.

(56)   "Fault-Tolerant System Design" (Invited Paper), Southcon Conference, Orlando,
       FL, March 15, 1990.

9.   SCIENTIFIC AND PROFESSIONAL SOCIETIES OF WHICH A MEMBER

        IEEE

10.   HONORS AND AWARDS

   1)   IEEE Computer Society Distinguished Visitor 1987-1990.

   2)   Florida High Technology & Industry Council Research Grant Award for the year
        1990, $20,000.

   3)   U. of Miami College of Engineering Alexander Orr, Jr. Excellence in Teaching Award,
        1989.

   4)   NASA Grant #NGR 11-002-I58, amount $24,63I. (Research in Computer
        Performance Evaluation), May 1972.

   5)   NASA Grant #NGR 11-002-I58, Supplement No. 1, amount $12,030., May 1973.

   6)   NASA Grant #NGR 11-002-I58, Supplement No. 2, amount $11,000.

   7)   Voted one of the four Best (exact rank not disclosed) teacher in E.E. School, Georgia
        Tech. in Spring 1970.

   8)   A runner-up for Eta Kappa Nu Best Teacher Award in 1971.

   9)   Selected in December 1970 to receive A.S.E.E. Ford Foundation Resident Fellowship
        When "considerably less than half" of the candidates (nationally), nominated, were
        actually selected to receive it.

   10) Received Certificate of Recognition for "Creative Development of Technology" from
        the National Aeronautics and Space Administration", May 2, 1975. Also, a $50
        award for it.

11) Received Award of Schmitt Scholarship ($595) to attend the National Engineering Consortioum Professional Growth in Engineering Seminar, "System Design Using Micro/Minicomputers".

12) Received NASA Grant #NSG 1436, "Development of Boolean Calculus and Its Applications", $16,098, August 1977.

13) Eastern Airlines Training Contract, $4,500 Fall 1977.

14) NASA Grant #NSG 1436 (extension #1), "Development of Boolean Calculus and Its Applications", $21,000., Aug. 1978.

15) NASA Grant #NSG 1436 (extension #2), $24,000, Aug. 1979.

16) Dade Country Grant "Introducting Careers in Science & Engineering to Gifted High School Students" ($1,500 p.a.,), 1981-1983.

17) NAVY-ASEE Summer Faculty Research Fellowship, $4000, 1982.

18) Played a very vital role as the seniormost computer faculty in writing a proposal for state subsidy for computer engineering program for the Department. The Department enrollment grew more than double since we got the state contract (about $180,000 per year) beginning in 1981.

19) Received ASEE Award to attend a two-week course: "Engineering Workstations", Rice University, Houston, Texas, August 1988.

20) Received ASEE Award to attend a two-week course: "Structure and Interpretation of Computer Programs", MIT, Cambridge, Mass, June-July '89.

21) Selected to participate in 3-week NSF Workshop: "Modern Foundations of Computer Science", SUNY at Stony Brook, N.Y. July 24, 1989 - August 11, 1989

11. SUBJECTS OR COURSES TAUGHT THIS YEAR BY TERMS (Give hours per week of lecture, recitation, and laboratory and number of sections if more than one. Designate day, evening, or graduate)

Spring Semester 1988-89

EEN 117   Pascal & Software Engineering, 3 credits, lecture, project, day class,
           undergraduate.
EEN 304   Logic Design, 3 credits, lecture, undergraduate.

Summer Session II 1989-1990

EEN 117   Pascal & Software Engineering, 3 credits, lecture, project, day class,
           · undergraduate.

Fall Semester 1989-1990

EEN 101   Orientation Seminar, 0 credits, day class, lecture, undergraduate.
EEN 117   Pascal & Software Engineering, 3 credits, lecture, project, day class, undergraduate.
EEN 304   Logic Design, 3 credits, lecture, undergraduate.

12.   OTHER ASSIGNED DUTIES PERFORMED DURING THE ACADEMIC YEAR, WITH AVERAGE HOURS PER WEEK. INDICATE WHICH CARRY EXTRA COMPENSATION.

   None

13.   SPECIFIC PROGRAMS IN WHICH FACULTY MEMBER HAS PARTICIPATED TO IMPROVE TEACHING AND PROFESSIONAL COMPETENCE.

   Attended the SCEE one-week Workshop "Integrating Reliability & Testability into the undergraduate electrical and computer engineering curricula", Feb. 12-16, 1990.

   Attended the ASEE two-week course: "Structure and Interpretation of Computer Programs", MIT, Cambridge, Mass., June-July '89.

   Participated in the 3-week NSF Workshop: "Modern Foundations of Computer Science", SUNY at Stony Brook, N.Y., July 24, 1989-August 11, 1989.

   Attended the ASEE two-week course: "Engineering Workstations:, Rice University Texas, August 1988.

14.   SPECIAL DUTIES OF CO-OP FACULTY (coordinators)

   Not applicable

1. Name: Borivoje Furht
   Date of birth: June 11, 1946

2. Academic rank: Adjunct Associate Professor (part-time, 20%)

   Non-academic activity (80%):
   Senior Director of Research and Advanced Development
   Modular Computer Systems, Inc, Fort Lauderdale, Florida

3. Degrees

   B.S.E.E. (Dipl. Eng.), University of Belgrade, Yugoslavia, 1970.
   M.Sc. in Electrical and Computer Engineering , University of Belgrade, 1973.
   Ph.D. in Electrical and Computer Engineering, University of Belgrade, 1978.

4. Number of years service on the faculty of the University of Miami

   Total number of years: 6 full time, and 2 part time

   1982-1984 - Assistant Professor
   1984-1988 - Associate Professor
   1988-present - Adjunct Associate Professor

5. Other related experience

   1970-1982   Project leader and manager
               Department of computer engineering, Institute "Boris Kidric"-Vinca,
               Belgrade, Yugoslavia

   1988-present Senior Director of Research and Advanced Development
               Modular Computer Systems, Inc., Fort Lauderdale, Florida

6. Consulting and patents

       Consulted for Cordis Corporation, IBM, NASA Kennedy Space Center, RCA, and
       Honeywell.

Two patents:

[1] W. Earnshow, B. Furht. K Kohler, J. Parker, H. Ohel, G. Rabbat, and P. Ripy,
"Three-Dimensional Computer Architecture", Patent No. 89112824.1, 1989.

[2] B. Furht and G. Rabbat, "Method for Measuring Three-Dimensional
Computer Performance", 1989.

7. None

8. Principal publications of last five years

<u>a. Books. Edited Books. and Monographs</u>

[1] B. Furht, M. McRoberts, D. Gluch, and G. Rabbat, "Real-Time UNIX Systems: Design and Application Guide", Kluwer Academic Publisher, to be published in 1990.

[2] B. Furht, and G. Rabbat, "Handbook on Design and Applications of MODCOMP Computer Systems", <u>Modcomp Press</u>, October 1989.

[3] D.D. Gajski, V. Milutinovic, H.J. Siegel, and B. Furht, "Tutorial on Computer Architecture", <u>IEEE Computer Society Press</u>, 1987.

[4] B. Furht, and H. Parikh, "Microprocessor Interfacing and Communications with the Intel SDK-85", <u>Prentice-Hall</u>, Englewood Cliffs, New Jersey, 1986.

<u>b. Book Chapters</u>

[1] B. Furht, "Language Directed Complex Instruction Set Computer Architectures", in High-Level Language Computer Architecture, edited by V. Milutinovic, <u>Computer Science Press</u>, Rockville, Maryland, 1989.

[2] B. Furht, and V. Milutinovic, "Microprocessor Architectures for Virtual Memory Management", in the Tutorial on Computer Architecture, edited by Gajski, Milutinovic, Siegel, Furht, <u>IEEE Computer Society Press</u>, 1987.

[3] A. Kabakibo, V. Milutinovic, A. Silbey, and B. Furht, " A Survey of Cache Memories in Modern Mini and Micro Computer Systems", in the Tutorial on Computer Architecture, edited by Gajski, Milutinovic, Siegel, Furht, <u>IEEE Computer Society Press</u>, 1987.

<u>c. Referred Journal Papers</u>

[1] D. Grostick, D.P. Gluch, and B. Furht, "REAL/IX: A Real-Time UNIX Operating Systems", <u>Nuclear Instruments and Methods</u>, June 1990.

[2] S. Geffin, and B. Furht, "A Dataflow Multiprocessor System for Robot Arm Control", <u>International Journal of Robotics Research</u>, The MIT Press, Vol. 9, No. 3, June 1990.

[3] D. Gluch and B. Furht, "Fault Tolerance Strategies for High-Performance Real-Time Computers", <u>International Journal of Mini and Microcomputers</u>, Vol. 11, No. 2, June 1989, pp 24-30.

[4] B. Furht, and P.S. Liu, "An Advanced Laboratory for Microprocessor Interfacing and Communication", <u>IEEE Transaction on Education</u>, Vol. 32, No. 2, May 1989, pp. 124-128.

[5] S. Geffin, and B. Furht, "Transputer-Based Dataflow Multiprocessor for Robot Arm Control", *Microprocessors and Microsystems*, Vol. 13, No. 3, April 1989, pp. 219-226.

[6] B. Furht, "A Contribution to Classification and Evaluation of Structures for Parallel Computers", *Journal of Microprocessing and Microprogramming*, March 1989, pp. 203-208.

[7] B. Furht, A. Perez, "An Adaptive Real-Time ECG Compression Algorithm with Variable Threshold", *IEEE Transaction on Biomedical Engineering*, Vol. 35, No. 6, June 1988, pp. 489-494.

[8] B. Furht, H. A. Aboalsamh, W.H. Chia, and Y.N. Lai, "Multiple Register Window File for LISP-Oriented RISC Architectures", *Microprocessors and Microsystems*, Vol. 12, No. 4, May 1988, pp.187-195.

[9] B. Furht, "A RISC Architecture with Two-Size Overlapping Register Windows, *IEEE Micro*, Vol. 8, No. 4, April 1988, pp 67-80.

[10] B. Furht, and V. Milutinovic, "A Survey of Microprocessor Architectures for Memory Management", *IEEE Computer*, Vol. 20, No. 3, March 1987, pp. 48-67.

[11] S. Geffin, T. Burges, and B. Furht, "The Expert System for Career Planning: ACES", *Microcomputer Applications*, Vol. 6, No. 3, 1987, pp. 71-77.

[12] B. Furht, "Evaluation and Selection of 16-Bit Microprocessors", *International Journal of Mini and Microcomputers*, Vol. 8, No. 1, January 1986, pp. 14-25.

[13] V. Milutinovic, W. Venners, V. Eigle, and B. Furht, "A Test Package for Bit-Slice and Standard-Cell Microprocessor Design", *International Journal of Mini and Microcomputers*, Vol. 7, No. 3, October 1985, pp. 60-66.

e. Non-Referred Journal Papers

[1] B. Furht, J. Parker et al, "Performance of REAL/IX - Fully Preemptive Real Time UNIX", *ACM Operating Systems Review*, Vol. 23, No. 4, October 1989, pp. 45-52.

[2] G. Rabbat, B. Furht, and R. Kibler, "Three-dimensional Computer Performance", *IEEE Computer*, Open Channel, Vol. 21, No. 7, July 1988, pp. 59-60.

[3] G. Rabbat, B. Furht, and R. Kibler, "Three Dimensional Computers and Measuring Their Performance", *ACM Computer Architecture News*, Vol. 16, No. 3, June 1988, pp. 9-16.

[4] B. Furht, "A Definition of Complex Instruction Set Computer (CISC) Architectures", *IEEE Computer*, Vol. 20, No. 5, May 1987, pp. 108.

[5] B. Furht, M. Georgiu, S. Cadambi, "Knowledge-Based System for Student Advising", *IEEE Technical Comm. on Computer Education Newsletter*, Vol 4., No. 2, Fall 1987.

f. Principal Conference Papers and Other Publications

[1] D. Gluch, B. Furht et al, "A Reconfigurable Real-Time RISC Computer System", *Proc. of the IEEE International Conf. on Databases, Parallel Architectures, and their Applications*, Miami Beach, Florida, March 1990.

[2] D. Grostick, D.P. Gluch, abd B. Furht, "REAL/IX: A Real-Time UNIX Operating System", *Proc. of the International Conf. on Accelerator and Large Equipment Physics Control Systems*, Vancouver, Canada, October 1989.

[3] B. Furht, R. Kibler, J. Parker, G. Rabbat, and S. Sanchez, "The Role of VLSI Chips in Designing High-Performance Real-Time Computers", *Proc. of the First Florida Microelectronics Conference*, Boca Raton, Florida, May 1989.

[4] B. Furht, G. Rabbat, R. Kibler, J. Parker, and D. Gluch, "The Design of Tri-D Real-Time Computer Systems", *Proc. of the Euromicro Workshop on Real-Time*, Como Italy, June 1989.

[5] B. Furht, "Real-Time Computing=Tri-Dimensional Computing", Chairman's Introduction to the Minitrack on "Real-Time Systems: Hardware and Architecture Issues", *Proc. of the 22nd Hawaii Conference on System Sciences*, January 1989.

[6] D. Gluch, and B. Furht, "Strategies for Fault Tolerance in Real-Time Computer Systems: A Survey", *Proc. of the International Conference on Mini and Microcomputers: From Micros to Supercomputers*, Miami Beach, December 1988.

[7] B. Furht, G. Rabbat, and R. Kibler, "New Generation of Real-Time Computers: Three-Dimensional Super Minicomputers", *Proc. of the International Conference on Mini and Microcomputers: From Micros to Supercomputers*, Miami Beach, December 1988.

[8] B. Furht, "Survey of Parallel Computers and Multiprocessors", *Session Records, Wescon '88*, Anaheim, California, November 1988.

[9] G. Spicker, B. Furht, and M. Tapia, "Simulation and Modeling of Tightly-Coupled Multiprocessors", *Session Records Wescon '88*, Anaheim, California, November 1988.

[10] B. Furht, M. Krishnamurtht, W. Shomar, and L. Llorens, "A Compiler Directed Cache Strategy for GaAs Microprocessor Architectures", *Proc. of the IEEE Southeastcon*, April 1988. pp. 186-192.

[11] B. Furht, H. Aboalsamh, C. Wang Hong, and L. Ying Nan, "Organization and Management of a Multiple Register Window File for LISP-Oriented

Architectures", *Proc. of the 21th Hawaii Int. Conf. on System Sciences*, Architecture Track, January 1988, pp. 238-247.

[12] S. Geffin, B. Furht, and A. Katbab, " A Massively Parallel Architecture for Robot Arm Control", *Proc. of the IEEE Technicon*, Miami, Florida, October 1987.

[13] H. Aboalsamh, and B. Furht, "A Multiple Register Window File for LISP-Oriented Architectures", *Proc. of the IEEE Technicon*, Miami, Florida, October 1987.

[14] B. Furht, and M. Krishnamurthy, "Optimizing Compilers for RISC Architectures", *Proc. of the IEEE Technicon*, Miami, Florida, October 1987.

[15] B. Furht, A. Aquart, S. Masson, and R. Dandia, "Quality Control and Reliability if Critical Biomedical Software Products", *Proc. of the IASTED Int. Conf. on Quality Control and Reliability*, UCLA, Los Angeles, California, May 1987.

[16] B. Furht, M. Vainstein, and E. Rodriguez, "The UM-RISC Central Processing Unit", *Proc. of the 19th Southeast Symp. on System Theory*, Clemson, SC, March 1987, pp. 415-422.

[17] H. Aboalsamh, and B. Furht, "A Software Tool for Dynamic Measurements of LISP Interpreters", *Proc. of the 31th Int. Symp. on Mini and Microcomputers and Their Applications*, Austin, Texas, November 1986, pp. 72-76.

[18] S. Geffin, T. Burges, and B. Furht, "The Expert System for Career Planning", *Proc. of the 31th Int. Symp. on Mini and Microcomputers and Their Applications*, Austin, Texas, November 1986, pp. 95-99.

[19] B. Furht, "RISC Architectures with Multiple Overlapping Windows", *Proc. of the Midcon '85*, Chicago, Ill., September 1985, paper 23/2.

[20] B. Furht, "Reduced Instruction Set Computers Versus Complex Instruction Set Computers", *Proc. of the Midcon '85*, Chicago, Ill., September 1985, paper 24/0.

[21] R. Ralston, G. Spicker, and B. Furht, "Comparison of Three Advanced RISC/CISC Computer Architectures", *Proc. of the Midcon '85*, Chicago, Ill., September 1985, Paper 24/1.

9. Scientific and Professional Societies

. Member of the Florida High Technology Council (1988-present)
. Senior Member of the IEEE
. Chairman of the IEEE Computer Society for Miami Chapter (1984-86)
. Member of the TAU BETA PI
. Member of the ACM

10. Honors and Awards

. Invited Lecturer, NATO Advanced Study Institute on Computer Architecture, L'Aquilla, Italy, June 1988.
. Publication Award, Cordis Corporation, Miami (FL) for the article "Quality Control and Reliability of Critical Biomedical Software Products", 1987.
. Who's Who in Technology: Who's Who in Electronics and Computer Science, 5th Edition, Research Publications, Woodbridge, Conn., 1986.
. Annual Award, Institute "Boris Kidric"-Vinca for Development of a Multiprocessor System for Digital Signal Processing, 1981.

11. EEN 690 Real-Time Systems, Spring 1990, 3 hours/week
    EEN 617 Multiprocessors, Fall 1989, 3 hours/week

12.-15. None

Shahriar Negahdaripour
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EDUCATION

Ph.D., Massachusetts Institute of Technology, February 1987
M.S., Massachusetts Institute of Technology, June 1980
B.S., Massachusetts Institute of Technology, June 1979

EMPLOYMENT

O. University of Miami, Associate Professor of Elect. & Computer Engineering, August 1991 – present.

1. *University of Hawaii*, Assistant Professor of Electrical Engineering, January 87- present. *July 1991*
2. *University of Maryland*, Visiting Scholar, Summer 88.
3. *Thinking Machines Corp*, Cambridge, MA, Research Engineer, Summer 85.
4. *The MIT Artificial Intelligence Lab*, Cambridge, MA, Research Assistant, September 82- December 86.
5. *University of Massachusetts*, Boston, MA, Instructor in the Department of Mathematics & Computer Science, September 83- December 85.
6. *Scientific Systems, Inc.*, Cambridge, MA, Consulting Engineer, May 84- December 84.
7. *Boston University*, Adjunct Faculty in the Department of Mechanical and Aeronautical Engineering, January 84- May 84.
8. *The Electrical Power Systems Engineering Lab*, MIT, Cambridge, MA, Research Staff (August 80-August 82), and Research Assistant (August 79-July 82).

PUBLICATIONS (since 1987)

Published/Accepted Journal Papers

1. "Direct passive navigation" (with B.K.P. Horn), *IEEE Trans. on PAMI*, January 1987.

2. "Closed-form solution for absolute orientation using unitary Matrices" (with B.K.P. Horn & M. Hilden), *Journal of Optical Society*, July, 1988.

3. "A direct method for locating the focus of expansion" (with B.K.P. Horn) *Computer Vision, Graphics, Image Processing*, Vol 46, No 3, June, 1989.

4. "Critical surface pairs and triplets," *International Journal of Computer Vision*, Vol 3, No 4, November, 1989.

5. "Closed-form relationship between the two interpretations of a moving plane," *Journal of the Optical Society of America*, Series A, Vol 7, February, 1990.

6. "Recovering shape and motion from undersea images" (with C.H. Yu & A. Shokrollahi), *IEEE Journal of Oceanic Engineering*, Vol 15, No 3, July, 1990

7. "Multiple interpretations of the shape and motion of objects from two perspective images," *IEEE Trans. on PAMI*, November, Vol 12, No 11, 1990.

8. "Adaptive control with visual sensing for an ROV in unstructured undersea environments" (with J. Yuh), to appear in the *International Journal of Robotics and Automation*, Vol 5, No 2.

9. "Orientation and distance recovery of Lambertian planar surfaces in light attenuating media from optical images" (with C.H. Yu), *Journal of the Optical Society of America*, Vol 8, No 1, January, 1991.

10. "Optical sensing for underwater robotic vehicles" (with C.H. Yu & A. Shokrollahi), to appear in the special issue of the *Journal of Robotics and Autonomous Systems*.

11. "Improved methods for optical stationkeeping," (with J. Fox), to appear in the special issue of the *Journal of Robotic Systems*.

In preparation/submitted Journal Papers

1. "On motion recovery in light attenuating media vehicles from image shading variations" (with C.H. Yu), submitted to the *Journal of the Optical Society of America*.

2. "Robust motion recovery from image sequences," (with S. Lee), to be submitted to the *IEEE Trans. on PAMI*.

3. "An error analysis for structure from motion; effects of field of view and surface orientation," in preparation.

4. "Relaxing brightness constancy in computing optical flow" (with A. Shokrollahi), in preparation.

Refereed Conference Papers

1. "Ambiguities of a motion field," *Proc. First International Conference in Motion Vision*, London, England, June, 1987.

2. "Using depth-is-positive constraint to recover motion" (with B.K.P. Horn), *Proc. IEEE Workshop on Computer Vision*, Miami, FL, November 30-December 2, 1987.

3. "Robust recovery of motion: effects of surface orientation and field of view" (with C.H. Yu), *Proc. IEEE Conference on Computer Vision and Pattern Recognition*, Ann Arbor, MI, June, 1988.

4. "On the development of underwater robotic vehicles" (with J.S. Fox & J. Yuh), *Proc. Second International Symposium on Robotics and Manufacturing Research: Education and Applications*, November, 1988.

5. "Passive navigation in a planar world," *Proc. Twelfth Canadian Symposium on Remote Sensing*, Vancouver, B.C., Canada, July, 1989.

6. "Relaxing the brightness constancy assumption in computing optical flow" (with A. Shokrollahi & M. Gennert), *Proc. International Conference on Image Processing*, Singapore, September, 1989.

7. "Direct motion/stereo for a translating observer" (with J. Aloimonos & B. Hayashi), *Proc. International Conference on Image Processing*, Singapore, September, 1989.

8. "Passive vision sensing techniques for autonomous undersea vehicles" (with C.H. Yu & A. Shokrollahi) *Proc. Second International Conference on Intelligence Autonomous Systems*, Amsterdam, The Netherlands, December, 1989.

9. "Robust motion recovery: The two-plane method" (with S. Lee & A. Shokrollahi), *Proc. Second International Conference on Intelligence Autonomous Systems*, Amsterdam, The Netherlands, December, 1989.

10. "Time-sequential structure and motion estimation without optical flow," (with J. Heel) *SPIE Symposium on Electronic Imaging: Sensing and Reconstruction of 3D Objects and Scenes*, February, 1990.

11. "Direct motion stereo," (with B. Hayashi) *SPIE Symposium on Electronic Imaging: Sensing and Reconstruction of 3D Objects and Scenes*, February, 1990.

12. "Passive Optical Sensing for Near-Bottom Stationkeeping," (with C.H. Yu) *Proc. Oceans'90*, Washington, D.C., September.

2

13. "Direct motion stereo: Recovering camera motion and scene structure," (with B. Hayashi) *Proc. 3rd International Conference on Computer Vision*, Osaka, Japan, December, 1990.

14. "Improved methods for optical stationkeeping," (with J. Fox), to be presented at the *International Conference on Robotics and Automation*, Sacramento, CA, April, 91.

15. "A pipeline architecture for optical flow computation" (with A. Shokrollahi and T. Dobry), submitted to the *Int. Conference on Parallel Processing*, St. Charles, IL, August, 91.

16. "Robust motion recovery from image sequences," (with S. Lee), to be submitted to the *IEEE Workshop on Visual Motion*, Princeton, NJ, October, 1991

TALKS AND CONFERENCE PRESENTATIONS

1. International Conference on Artificial Intelligence, Los Angeles, CA, August 85.
2. University of Southern California, January 86.
3. IEEE Conference on Robotics and Automation, San Francisco, CA, April 86.
4. AT & T Bell Laboratory, June 86.
5. Carnegie Mellon University, June 87.
6. IEEE Workshop on Computer Vision, Miami, FL, December 87.
7. IEEE Conference on Comp. Vision & Pattern Recognition, Ann Arbor, MI, June, 88.
8. University of Maryland, July, 88.
9. Massachusetts Institute of Technology, December, 88.
10. Stanford University, January 89.
11. California Institute of Technology, March 89.
12. International Conference on Image Processing, Singapore, September, 89.
13. Advanced Technology Center, Hsinchu, Taiwan, September, 89.
14. Academia Sinica, Taipei, Taiwan, September, 89.
15. Second International Conference on Intelligent Autonomous Systems, Amsterdam, The Netherlands, December, 89.
16. Hughes Aircraft Company, El Segunda, CA, March, 90.
17. University of California at Davis, Davis, CA, March, 90.
18. Rockwell International Science Center, Thousand Oaks, CA, April, 90.
19. Jet Propulsion Laboratory, Pasadena, CA, July, 90.
20. IEEE Conference on Oceans'90, Washington, D.C., September, 90.
21. University of California, San Diego, September, 90.
22. International Conference on Computer Vision, Osaka, Japan, December, 90.
23. The MIT Sea Grant ROV Lab, Cambridge, MA, December, 90.

RESEARCH GRANTS

1. "Developing Models of Undersea Image Formation Process," Research grant for $5,320 from the Hawaii Natural Energy Institute, Summer 87.
2. "Robust Motion Vision," Research grant for $46,749, Pacific International Center for High Technology Research, July 87- July 88.
3. "Robust Motion Vision," Research grant for $94,739, Pacific International Center for High Technology Research, July 88- July 89.
4. "Custom VLSI for Motion Sensing," UH Seed grant for $6,000, June 89- September 90.

5. "Robust Motion Vision," Research grant for $49,000, Pacific International Center for High Technology Research, July 89- July 90.
6. "Automatic Optical Stationkeeping in a Subsea Remotely Operated Vehicle," (with J. Fox, E.J. Weldon, Jr., & J. Yuh), Sea Grant College Program grant for $172,000, June 89- June 91.
7. "Relaxing the Brightness Constancy Assumption in Motion Vision," Engineering Initiation Grant for $63,361, NSF, July 89- July 91.
8. "Passive Optical Sensing for Automatic Stationkeeping of ROVs," Three-year Research Grant for $196770, submitted to NSF, pending.
9. "Challenges in Computer Vision; Future Directions of Research," (with A.K. Jain, Michigan State University), Workshop Proposal for $23,400, submitted to NSF, Recommended for funding by Dr. Howard Moraff, Director of Information, Robotics, and Intelligent Systems Program, NSF.

GRADUATE STUDENTS SUPERVISED

1. Kavindra Saxena, M.S. Degree, June, 88.
2. C.H. Yu, Ph.D. degree, December 90.
3. B. Hayashi, M.S. Degree, December 90.
4. S. Lee, M.S. Degree, December 90.
5. A. Shokrollahi, M.S. Degree, December 90.
6. Vidyasagar Ganesan (M.S.), Dan Sternlicht (M.S.) and H. Liu (Ph.D.) to graduate.

TEACHING

1. Undergraduate course in signals & systems (EE315).
2. Undergraduate course in linear systems and control (EE351)
3. Undergraduate course in image processing & computer vision (EE463).
4. Undergraduate course in control system design (EE451)
5. Graduate courses in computer vision (EE662, EE693G).

OTHER ACTIVITIES

1. Member of the Department Recruiting Committee (Spring 1988).
2. MIT Educational Council in Hawaii (1987-present)
3. Organizer of weekly departmental seminars (Spring 1989).
4. Developed two graduate courses in low and high level vision processing.
5. Responsible for revision of the EE Control curriculum at UH; contributions include the development of a junior course in Linear Systems and Control (to be offered in Spring 1991), and a senior course in digital control systems (to be taught in September 1991).
6. Reviewer of IEEE and International journal and conference papers in Computer Vision.
7. Reviewer of NSF proposals.
8. Session Chair of various workshops and conferences in Computer Vision, Robotics, and Image Processing, including IEEE Robotics and Automation Conference in San Francisco (1986), IEEE Workshop on Motion Vision in Newport Beach (1989), International Conference on Image Processing in Singapore (1989), 2nd International Conference on Intelligent Autonomous Systems in Amsterdam (1989), and 3rd International Conference in Computer Vision in Osaka, Japan (1990).
9. General Chair and Finance Chair of the IEEE Conference on Computer Vision and Pattern Recognition, to be held in Maui, Hawaii, June 1991.

4

OTHER REVIEWED PUBLICATIONS (before 1987)

1. "An innovative based methodology for HVAC fault detection" (with P.B. Usoro & I.C. Schick), *ASME Journal of Dynamic Systems, Measurement, and Control: Special Issue on Thermo-Fluid Processes and Systems*, December, 1985.

2. "Control System Design with Bounded Variables" (with L.A. Gould, R. Kim), *Proceed. of JACC Conference*, Charlottesville, Virginia, June, 1981.

3. "Modeling and Simulation of an HVAC Air Handler Unit" (with P.B. Usoro & R. Nadira), *Proc. Eastern Simulation Conferences*, Norfolk, Virginia, March, 1985.

4. "HVAC System Fault Detection and Diagnosis" (with P.B. Usoro & I.C. Schick), *Proc. American Control Conference*, June 19-21, 1985.

5. "Determining 3-D Motion of Planar Objects from Image Brightness Patterns" (with B.K.P. Horn), *Proceed. Ninth International Joint Conference on Artificial Intelligence*, Los Angeles, California, August, 1985.

6. "Direct Passive Navigation: Analytical Solution for Planes" (with B.K.P. Horn), *Proc. IEEE Conference on Robotics and Automation*, San Francisco, California, April, 1986.

CURRICULUM VITAE
Dr. Mansur R. Kabuka

Dr. Mansur R. Kabuka, tenured Associate Professor of Electrical and Computer Engineering, University of Miami, FLorida. Dr. Kabuka received his doctorate degree from the University of Virginia, Charlottesville, Virginia 1983. His current research interests include special purpose computer architecture, real-time systems, computer vision, robotics and automation and artificial intelligence.

Dr. Kabuka has extensive research and industrial experience. He published over thirty papers in prestigious journals and conferences. **He was the recipient of the 1987 best research paper award, College of Engineering, University of Miami.** Dr. Kabuka is involved with directing individual student learning efforts such as Senior Design Projects, Master's Theses and Projects, and Doctoral Dissertations. He supervised over fourty senior projects. Currently, he is advising two Ph.D. and six M.S. students. Dr. Kabuka received several grants. He obtained donations (hardware and software) from several companies valued at approximately four million dollars.

Dr. Kabuka has extensive experience in multidisicplinary projects. He initiated and played a principal role in establishing the interdisciplinary Computer Integrated Manufacturing (CIM) program, at the University of Miami, College of Engineering. He created and developed several labs and lab courses. He has proven track record of producing and recruiting outstanding undergraduate to continue on for graduate work.

Dr. Kabuka served on many Department, College, and University Committees. He is a member of the College of Engineering Council, the College of Engineering Research Council, and the University Computer Advisory Committee. He served on the University of Miami Faculty Development Committee. **Dr. Kabuka is a recent appointee to Florida High Technology and Industry Council Subcommittee on Computer Integrated Engineering and Manufacturing.**

EDUCATION

Ph.D., University of Virginia, 1983
Area of Concentration: Computer Vision and Digital Systems

M.S., University of Miami, Florida
Area of Concentration: Digital System Design & Software Engineering

B.S., University of Alexandria
Area of Concentration: Computer Science and Control

CONTINUING EDUCATION

Extensive two weeks course on Knowledge Based Systems,
IBM System Research Institute, Thornwood, N.Y., 1987.

EXPERIENCE - TEACHING, INDUSTRIAL, ETC.

Associate Professor, Department of Electrical and Computer
Engineering, University of Miami, 1988-Present.

Assistant Professor, Electrical and Computer Engineering,
University of Miami, August 1983 - 1987.

TEACHING INNOVATIONS

Developed and taught undergraduate and graduate courses in
digital system design, fault-tolerant, microprocessors,
simulation and design automation, ASIC design, robotics, computer
vision and pattern recognition.

Created and developed the following laboratories:

Digital System Design Lab.
Electronic Design Automation/Computer
Aided Software Engineering
(EDA/CASE) Lab.

Contributed significantly to the Computer Engineering Curriculum

Proven track record of producing and recruiting outstanding
undergraduate to continue on for graduate work.

Supervised over forty senior projects.

New Programs:
Initiated and played a principal role in
establishing the interdisciplinary Computer Integrated
Manufacturing (CIM) program, College of Engineering,
University of Miami, 1988.

INDUSTRIAL & PROFESSIONAL EXPERIENCE

Specifications engineer, two years.

System Product Division, IBM, Boca Raton, Florida
Summer 1984.

Digital Image Processing and Pattern Recognition Lab,
University of Virginia.

Design and construction of a Pedobarograph, University
of Miami, School of Medicine, 1986.

2

Design and construction of a camera stand and tracking system, 1985.

Design and construction of a High Speed Video Image Processor for Templete Operation, 1986.

Design a Real-time Video Image Sequence Digitizer (variable frame rate), 1986-1987.

Design and construction of a Flexible High Performance Robot Arm Controller, 1987-1988.

PROFESSIONAL ACTIVITIES

Member of the Attendance Committee of the Southcon 87.

Member of the Attendance Committee of the Southcon 88.

Member of the Steering Committee of the Florida Artificial Intelligence Conference, Orlando, Florida, May 1988.

Member of the Program Committee of the ISMM International Conference on Mini and Microcomputers, Miami Beach, Florida, December 1988.

Continuing Education Program for Engineering Faculty, IBM System Research Institute, Thoronwood, N.Y., 1987.

Member of the Florida High Technology and Industry Council Subcommittee on Computer Integrated Engineering and Manufacturing.

Attended several conferences.

Attended several professional seminars (Intel, Motorola, Gould, etc.).

RECENT PUBLICATIONS

REFEREED JOURNAL PAPERS

1. M. R. Kabuka and E. McVey, "Input-Output Characteristics for Image Transducers," IEEE Trans. on Robotics and Automation (RA), vol. RA-2, no. 2, June 1986.

2. M. R. Kabuka and A. Arenas, "Position Verification of a Mobile Robot Using Standard Pattern," IEEE Trans. on Robotics and Automation (RA), vol. RA-3, no. 6, Dec. 1987.

3. M.R. Kabuka, J.H. Desoto, and J.F. Miranda, "Robot Vision Tracking System," IEEE Trans. on Industrial Electronics, vol. 35, no. 1, Feb. 1988.

3

17. H. Fok and M.R. Kabuka, "CAD/Simulation for Dynamic Environment", IEEE Symp. on Intelligent Control, Philadelphia, Sept. 1990.

18. M.R. Kabuka, S. Harjadi and A. Younis, "Object Recognition Using CAD Generated Vision Models", International Conference on Automation, Robotics, and Computer Vision (ICARCV), Singapore, Sept. 18-21, 1990.

PAPERS IN CONFERENCE PROCEEDINGS

19. P. Shironshita, B. Hussain, and M.R. Kabuka, "Real-Time Algorithm for Three-Dimensional Position Verification", IEEE Computer Society Workshop on Computer Vision, Miami Beach, Florida, Nov. 30 - Dec. 2, 1987.

20. M.R. Kabuka, P. Glaskowsky, and J.B. Miranda, "A Flexible High-Performance Robot Arm Controller", IEEE International Conference on Robotics and Automation, Philadelphia, Pennsylvania, April 1988.

21. R. Sureswaran and M.R. Kabuka, "Intelligent Quantitative Pressure Mapping System," Florida Artificial Intelligence Conference, May 1988.

22. K. Fok and M.R. Kabuka, "An Efficient Navigation System for Vision Guided Vehicles," Florida Artificial Intelligence Conference, May 1988.

23. B. Hussain and M.R. Kabuka, "Real-Time Gray Scale Image Moments Generating", Florida Conference on Computer Integrated Manufacturing (CIM), Orlando, Florida, Nov. 1988.

24. I. Haq and M.R. Kabuka, "A Three-Joint Camera Mount for Robot Vision", ISMM Inter. Conf. on Mini and Microcomputers, Miami Beach, FL, Dec. 1988.

25. M.R. Kabuka, R. Sureswaran, J. Bowker, and L. Latta, "Intelligent Vision-based System for Diagnosis and Treatment of Foot Ulcers, ISMM Inter. Conf. on Mini and Microcomputers, Miami Beach, FL, Dec. 1988.

BOOKS AND CHAPTERS

26. A. Genaidy, S. Asfour and M.R. Kabuka, "An Expert System for the Design of Manual Materials Handling Tasks", Trends in Ergonomics/Human Factors IV, North-Holland Pub., pp. 559-566, 1987.

27. N. Boubakri, T. Khalil, M.R. Kabuka, "Human-Machine Interface in Remote Monitoring and Control of Flexible Manufacturing Systems, Ergonomics of Advanced Manufacturing and Hybrid Automated Systems, Elsevier Science Pub., 1988.

   Modern Approach to Reliable Design of Digital Systems, Textbook, in preparation.

BOOK REVIEW

   Design with Microcontroller, John B. Peatman, Georgia Institute of Technology, McGraw-Hill Publisher, 1987.

Digital Control System Design, by G.H. Hostetter, University of California, Irvine,
Holt, Rinehard and Winston, Inc., Publisher, 1987.

XV.D. FACULTY CURRICULUM VITAE

1.   NAME AND DATE OF BIRTH

      Abdullah Mete Kabakcioglu
      August 7, 1956

2.   ACADEMIC RANK (state whether full-time or part-time, and if part-time indicate non-academic activity and percent of time devoted to it).

      Assistant Professor
      Full time

3.   DEGREES WITH FIELDS, INSTITUTIONS AND DATES

      B.S.E.E., Electrical Engineering, Bogazici University
                 Istanbul, Turkey, June 1979
      M.S.,   Computer Engineering, Syracuse University
                 New York, May 1984
      Ph.D.,   Computer Engineering, Syracuse University
                 New York, May 1989.

4.   NUMBER OF YEARS SERVICE ON THIS FACULTY INCLUDING DATE OF ORIGINAL APPOINTMENT AND DATES OF ADVANCEMENT IN RANK.

      Two years.
      Instructor, January 1988
      Assistant Professor, January 1989 - present

5.   OTHER RELATED EXPERIENCE - TEACHING, INDUSTRIAL, ETC. (responsibility, location, dates)

      Syracuse University, January 1985 - August 1987
      Research Assistant.

      Syracuse University, September 1980 - January 1985
      Teaching Assistant.

      Bogazici University, January - May 1980
      Teaching Assistant.

6. CONSULTING, PATENTS, ETC.

    None

7. STATE IN WHICH REGISTERED

    None

8. PRINCIPAL PUBLICATIONS OF LAST FIVE YEARS (Give titles and references)

    A.M. Kabakcioglu, E.P. Stabler, "Automatic Verification of Temporal Logic Specifications about Sequential Hardware Designs using Symbolic Simulation", accepted for publication in International Journal of Computer Aided VLSI Design.

    A.M. Kabakcioglu, P.K. Varshney, and C.R.P. Hartmann, "Application of Information Theory to Switching Function Minimization", accepted for publication in IEEE Proceedings, Part E, Computers and Digital Techniques.

    A.M. Kabakcioglu, "An Artificial Intelligence Approach to PLA Optimization (Further Results)", Proc. of the International Conference on Mini and Microcomputers, December 1988, Miami Beach, FL.

    A.M. Kabakcioglu, P.K. Varshney, and C.R.P. Hartmann, "An Artificial Intelligence Approach to PLA Optimization", Proc. of the IEEE International Symposium on Circuits and Systems, Helsinki University of Technology, Espoo, Finland, June 1988.

    A.M. Kabakcioglu, P.K. Varshney, and C.R.P. Hartmann, "Applications of Information Theory to Switching Function Minimization", Proc. of the IEEE International Symposium on Information Theory, St. Jovite, Canada, September 1983.

    C.L. Gerberich, A.M. Kabakcioglu, C.R.P. Hartmann, and P.K. Varshney, "Further Results on Information Theoretic Approach to the Construction of Efficient Decision Trees, Proc. of the IEEE Symposium on Information Theory, Les Arcs, France, June 1982.

9. SCIENTIFIC AND PROFESSIONAL SOCIETIES OF WHICH A MEMBER

    American Association for Artificial Intelligence (AAAI)

10. HONORS AND AWARDS

    Turkish Educational Foundation Scholarship, 1979
    Turkish Scientific and Technological Research Association Scholarship, 1976.

11. SUBJECTS OR COURSES TAUGHT THIS YEAR BY TERMS (Give hours per week of lecture, recitation, and laboratory and number of sections if more than one. Designate day, evening, or graduate)

Spring Semester 1989 - 1990

EEN 547   Expert Systems for Computer and Electrical Engineering,
           3 credits, lecture, day class, undergraduate and graduate.

EEN 414   Computer Organization and Design,
           3 credits, lecture, day class, undergraduate.

Fall Semester 1989 - 1990

EEN 414   Computer Organization and Design,
           3 credits, lecture, day class, undergraduate.

EEN 312   Microprocessors,
           4 credits, lecture, day class, undergraduate.
           EEN 312 has a laboratory (3 sections) and the teaching assistants
           were supervised.

12. OTHER ASSIGNED DUTIES PERFORMED DURING THE ACADEMIC YEAR, WITH AVERAGE HOURS PER WEEK. INDICATE WHICH CARRY EXTRA COMPENSATION.

Computer Networking Committee (2 hours/week)
Supervision of the microprocessor laboratory and assistants (1 hour/week)

13. SPECIFIC PROGRAMS IN WHICH FACULTY MEMBER HAS PARTICIPATED TO IMPROVE TEACHING AND PROFESSIONAL COMPETENCE DURING LAST FIVE YEARS

Designed and implemented an Expert System course.

Research Grants

College of Engineering Research Equipment Competition, University of Miami, Spring 90.
College of Engineering Research Equipment Competition, University of Miami, Fall 89.
General Research Support Award, University of Miami, 1989.

14. SPECIAL DUTIES OF CO-OP FACULTY (coordinators)

Not applicable

XV.D. FACULTY CURRICULUM VITAE

1. NAME AND DATE OF BIRTH

>   Ying-Chan Fred Wu
>   February 24, 1958

2. ACADEMIC RANK (state whether full-time or part-time, and if part-time indicate non-academic activity and percent of time devoted to it).

>   Assistant Professor
>   Full time

3. DEGREES WITH FIELDS, INSTITUTIONS AND DATES

> | | |
> |---|---|
> | B.S. | Electrical Engineering, Tatung Institute of Technology, Taiwan, May 1980. |
> | M.S. | Electrical Engineering, Iowa State University, December 1984. |
> | Ph.D. | Computer Engineering, Iowa State University, May 1988. |

4. NUMBER OF YEARS SERVICE ON THIS FACULTY INCLUDING DATE OF ORIGINAL APPOINTMENT AND DATES OF ADVANCEMENT IN RANK.

>   Two years, January 1988 (original appointment).

5. OTHER RELATED EXPERIENCE - TEACHING, INDUSTRIAL, ETC. (responsibility, location, dates)

>   Assistant Professor, University of Miami, 1988 - present.
>   Teaching Assistant, Iowa State University, 1984 - 1987
>   Instructor, Tatung Institute of Technology, Taiwan, 1982 - 1983.

6. CONSULTING, PATENTS, ETC.

>   None

7. STATE IN WHICH REGISTERED

>   None

8. PRINCIPAL PUBLICATIONS OF LAST FIVE YEARS (Give titles and references)

S. Leong and F.Y. Wu, "A Knowledge-based System for Transporting Software", Proc. of the 3rd Florida Artificial Intelligence Research Symposium, Cocoa Beach, Florida, April 1990, pp. 250-253.

F.Y. Wu and K. Yen, "A Multi-dimensioal Representation for Composite Knowledge", Proc. of the 6th IASTED International Conference on Expert Systems Theory and Applications, L.A., California, Dec. 1989, pp. 91-94.

F.Y. Wu, "From Reasoning to Creating: Influences of AI on Human Capability Simulations", Proc. of the 20th Annual Pittsburgh Conference on Modeling and Simulation, Vol. 20, Part 2, pp. 525-529, Pittsburgh, PA, May 1989.

F.Y..Wu, "Virtual Operator: An Intelligent System for Enhancement of Computer-to-Computer Interactivity", Proc. of the 27th Annual Southeast Regional Conference of ACM, Atlanta, GA, Apr. 1989, pp. 580-584.

S. Leong and F.Y. Wu, "An AI Approach in Transporting Software", SOUTHEASTCON 89 Vol. 3, Columbia, South Carolina, Apr. 1989, pp. 1004-1007.

F.Y. Wu, "A Step Toward an Intelligent Software Transportation System", Proc. of the 2nd Florida Artificial Intelligence Research Symposium, Orlando, FL, April 1989, pp. 158-162.

F.Y. Wu, "Analogical Knowledge Transformation for Generating Computer Commands", Proc. of International Conference on Mini and Microcomputers, Miami Beach, Florida, Dec. 1988, pp. 112-116.

F.Y. Wu, "A Multi-Dimensional Reasoning Scheme Using Prolog", the 21st Annual Pittsburgh Conference on Modeling and Simulation, Pittsburgh, PA, May 1990, accepted.

S. Leong and F.Y. Wu, "An Intelligent Interface for generating Translation Software", the 21st Annual Pittsburgh Conference on Modeling and Simulation, Pittsburgh, PA, May 1990, accepted.

9. SCIENTIFIC AND PROFESSIONAL SOCIETIES OF WHICH A MEMBER

IEEE Computer Society

10. HONORS AND AWARDS

Research equipment competition award, College of Engineering, University of Miami, 1990.

Research equipment competition award, College of Engineering,
University of Miami, 1989.

Summer research award, University of Miami, 1989.

11. SUBJECTS OR COURSES TAUGHT THIS YEAR BY TERMS (Give hours per week of lecture,
     recitation, and laboratory and number of sections if more than one. Designate day,
     evening, or graduate)

     Spring Semester 1988-1989

     EEN 312   Microprocessor, 4 credits, lecture, day class, undergraduate.
     EEN 417   Embedded Microprocessor System Design, 2 credits, lecture,
                    day class, undergraduate.

     Fall Semester 1989-1990

     EEN 117   Introduction to Pascal and Software Engineering, 3 credits, lecture,
                    day class, undergraduate.
     EEN 417   Embedded Microprocessor System Design, 2 credits, lecture,
                    day class, undergraduate.
     EEN 548   Machine Learning, 3 credits, lecture, day class, undergraduate and
                    graduate.

12. OTHER ASSIGNED DUTIES PERFORMED DURING THE ACADEMIC YEAR, WITH AVERAGE
     HOURS PER WEEK. INDICATE WHICH CARRY EXTRA COMPENSATION.

     None

13. SPECIFIC PROGRAMS IN WHICH FACULTY MEMBER HAS PARTICIPATED TO
     IMPROVE TEACHING AND PROFESSIONAL COMPETENCE.

     Research Grant and Contract

     Florida High Tech, "A Knowledge-based System for Transporting Software",
     January 1990, $19,962 grant.

14. SPECIAL DUTIES OF CO-OP FACULTY (coordinators)

     Not applicable

XV.D. FACULTY CURRICULUM VITAE

1.   NAME AND DATE OF BIRTH

        Arun K. Thakore
        May 1962

2.   ACADEMIC RANK (state whether full-time or part-time, and if part-time indicate non-academic activity and percent of time devoted to it).

        Assistant Professor
        Full time

3.   DEGREES WITH FIELDS, INSTITUTIONS AND DATES

        Ph.D.   University of Florida, July 1990
        M.E.   University of Florida, August 1986
        BE   Osmania University, June 1983

4.   NUMBER OF YEARS SERVICE ON THIS FACULTY INCLUDING DATE OF ORIGINAL APPOINT-MENT AND DATES OF ADVANCEMENT IN RANK.

        Not applicable, new faculty, 1990

5.   OTHER RELATED EXPERIENCE - TEACHING, INDUSTRIAL, ETC. (responsibility, location, dates)

        Research

        11/89 - present   Research Assistant, Database Systems R&D Center, University of
                             Florida
        8/84 - 4/89   R A . Database Systems R&D Center, University of Florida
        5/89 - 10/89   Supplement Technical Employee, IBM Thomas J. Watson Research
                             Center, Yorktown Heights

        Teaching

                             Lectured and assisted in teaching graduate level course on
                             "Architecture for Non-Numeric Processing", for various
                             semesters, University of Florida

6. CONSULTING, PATENTS, ETC.

    None

7. STATE IN WHICH REGISTERED

    None

8. PRINCIPAL PUBLICATIONS OF LAST FIVE YEARS (Give titles and references)

    Stanley Y.W. Su and Arun K. Thakore, "Matrix Operations on a Multicomputer System with Switchable Main Memory Modules and Dynamic Control", IEEE Trans. on Computers, Vol. C-36, No. 12, December 1987, pp. 1467-1484.

    "Asynchronous Parallel Processing of Large Object-Oriented Knowledge Bases", in preparation for submission to the IEEE Trans. on Knowledge and Data Engineering.

    Dennis, G. Shea, et. al., "Monitoring and Simulation of Processing Strategies for Large Knowledge Bases on the IBM Victor Multiprocessor", Proc. of the Second Conference of the North American TransputerUsers Group, Oct. 1989, pp. 11-26.

    Arun K. Thakore and Stanley Y.W. Su, "Matrix Inversion and LU Decomposition on a Multicomputer System with Dynamic Control", Proc. of the Second International Conference on Supercomputing, May 1987, pp. 291-300.

    Chaitanya K. Baru, Arun K. Thakore, and Stanley Y.W. Su, "Matrix Multiplication on a Multicoputer System with Switchable Main Memory Modules", Proc. of the First Int. Conference on Supercomputing Systems, Dec. 1985, pp. 650-659.

    Arun K. Thakore, Stanley Y.W. Su, Herman Lam, and Dennis G. Shea, "Asynchronous Parallel Processing of Object Bases Using Multiple Wavefronts", submitted to the 1990 Int. Conference on Parallel Processing to be held in August 1990.

    Stanley Y.W. Su, Arun K. Thakore, and Herman Lam, "Greedy Heuristic Mapping of Semantic Schemas onto Regularly and Homogenously Connected Processors", submitted to the 16th Int. Conference on Very Large Databases to be held in August 1990.

    "Asynchronous Parallel Execution of Deductive Queries Against Object-Oriented Databases", in preparation for submission to the Seventh Int. Conference on Data Engineering to be held in April 1991.

9. SCIENTIFIC AND PROFESSIONAL SOCIETIES OF WHICH A MEMBER

10. HONORS AND AWARDS

    Distinction in Undergraduate Studies

11. SUBJECTS OR COURSES TAUGHT THIS YEAR BY TERMS (Give hours per week of lecture, recitation, and laboratory and number of sections if more than one. Designate day, evening, or graduate)

    Not applicable, new faculty 1990

12. OTHER ASSIGNED DUTIES PERFORMED DURING THE ACADEMIC YEAR, WITH AVERAGE HOURS PER WEEK. INDICATE WHICH CARRY EXTRA COMPENSATION.

    Not applicable; new faculty 1990

13. SPECIFIC PROGRAMS IN WHICH FACULTY MEMBER HAS PARTICIPATED TO IMPROVE TEACHING AND PROFESSIONAL COMPETENCE.

    Not applicable; new faculty 1990

14. SPECIAL DUTIES OF CO-OP FACULTY (coordinators)

    Not applicable

XIV.   INFORMATION REGARDING FACULTY

1.   NAME AND DATE OF BIRTH

Soklei Leong
October 7, 1952

2.   ACADEMIC RANK (state whether full-time or part-time, and if part-time indicate non-academic activity and percent of time devoted to it).

Assistant Professor
Full time

3.   DEGREES WITH FIELDS, INSTITUTIONS AND DATES

Ph.D., Computer Science & Engineering, Auburn University, August 1986.
M.S., Computer Science, The Pennsylvania State University, March 1982.
M.E., Electronics Engineering, Chiba University, Japan, March 1976.
B.E., Electronics Engineering, Chiba University, Japan, March 1974.

4.   NUMBER OF YEARS SERVICE ON THIS FACULTY, INCLUDING DATE OF ORIGINAL APPOINTMENT AND DATES OF ADVANCEMENT IN RANK.

Three years
January 1987 - present, Assistant Professor

5.   OTHER RELATED EXPERIENCE - TEACHING, INDUSTRIAL, ETC. (what capacity, when, where?)

Teaching

Assistant Professor, University of Miami, 1987-present

Industrial

System Programmer, Fujitsu Co. Ltd., Japan, 1977 - 1979.

6.   CONSULTING

None

7.   STATES IN WHICH REGISTERED

None

8. PRINCIPAL PUBLICATIONS OF LAST FIVE YEARS (Give Titles and reference)

S. Leong, O. Jiang, S. Jodis and P.A.D. de Maine, "A Transportable Programming Language (TPL) System II. The Bifunctional Compiler System", I.E.E.E. Trans. on Software Engineering (in press).

S. Leong and F.Y. Wu, "An Intelligent Interface for Generating Translation Software", Twenty-first Annual Pittsburgh Conference on Modelling and Simulation, May 1990.

S. Leong and F.Y. Wu, "A Knowledge Based System for Transporting Software", Flairs-90, Cocoa Beach, Florida, Apr. 1990, 250-253.

S. Leong and F.Y. Wu, "An AI Approach in Transporting Software", Proc. of Southeastcon'89, 1989, 1004-1008.

S. Leong, "The Design and Implementation of Converter Writing System", Miami Technicon'87, 1987, 313-316.

S. Leong, O. Jiang, S. Jodis and P.A.D. de Maine, "Design for a TPL Compiler System -- A System for Retargeting High Level Language Programs", Proc. of Workshop on Future Directions in Computer Architecture and Software", 5-7 May 1986, Sea-brook Island, Charleston, South Carolina.

S. Leong, P.A.D. de Maine, S. Jodis and O. Jiang, "System Manual for the Bifunctional HLL-TPL Compiler", Report IV of the Series: Transportable Programming Language (TPL) Systems, Computer Science and Engineering Department, Auburn University, Auburn, AL 36849 (1986).

O. Jiang, PA.D. de Maine, S. Jodis and S. Leong, "User Manual for Hypothetical Parent FORTRAN", Report III of the Series: Transportable Programming Language (TPL) Systems, Computer Science and Engineering Department, Auburn University, Auburn, AL 36849 (1986).

P.A.D. de Maine, S. Leong and O. Jiang, "System Manual for the TPL System Library", Report II of the Series: Transportable Programming Language (TPL) Systems, Computer Science and Engineering Department, Auburn University, Auburn, AL 36849 (1986).

P.A.D. de Maine, S. Leong, O. Jiang and S. Jodis "Transportable Programming Language Systems for Distributed Environments", Special Technical Report BMDTPL.S04, Auburn University, Auburn, AL 36849 (1985).

P.A.D. de Maine and S. Leong, "A Transportable Programming Language (TPL) System I. Overview", Advances in Information System Science, Vol. 14, No. 3, 161-182 (1985).

P.A.D. de Maine and S. Leong, "Transportation of Programs", Simulation, Oct. 1985, 190-191.

9. SCIENTIFIC PROFESSIONAL SOCIETIES OF WHICH A MEMBER

   IEEE
   ACM

10. HONORS AND AWARDS

    None

11. SUBJECTS OR COURSES TAUGHT THIS YEAR BY TERMS. (Give hours per week of lecture recitation, and laboratory and number of sections if more than one.. Designate day, evening, extension, or graduate.

    Spring Semester 1988-1989

    EEN 324 Systems Programming, 3 credits, lecture, day class, undergraduate.
    EEN 594 Translator Design, 3 credits, lecture, day class, undergraduate and graduate

    Summer Session 1989-1990

    Fall Semester 1989-1990

    EEN 324 Systems Programming, 3 credits, lecture, day class, undergraduate.
    EEN 521 Operating Systems, 3 credits, lecture, day class, undergraduate

12. OTHER ASSIGNED DUTIES PERFORMED DURING THE ACADEMIC YEAR, WITH AVERAGE HOURS PER WEEK. INDICATE WHICH CARRY EXTRA COPENSATION.

    None

13. LIST ANY SPECIFIC PROGRAMS IN WHICH FACULTY MEMBER HAS PARTICIPATED TO IMPROVE TEACHING AND PROFESSIONAL COMPETENCE.

    None.

14. SPECIAL DUTIES OF CO CP FACULTY (coordinators)

    Not applicable

University of Miami
Electrical and Computer Engineering

XV.D. FACULTY CURRICULUM VITAE

1. NAME AND DATE OF BIRTH

    Christos Douligeris
    January 19, 1962

2. ACADEMIC RANK (state whether full-time or part-time, and if part-time indicate non-
    academic activity and percent of time devoted to it).

    Assistant Professor
    Full time

3. DEGREES WITH FIELDS, INSTITUTIONS AND DATES

    Diploma in E.E.   National Technical University of Athens, July 1984
    M.S.E.E.   Columbia University, May 1985
    M. Phil. E.E.   Columbia University, Oct. 1987
    Ph.D.   Columbia University, June 1989

4. NUMBER OF YEARS SERVICE ON THIS FACULTY INCLUDING DATE OF ORIGINAL APPOINT-
    MENT AND DATES OF ADVANCEMENT IN RANK.

    1 year
    August 1989- present, Assistant Professor

5. OTHER RELATED EXPERIENCE - TEACHING, INDUSTRIAL, ETC. (responsibility, location,
    dates)

    Teaching
    Teaching Assistant, Columbia University, 1985-1986

    Research
    Research Assistant, Columbia University, 1984-1989.

    Industrial
    IKO KABEL (Sweden) Assistant to Chief Engineer, 1982.

6. CONSULTING, PATENTS, ETC.

    Compunetics, Inc.

7. STATE IN WHICH REGISTERED

Registered Professional Engineer in Greece

8. PRINCIPAL PUBLICATIONS OF LAST FIVE YEARS (Give titles and references)

R. Mazumar, L.G. Mason and C. Douligeris, "Fairness in Network Optimal Flow Control: Optimality of Product Forms", accepted for publication. IEEE Transactions on Communications, also invited fot ITS '90, Brazil, September 1990.

C. Douligeris, "Pareto Flow Control in Markovian Queueing Networks", IFORS '90, Athens, Greece, June 1990.

C. Douligeris and R. Mazumar, "On a Multiclass System Optimum Flow Control Algorithm", Annual Pittsburgh Conference on Modeling and Simulation, May 3-4, 1990.

C. Douligeris, "Optimal Flow Control and Fairness Issues in Communication Networks, A Game Theoretic Approach", Ph.D. Thesis, Columbia University, New York, June 1989.

C. Douligeris and R. Mazumdar, "Multilevel Flow Control of Queues", Proc. of the John Hopkins Conference on Information Sciences, Baltimore, MD, March 1989.

C. Douligeris and R. Mazumdar, "More on Pareto Optimal Flow Control", Proc. of the 26th Allerton Conference on Communications, Control and Computing, University of Illinois, Urbana, 1988.

C. Douligeris and R. Mazumdar, "User Optimal Flow Control in an Integrated Environment", Proc. of the Indo-US Workshop, Bangalore, India, January 9-12, 1988.

C. Douligeris and R. Mazumdar, "A Game Theoretic Approach to Flow Control in an Integrated Environment with Two Classes of Users", Proc. of the Computer Networking Symposium, pp. 214-221, Washington DC area, April 1988.

C. Douligeris and R. Mazumdar, "On Pareto Optimal Flow Control in an Integrated Environment", Proc. of the 25th Allerton Conference on Communications, Control and Computing, University of Illinois, Urbana, 1987.

C. Douligeris and R. Mazumdar, "A Game Theoretic Approach to Flow Control in an Integrated Environment", CTR Technical Report, CUCTR-TR-50, Columbia University, 1987.

L-N Wong, C. Douligeris and N.F. Maxemchuck, "ALOHA for Local Area Networks", Proc. of INFOCOM 1987, San Francisco, CA, pp. 312-319.

9. SCIENTIFIC AND PROFESSIONAL SOCIETIES OF WHICH A MEMBER

    IEEE
    ORSA
    Technical Chamber of Greece

10. HONORS AND AWARDS

A Model for Reducing Service Restoration Time Through the "Optimum Development of Service Restoration Units" (funded $109,313 with Dr. K.G. Zografos).
"Multiobjective Flow Control in Computer Networks", Florida High Technology and Industry Council (funded, $20,000).
"Resource Allocation in an Integrated Telecommunications Network Environment, University of Miami General Research Support Awards (for equipment)(funded, $2,863).
"Multiclass Optimal Flow Control in Integrated Telecommunication Networks", U. of Miami, Summer Awards in Natural Sciences and Engineering Program (funded, $6,000)
"Software Applications in Artificial Intelligence, Expert Systems, Software Translation and Telecommunication Networks", College of Engineering (with M. Kabakcioglu, S. Leong and F. Wu)(funded $15,790).
"Reliability in Engineering", U. of Miami Institute for the study of Quality (with K. Zografos)(funded $1,000).
"Fairness in Flow-Controlled Telecommunication Networks", NSF Initiation Awards and College of Engineering.
"An Intelligent Computing Environment", College of Engineering (with M. Kabakcioglu, S. Leong and F. Wu)(funded $5,447).
"State of the Art CIM Laboratory", College of Engineering (with several faculty from College of Engineering).
"Philosophical, Behavioral, Managerial and Engineering Aspects of Quality", NSF Behavioral and Decision Sciences Directorate (with K. Zografos, H.S. Gitlow, L. Romero).

University Faculty Grant from Eastern Communications Forum, 1990.
University Faculty Grant from National Communications Forum, 1989.
Research Assistantship at CTR-Columbia University (1984-1989).
Armstrong Foundation Memorial Prize, Columbia University.
Greek Government scholarship for achievement in University entrance examinations (Fall 1979).
Workers Union: Scholarship for excellence in all years of studies
Deans List (1980-1984).

11. SUBJECTS OR COURSES TAUGHT THIS YEAR BY TERMS (Give hours per week of lecture, recitation, and laboratory and number of sections if more than one. Designate day, evening, or graduate)

Fall Semester 1989-1990

EEN 404: Communication Systems, 3 credits, lecture, 3 hours, day class, project, undergraduate.

Spring Semester 1989-1990

EEN 534: Telecommunication Networks, 3 credits, lecture, 3 hours, day class, project, undergraduate and graduate.

12. OTHER ASSIGNED DUTIES PERFORMED DURING THE ACADEMIC YEAR, WITH AVERAGE HOURS PER WEEK. INDICATE WHICH CARRY EXTRA COMPENSATION.

Computer Networking Committee (2 hrs/week)

13. SPECIFIC PROGRAMS IN WHICH FACULTY MEMBER HAS PARTICIPATED TO IMPROVE TEACHING AND PROFESSIONAL COMPETENCE.

National Communications Forum 1989, Chicago, IL.
ORSA SIG Conference on Telecommunications, Boca Raton, March 1990
International Conference on Communications 1990, Atlanta GA.

14. SPECIAL DUTIES OF CO-OP FACULTY (coordinators)

Not applicable