Computer Information Systems
Program Review

Computer Information Systems

Academic Program Review

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Section 1

Overview

Mission
The mission of Ferris State University has, since its inception, emphasized occupational, technical, professional, and other career-oriented education, dedicated to pioneering exploration and service to the people of the State of Michigan.

> *"Ferris State University will be a national leader in providing opportunities for innovative teaching and learning in career-oriented, technological, and professional education."*

The Computer Information Systems program has certainly met the spirit and goals of the original mission of Ferris State University —concentrating on the career needs of students and their eventual employers, and providing educational opportunities for all citizens. The CIS program also achieves the Ferris goal of national leadership.

History
The initiation of the Computer Information Systems program in the fall of 1964 was certainly a pioneering exploration into technical instruction. General use of computers was limited exclusively to large corporations; the mini-computer had just been developed; and microcomputers did not exist. The CIS program literally coincided with the birth of an industry – a new age of technology and information that by all indications is still developing.

Enrollment
Demand for the CIS program remains high. Despite enrollment declines earlier this decade, enrollment is growing. Total enrollment has increased from 243 in 1994 to 306 in 1998. The popularity of the CIS program with off-campus and Internet students is, in part, responsible for this increase.

Faculty
The number of full-time tenure track faculty who are actively teaching in Computer Information Systems program has decreased from 21 in 1994 to 9.5 in 1998. Additional tenure track faculty are employed in the CIS program, but are released from teaching for administrative and special projects assignments. The opposite trend occurs with Overload and Supplemental FTEF. The number of Overload/Supplemental FTEF teaching in the CIS program has increased from 2 in 1994 to 10 in 1998.

Degrees and Articulation
The program has developed from a two-year and four-year CIS degree program to a four-year program offering degrees in CIS, CIS/Accountancy, CIS/Management, and CIS/Marketing. A minor in CIS is also a popular option. In addition, the program maintains articulation with the state's community colleges offering senior level degree completion options. Off-campus courses are taught in Dowagiac, Muskegon, and Traverse City.

Placement
Coast-to-coast recruiting of CIS graduates reflects the program's success. Although the number of graduates has declined from 90 in 1994 to 35 in 1998, the placement rate has increased. In 1994, 83% of graduates were placed in jobs in the Information Technology field. The average starting salary was $27,649. In 1998, 100% of graduates were placed in jobs in the Information Technology field. The average starting salary in 1998 was $38,071. Starting salaries in 1998 ranged from $28-29,000 to $52-55,000.

Impact
Continual program evaluation and development based on the knowledge of faculty with extensive industry experience, in conjunction with an advisory committee representing a wide range of industries, makes CIS a highly respected program. But success does not come without a price. Computer technology is a constantly expanding and changing industry that requires continuous evaluation and upgrading to maintain a competitive edge. For Ferris' CIS program, the competitive edge will become increasingly more important as new programs are developed at competing institutions and established competitive programs elsewhere are upgraded. In addition, there will be increasing institutional demands for the equality of computer instruction that the CIS program offers. With planning, institutional commitment, and resources to meeting the challenges of the future, the CIS program will continue to excel in its service to the institution, the state, and the nation.

Section 2

Graduate Follow-up Survey

Section 2 - GRADUATE FOLLOW-UP SURVEY

The CIS Academic Program Review Panel sent the surveys to all graduates of the program. The graduate had the option of either completing the survey online or sending a paper survey back to the CIS program using a postage-paid envelope. Each printed survey had a control number encoded on the first page of the survey. Respondents, who elected to complete the survey online, were asked to input the control number from the printed document. The CIS faculty used this control number to verify that duplicate or fraudulent surveys were not submitted.

The Graduate Follow-up survey was composed of three sections:
1. Section I focused on the Information Technology (IT) Professional;
2. Section II requested the graduates' views on Academic Training; and
3. Section III focused on current and future job entry requirements.

SURVEY SECTION I - The Information Technology Professional
Based on the results of the CIS Program Graduate Follow-up Survey, the composite CIS Alumnus is an individual who graduated in the early 90's and entered the job market at a starting salary of about $25,000. During the intervening years this individual has had an average of 4.5 promotions and has seen their salary increase to an average of $60,000.

The skills our composite individual uses in the workplace and the percentage of time spent in each skill category are shown in the table and chart below.

SKILL	Percentage of time
System Analysis	18
Systems Implementation or modification	12
Word processing / PC data base	12
Systems Design / Development	11
Programming	10
Managing Employees	10
Marketing Presentations	7
Network configuration / modification	6
Other	14

Percentage of Time Spent Per Category

- System Analysis
- Systems Implementation or modification
- Word processing / PC data base
- Systems Design / Development
- Programming
- Managing Employees
- Marketing Presentations
- Network configuration / modification
- Other
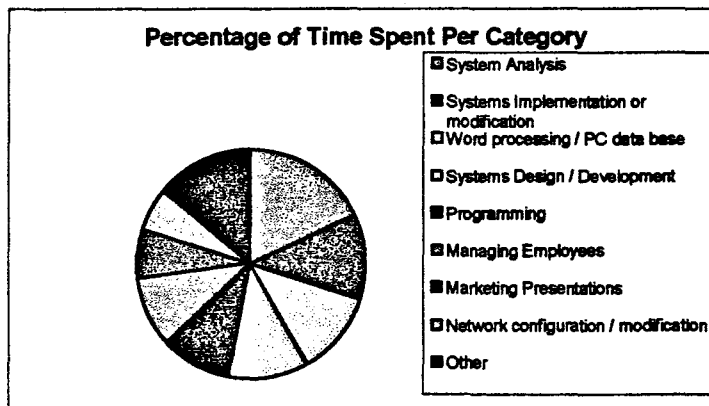
The survey results show the primary areas of job responsibility are in application programming, systems analyst, and project leader categories. A majority of the alumni are in management positions within the IT departments in their organizations.

The types of applications areas for which CIS alumni are responsible were, in rank order:
1. Financial/accounting systems
2. Systems software
3. Manufacturing systems
4. Human resource systems
5. Order distribution systems
6. Network systems
7. Process control systems
8. Marketing/Sales systems
9. Engineering/Research systems.

The hardware and operating systems used by the alumni span the whole range of commercial computer systems. Almost all of the hardware systems used by the survey group include models of IBM mainframes, midrange computers, or IBM-compatible Intel-based PC. The surveys point out the integration of computer systems across multiple platforms. Most of the respondents work on either mainframes (IBM S390 type) or midrange (IBM AS/400) systems that are networked with local area networks of PC's.

The operating system utilized on the mainframes is OS/390 and MVS. In the midrange area the most frequently used operating system is OS/400, followed by UNIX. A few reported using SUN's Solaris system. The primary local area network operating system in use by our respondents is Novell followed closely by Windows NT.

The majority of the PC's used were Intel-based systems running Windows 95; a few were running Windows NT. There was one using SUN's Solaris operating system.

SURVEY SECTION II - Academic Training
The second section of the survey asked the respondents to rate the importance of various job-related areas for entering IT professionals (new graduates). Not surprisingly the results show a high degree of correlation with the skills these respondents use every day in the workplace.

The highest rated skill was the ability to adapt and learn new concepts, followed very closely by professional responsibility and ethics. The next highest grouping was in understanding the functional areas of business, and how to use that understanding in the analysis of the information requirements of the system. Included in the analysis of the information requirements of a system are how to design a more efficient information system, how to develop of the components of the system, how to implement and install new hardware and software.

The major programming languages seen as important were:
1. C++
2. JAVA
3. COBOL
4. Visual Basic
5. RPG

Word processing and PC skill were seen as necessary along with marketing presentation skills and managing employees.
Questions concerning the quality of education received in the CIS program at Ferris and Alumni were asked to respond to questions about how well the CIS curriculum prepared alumni were for the work force. Their responses show a high degree of correlation between their academic preparation and their current responsibilities. The topics that best prepared the alumni for success were:
1. Systems analysis
2. Systems design and development
3. Systems implementation

The programming languages that best prepared the alumni for success were:
COBOL
RPG
C++, Visual Basic and JAVA (in almost equal measure)
The ability to learn new concepts and professional responsibility and ethics both were considered to be highly important.

It is not surprising to see the difference between what the alumni view as necessary for the new graduates versus the education the alumni received. The IT area requires new skills while retaining its historical skill-base requirements.

The ratings of the overall program were very favorable. Most of the respondents felt extremely qualified to enter the world of work. They rated their professors above average in their teaching methods, knowledge, concern for students, and the reputation of the program in the business community.

Ferris State University

Computer Information Systems
Survey of Alumni

As part of the Computer Information Systems (CIS) academic program review process, we are assessing alumni perceptions of the program.

Please assist us by responding to the following questions regarding the CIS program at Ferris State University.

General Directions:

- This survey consists of 5 pages.
- When you submit a page, the next page will automatically load.
- After completing the 5 page survey, you will be asked to provide current information about yourself.
  Thank you for taking the time to help the Computer Information Systems program in the Academic Program Review.

STEP 1 - Please remember to input your control number.

Input Control Number

- **Input the control number from the printed survey form.**
  (If you don't have a control number, just enter a 6 character value.)
- **Click on "Input Control Number" button.**

STEP 2 - Begin Alumni Survey

Go to Ferris State University Home Page

Thank you for participating in our survey of Computer Information Systems Alumni.

If you have any questions, please contact Carole Kosanovich
:
email: kosanovc@ferris.edu
phone: (231) 592-2446

Ferris State University

Computer Information Systems
Survey of Alumni

Control Number: subNull

Page 1 of Alumni Survey
Section I: The IT Professional

1. What year did you graduate?

○   ○   ○   ○   ○   ○   ○   ○   ○   ○
Before   *1990*   *1991*   *1992*   *1993*   *1994*   *1995*   *1996*   *1997*   *1998*
1990

2. What is the primary area(s) of your job responsibility? (Check ALL that apply.)

☐	*A. Applications Programmer/Analyst*	☐	*I. Internet Specialist*
☐	*B. Data Communications/Lan Specialist*	☐	*J. Manager Data Communications / LAN*
☐	*C. Systems Analyst*	☐	*K. Senior Analyst / Project Leader*
☐	*D. Lead Programmer*	☐	*L. Programming Manager*
☐	*E. Systems Manager*	☐	*M. Database Analyst*
☐	*F. Data Base Administrator*	☐	*N. Systems Programmer*
☐	*G. Manager of Systems & Programming*	☐	*O. IS Manager*
☐	*H. Other (please specify)*		

3. What are the primary application area(s) of responsibility? (Check ALL that apply.)

☐	*A. Financial/Accounting Systems*	☐	*F. Manufacturing Systems*
☐	*B. Process Control Systems*	☐	*G. Systems Software*
☐	*C. Marketing/Sales Systems*	☐	*H. Order/Distribution Systems*
☐	*D. Engineering/Research Systems*	☐	*I. Human Resources Systems*
☐	*E. Network Systems Software/Hardware*		

Submit

Ferris State University

Computer Information Systems
Survey of Alumni

Control Number: subNull

Page 2 of Alumni Survey
Section I: The IT Professional (continued)

4. What is the primary hardware environment(s) at your job site?
(Check ALL that apply.)

⊐ **MAINFRAME**

Mainframe Brand _____

Model _____

Operating System _____

⊐ **MICROCOMPUTER**

Micro Brand _____

Model _____

Operating System _____

⊐ **MID-RANGE**

Mid-range Brand _____

Model _____

Operating System _____

⊐ **NETWORK**

Network Brand _____

Model _____

Operating System _____

5. What was your starting salary upon graduation?

| Starting salary | ▼ |

6. Indicate the total number of promotions and job changes you have received since graduation

| 0 | ▼ |

7. What is your current annual salary?

| Current salary | ▼ |

| Submit |

Ferris State University

Computer Information Systems
Survey of Alumni

Control Number: subNull

Page 3 of Alumni Survey
Section I: The IT Professional (continued)

8. **What percentage of time does your job require you to use these skills?**

   Example: One-third of your time should be entered as 33.33

   _____ A. *Word processing / PC database*

   _____ B. *Marketing presentation skills*

   _____ C. *JAVA language*

   _____ D. *Visual Basic language*

   _____ E. *C or C++ language*

   _____ F. *COBOL language*

   _____ G. *RPG language*

   _____ H. *Network configuration and modification*

   _____ I. *Systems Analysis*

   _____ J. *Systems design - development*

   _____ K. *Systems implementation - modification*

   _____ L. *Managing employees*

   _____ M. *Selling services*

   _____ N. *Other   (Please specify)* _____

   [Submit]

Control Number: subNull

Page 4 of Alumni Survey
Section II: Academic Training

Legend
0 Not important
1 Nice to know but not required
2 Required to know but not essential
3 Important and essential
4 Very important
5 Must have

9. How would you rate the degree of importance for the entering CIS professional in each of the following areas?

A. Word Processing/ PC data base   0 - Not important ▼

B. Marketing Presentation skills   0 - Not important ▼

C. Java language   0 - Not important ▼

D. Visual Basic   0 - Not important ▼

E. C or C++   0 - Not important ▼

F. Cobol   0 - Not important ▼

G. RPG   0 - Not important ▼

H. Network configuration/modification   0 - Not important ▼

I. Systems Analysis   0 - Not important ▼

J. Systems design/development   0 - Not important ▼

K. Systems implementation / modification   0 - Not important ▼

L. Managing employees   0 - Not important ▼

M. Selling services   0 - Not important ▼

N. Professional responsibility and ethics   0 - Not important ▼

O. Ability to adapt & learn new concepts   0 - Not important ▼

P. Data base design   0 - Not important ▼

Q. Understand the functional areas of business   0 - Not important ▼

R. CASE tools   0 - Not important ▼

S. Object oriented design methods   0 - Not important ▼

T. Web page design/HTML   0 - Not important ▼

U. Other. (Please specify)   0 - Not important ▼

Submit

Ferris State University

Computer Information Systems
Survey of Alumni

Control Number: subNull

Page 5 of Alumni Survey
Section II: Academic Training *and* Section III: The Future

Question 10 - Legend
0 Not applicable
1 Poor
2 Fair
3 Good
4 Very good
5 Excellent

10. How would you rate the quality of instruction you received for Ferris' Computer Information Systems faculty?

A. *PC applications*   `0 - Not Applicable ▼`

B. *Marketing Presentation skills*   `0 - Not Applicable ▼`

C. *Java language*   `0 - Not Applicable ▼`

D. *Visual Basic*   `0 - Not Applicable ▼`

E. *C or C++*   `0 - Not Applicable ▼`

F. *Cobol*   `0 - Not Applicable ▼`

G. *RPG*   `0 - Not Applicable ▼`

H. *Network configuration/modification*   `0 - Not Applicable ▼`

I. *Systems Analysis*   `0 - Not Applicable ▼`

J. *Systems design/development*   `0 - Not Applicable ▼`

K. *Systems implementation / modification*   `0 - Not Applicable ▼`

L. *Managing employees*   `0 - Not Applicable ▼`

M. *Selling services*   `0 - Not Applicable ▼`

N. *Professional responsibility and ethics*   `0 - Not Applicable ▼`

O. *Ability to adapt & learn new concepts*   `0 - Not Applicable ▼`

P. Data base design	0 - Not Applicable ▼
Q. Understand the functional areas of business	0 - Not Applicable ▼
R. CASE tools	0 - Not Applicable ▼
S. Object oriented design methods	0 - Not Applicable ▼
T. Web page design/HTML	0 - Not Applicable ▼
U. CIS professors' teaching methods	0 - Not Applicable ▼
V. CIS professors' knowledge	0 - Not Applicable ▼
W. CIS professors' concern for students	0 - Not Applicable ▼
X. CIS program's ability to prepare you for work	0 - Not Applicable ▼
Y. CIS program overall	0 - Not Applicable ▼
Z. Rputation of the CIS program with business	0 - Not Applicable ▼
AA. Other	0 - Not Applicable ▼

Section III: The Future

11. What could be done to make this program more effective in preparing students for future trends in the CIS profession?

12. Please refer to the topics listed in Question 10 and below.
Describe the most important topics for future CIS graduates. Also. indicate omissions and/or additions to the list of topics.

Ferris State University

Computer Information Systems
Survey of Alumni

Thank you for participating in our survey of Computer Information Systems Alumni.

Below is a brief questionnarie concerning your current address.
This survey is not linked in any way to the survey you have just completed.
All the following information is for the internal use of the Computer Information Systems department.

Completion of this questionnaire is optional.

If you have any questions, please contact Carole Kosanovich :

email: kosanovc@ferris.edu
phone: (231) 592-2446
General Directions:
Please fill in the blanks. (Maximum number of characters are in parentheses.)
Then press the "Submit Alumni Information" button.

First Name (50) _____

Last Name (50) _____

Email (50) _____

Street (50) _____

City (50) _____

State (2) _____

Zip (10) _____

Place of (50) _____
Employment

Title or (50) _____
Position

| Submit Alumni Information |

Go to Ferris State University Home Page

Thank you for participating in our survey of Computer Information Systems Alumni.

If you have any questions, please contact Carole Kosanovich

email: kosanovc@ferris.edu
phone: (231) 592-2446

Ferris State University
Computer Information Systems Program
Survey of Alumni

As part of the **Computer Information Systems** (CIS) academic program review process, we are assessing alumni perceptions of the program.
Please assist us by responding to the following questions regarding the CIS program at Ferris State University.

General Directions:
Online: You may complete this questionnaire online at: **http://216.25.61.5/fsuapr/alumni.asp**.
Please input your **control number** in the online form. The online form will be available from August 15, 1999 until September 8, 1999.

Paper Document: You may complete the paper form. Please check the appropriate boxes.
If you elect to complete the paper form, please return the questionnaire in the enclosed envelope by September 4, 1999 to:
Computer Information Systems Program
119 South Street
Ferris State University
Big Rapids, MI 49307
If you have any questions, please contact Carole Kosanovich: kosanovc@ferris.edu or (231) 592-2446.

Section I: The IT Professional
1. **What year did you graduate?**

   O 1990 O 1991 O 1992 O 1993 O 1994 O 1995 O 1996 O 1997 O 1998

2. **What is the primary area(s) of your job responsibility? (Check ALL that apply.)**

   ☐ Applications Programmer/Analyst   ☐ Internet Specialist

   ☐ Data Communications/LAN Specialist   ☐ Manager Data Communications/LAN

   ☐ Systems Analyst   ☐ Senior Analyst/Project Leader

   ☐ Lead Programmer   ☐ Programming Manager

   ☐ Systems Manager   ☐ Data Base Analyst

   ☐ Data Base Administrator   ☐ Systems Programmer

   ☐ Manager of Systems & Programming   ☐ DP or CIS manager

   ☐ Other (please specify) _____

3. **What are the primary application area(s) of responsibility? (Check ALL that apply.)**

   ☐ Financial/Accounting Systems   ☐ Manufacturing Systems

   ☐ Process Control Systems   ☐ Systems Software

   ☐ Marketing/Sales Systems   ☐ Order/Distribution Systems

   ☐ Engineering/Research Systems   ☐ Human Resources Systems

   ☐ Network Systems Software/Hardware

4. **What is the primary hardware environment(s) at your job site? (Check ALL that apply.)**

Mainframe ☐
Mainframe Brand _____
Model _____
Operating system _____

Mid-Range ☐
Mid-Range Brand _____
Model _____
Operating system _____

Microcomputer ☐
Microcomputer Brand _____
Model _____
Operating system _____

Network ☐
Network Brand _____
Version _____
Operating system _____

5. **What was your starting salary upon graduation?**

○ Less than 20,000   ○ 20,000 to 25,000

○ 25,000 to 30,000   ○ 30,000 to 35,000

○ 35,000 to 40,000   ○ 40,000 to 45,000

○ 45,000 to 50,000   ○ Over 50,000

6. **Indicate the total number of promotions and job changes you have received since graduation**

○ None   ○ One

○ Two   ○ Three

○ Four   ○ Five

○ Six or more.

7. **What is your current annual salary?**

○ Less than 30,000   ○ 30,000 to 40,000

○ 40,000 to 50,000   ○ 50,000 to 60,000

○ 60,000 to 70,000   ○ 70,000 to 80,000

○ 80,000 to 90,000   ○ Over 90,000

8. **What percentage of time does your job require you to use these skills?**

_____A. Word Processing/ PC data base   _____ H. Network configuration/modification

_____B. Marketing Presentation skills   _____ I. Systems analysis

_____C. Java language   _____ J. Systems design/development

_____D. Visual Basic   _____ K. Systems implementation/modification

_____E. C or C++   _____ L. Managing employees

_____F. COBOL   _____M. Selling services

_____G. RPG   _____N. Other.

_____

Section II: Academic Training

9. **Please rate the importance for entering CIS professionals in each of the following areas. Please circle your responses.**

Legend

0 - Not important	3 - Important and essential
1 - Nice to know but not required	4 - Very important
2 - Required to know but not essential	5 - Must have

0 1 2 3 4 5 A. Word Processing/ PC data base	0 1 2 3 4 5 L. Managing Employees
0 1 2 3 4 5 B. Marketing Presentation skills	0 1 2 3 4 5 M. Selling services
0 1 2 3 4 5 C. Java language	0 1 2 3 4 5 N. Professional responsibility and ethics
0 1 2 3 4 5 D. Visual Basic	0 1 2 3 4 5 O. Ability to adapt & learn new concepts
0 1 2 3 4 5 E. C or C++	0 1 2 3 4 5 P. Data base design
0 1 2 3 4 5 F. Cobol	0 1 2 3 4 5 Q. Understand functional areas of business
0 1 2 3 4 5 G. RPG	0 1 2 3 4 5 R. CASE tools
0 1 2 3 4 5 H. Network configuration/modification	0 1 2 3 4 5 S. Object oriented design methods
0 1 2 3 4 5 I. Systems analysis	0 1 2 3 4 5 T. Web page design/HTML
0 1 2 3 4 5 J. Systems design and development	0 1 2 3 4 5 U. Other
0 1 2 3 4 5 K. Systems implementation	

10. Please rate the quality of instruction you received at Ferris from the CIS faculty and how that instruction prepared you for entry into the CIS profession?
Please circle your responses.

Legend
0 - Not important
1 - Nice to know but not required
2 - Required to know but not essential

3 - Important and essential
4 - Very important
5 - Must have

0 1 2 3 4 5 A. Word Processing/ PC data base	0 1 2 3 4 5 O. Ability to adapt & learn new concepts
0 1 2 3 4 5 B. Marketing Presentation skills	0 1 2 3 4 5 P. Data base design
0 1 2 3 4 5 C. Java language	0 1 2 3 4 5 Q. Understanding of functional areas of business
0 1 2 3 4 5 D. Visual Basic	0 1 2 3 4 5 R. CASE tools
0 1 2 3 4 5 E. C or C++	0 1 2 3 4 5 S. Object oriented design methods
0 1 2 3 4 5 F. Cobol	0 1 2 3 4 5 T. Web page design/HTML
0 1 2 3 4 5 G. RPG	0 1 2 3 4 5 U. CIS professors' teaching methods
0 1 2 3 4 5 H. Network configuration/modification	0 1 2 3 4 5 V. CIS professors' knowledge
0 1 2 3 4 5 I. Systems analysis	0 1 2 3 4 5 W. CIS professors' concern for students
0 1 2 3 4 5 J. Systems design and development	0 1 2 3 4 5 X. CIS program - prepare you for work
0 1 2 3 4 5 K. Systems implementation	0 1 2 3 4 5 Y. CIS program overall
0 1 2 3 4 5 L. Managing employees	0 1 2 3 4 5 Z. Reputation of program within business
0 1 2 3 4 5 M. Selling services	0 1 2 3 4 5 AA. Other
0 1 2 3 4 5 N. Professional responsibility/ethics	

Section III: The Future

11.   What could be done to make this program more effective in preparing students for future trends in the CIS profession?

12.   Please refer to the topics listed in Question 10.
       Describe the most important topics for future CIS graduates.
       Also, indicate omissions and/or additions to the list of topics.

General Directions:
Online: You may complete this questionnaire online at: **http://216.25.61.5/fsuapr/alumni.asp**.
Please input your **control number** in the online form.

Paper Document: You may complete the paper form. Please check the appropriate boxes.
If you elect to complete the paper form, please return the questionnaire in the enclosed envelope to:
Computer Information Systems Program
119 South Street
Ferris State University
Big Rapids, MI 49307
If you have any questions, please contact **Carole Kosanovich: kosanovc@ferris.edu or (231) 592-2446.**

Question 11 Comments
What could be done to make this program more effective in preparing students for future trends in the CIS profession?

101 The CIS program should include more eCommerce applications using tools such as Cold Fusion.

1042 Offer as many languages as possible! I still do a lot of mainframe development and finding graduates with mainframe knowledge is very difficult.

1044 When i graduated there was only CIS, system implementation and programming. There needs to be an offering for programming: Client/server, mainframe, AS/400, one for networking design teaching cabling connectivity. Network o5, and workstation o5, as well as an offering for UNIX. I'm a network administrator at a large firm, with a "wan" going around the country and into several other countries, with several thousand users. College graduates cannot walk into our company and help us because they don't have experience. Our team had on the job training and countless hours of experience to get to where we are, but no help from college. College graduates can step into a job as a programmer, but i haven't seen any qualified, as a network administrator. I believe that is something that can change. As a side note, terrence campbell is on our team and received good training at Ferris.

1060 Give exposure to integrated software packages like SAP, Baan, Etc. Drop RPG. More case study classes. Inter-personal communication classes

1078 Provide course electives that give students a foundation in entrepreneurship and/or running a small business. Provide guidance on managing careers and establishing a life-long goal of learning new technical skills.

1155 With surveys like this one, interview companies to understand their needs. Keep abreast of current technologies and offer classes (or independent study). Weed out students. Make the program tough / produce quality students.

116 SAP/EAP appears to be the next frontier that needs to be addressed. Experience in this area is in high demand. Experience in E Business/Solutions will be vital when entering the job market.

1168 Keep up with newest technology

1202 Offer classes on new technology when it becomes available instead of waiting a year or two. Also, provide instructors that have working experience on that new technology, not instructors that learned it a week before the class started.

1308 My career has very little to do with CIS, in fact it has nothing to do directly with CIS. However, the CIS/Business College did prepare me for various encounters I have had in the business world. Many a time I find myself in a situation that brings me back to school, saying.."Gee, I can't believe what I studied is actually happening"!
College alone helped me get where I am today, not the CIS college, but all the other human nature aspects of live. i.e.. Survival, fending for yourself.

1322 Focus on technical detail and focus on "what if" situations. Increase available classes and stress detail in the networking field. The few classes we had showed good overall pictures, but to be a step above you need to understand the details.

1331 Emphasizing systems analysis and design and have more projects go through the full dev. Life cycle. Don't forget Cobol- There's a lot of Cobol development and it's difficult to find students prepared and wanting to do this. There is going to be a surge in Internet development

134 Since I graduated in 1970, one would have to agree that things have changed a little. But as I also teach at a local community college as a part-time faculty member, I know that the full-time staff must keep up with current trends in technology. The best suggestion I can provide for preparing students is to keep your faculty and equipment up-to-date. Have faculty attend seminars and exhibits (COMDEX) to find out what is available now and what is coming. Then the college must also put the dollars into the program for hardware, software and training instructors.

1355 Incorporate into the curriculum the dynamics surrounding "CHANGE" and integration (outsourcing, ERP, CRM, business re-engineering, e-commerce, etc.) that are enabled by information systems and technologies. This must address from both an IS and a business perspective.
Continue to drive the focus on understanding and determining business goals and objectives (and related IS requirements) and how the IS function can support the realization of those goals through the successful delivery of IS solutions.

1443 Make sure you know what businesses are doing. Have Instructors spend time with IT professional to learn what the Issues are and where training needs to take place. Internships should be required! Bring in IT professional to do lectures, give demos of products.

1472 Internet training, PC-everything, application areas: accounts payable/receivable, order processing, warehousing, accounting, human resource and payroll, marketing and education/trucking

1534 I graduated in 1985 so the program was much different then. IBM mainframes, OS JCL and COBOL were necessary to get a job. FSU did an excellent job with that technical training. I wish I had gotten a much better understanding of

functional business areas though. IS professionals need to be business analysts, not just technical analysts. It's very important. The courses were there and I obviously took them to graduate but I never received the guidance to understand how important accounting, economics, marketing, etc. would be to an IS professional.

1540 Program needs to keep current with changes in technology. However, needs to keep focusing on base skills such as Cobol programming, structured problem solving, etc. You also need to keep the focus on Systems Analysis and Project Management. Encourage students to focus on the "Big" picture and enable them to understand the importance of the "business" they are working in and/or for. In my opinion, you need BOTH sides of the equation to be successful. I also feel you need to do a better job dealing with the interpersonal skills, which are needed from a CIS discipline: communication and listening skills, presentation skills, teamwork, and leadership.

1585 The program must keep up with emerging technologies, such as, Internet, eCommerce, new types of databases, global considerations, privacy and security, etc.

1625 Eliminate mainframe work, introduce United Modeling Language; incorporate a methodology in work, have Data Administration course; Database Administration course, Project Planning and Project Management course; Metrics

1644 Teach Documentation, Writing test plans and Development Methodologies.

166 More PC work. Web design as well.

183 Specific technologies are not as important as the ability to quickly grasp new technology and understand the implications for your business. That said, some classes should focus on major and emerging technologies and "practice" learning them by having students present and explain both the technology and possible applications and implications. Need more exposure to types of "vertical markets" and types of aps within them, e.g., banking, mfg., healthcare, govt. At the MS level, more case studies in dealing w/ non-tech factors and other non-MIS high-level mgmt staff, cost-justification, project presentation and prioritization etc. More "management" type issues.

195 I have been out to long to answer, I assume the CIS program has changed a lot in 10 years. Schools must adapt to the rapid change in the market for the programming languages. Maybe focus on the non-tech stuff early; design, implementation, people skills, and hit the programming late so graduates are up to date.

435 Prepare students to be able to adapt to a changing environment. There are many outdated gurus in the workforce. People that are able to learn new skills and add to their skill sets will be the most successful IT professionals.

49 Offer more classes dealing with networks. Also offer a class with Oracle.

52 Keep current to what the industry is doing and teach what is needed. I heard a Unisys contractor Manager say to our director that he has to offer a $10,000 bonus to a new computer science grad and $50,000 annual salary, just to hire him/her and then send them off to school to learn what we are doing in the industry today

691 I have been on the advisory board for CIS. I would like to see the following:
- Less emphasis on the technology of programming.
- More emphasis on presentation skills and writing technical terms in non-technical ways.
- Learn a foreign language and have to write a presentation, report, and several screens/reports in that foreign language.
- International business classes.
- Implementing packages/package configuration.

837 Don't know, I must first understand the changes that FSU has brought forward after my graduation. Thus, to tell what is not known is hard.

9991 Keep in mind I graduated in 1985. As the curriculum was designed then, I was able to step out and become immediately productive as compared to other hirees. I think you should look at the typical IT organization and ask yourselves how to train people for the jobs in that organization. A programmer/Analyst is the job I was taught, but there were others to be had. Project Management is key! Some people are technicians, other exploit technology. I wish I had been what to do with all the money I made too. Something that told me to put 15% of my pay away from the day I started. I ended up doing what I did in college with the money; I bought beer!

9992 I felt I received a very good education from Ferris in the area of Programming Languages and Systems Analysis and Design. The program may have changed since I graduated in 1981. But, I feel the students could be better prepared for the business world. Dealing with customers / users is absolutely essential. Project Management is also another area that would help in preparing the students, not that everyone wants or will become a project manager but it is important to understand the processes used by project managers. Development processes and procedures are areas that could be expanded in the program. Most companies have these processes and employees must work within those processes. Business / Industry knowledge is also very important for students. The ability to work with teams is also important for the students to understand.

I think the survey is an excellent idea! My education at Ferris was a great foundation for my career. I imagine that you've even improved the program since I've left. Tracy Martin

608   Every CIS student must put together a small network, even if only 2 or 3 PCs. I thank FSU teaches all the pieces, but I'm not sure the students get the total concept of a JCL Job Stream from Job Car, PROC to PROCLIB to Parm or control card in control or proclib usage. Every student should design a web page and post to an online Web site.

1047   Continue to monitor trends in CIS and continue to offer those courses. However, continue to offer older languages (like COBOL) because companies still use it.

1601   Hard to answer as I'm not up to date on the current program offered. Most important skills are sound analysis and design. Specific languages are not as important as graduates will be trained as needed by their employer. Good, broad base exposed to both PC based and mainframe languages most important.

Question 12 Comments
Please refer to the topics listed int Question 10. Describe the most important topics for future CIS graduates. Also, indicate omissions and/or additions to the list of topics.

101   Systems analysis, programming, database, Internet Applications.

1042   System design and implementation languages (visual basic, c, Cobol).

1044   Question 10 was worded very poorly. I can not rate the reputation or teachers knowledge on "must have" required but essential. The computer field is so diverse and the question did not take that into account. As a network administrator, I don't use any of the things I learned in class because it was all programming. I answered questions according to what I do now, not what I would need if I stayed with the path I chose in college.

1060   Important: Web Page Design, Network Config., Systems analysis, Understanding Functional areas of business, Cobol, Ability to adapt and learn, Project mgmt. OMIT: RPG

1078   Anything Web related (internet, intranet, extranet).

1103   The single-most important item listed is 'The ability to adapt and change'. Anyone can learn a programming language efficiently enough to code, but to be able to perform in rapidly changing environments or catching on quickly in a new environment is what really gets you noticed. This, of course, assumes that you have a sound skill set and logical methodology, which Ferris was very good at providing.

1155   Presentation/communication skills are a MUST. Also, in-depth relational database knowledge is very important. Whatever language (technology) a developer is working in, there is a DBMS running behind the scenes. The repository behind virtually every system is some sort of relational database. Understanding SQL, data modeling, indexes...etc, opens the door for many opportunities. These are essential skills that apply to just about every technology. (DBA's, client server developers, analysts, system designers, conversion specialists)

116   Students need to be prepared for the rate of change experienced in the "computer" industry. Its not an environment where their skills learned in college will carry for a lifetime. They need to anticipate a complete re-skilling every 3 to 5 years, more often in some cases. The diversity of the industry allows for a wide range of opportunity, but it also requires a commitment to keeping current with technology. In short, CIS grads must be committed to being life long learners.

117   One area not referenced in your survey is the topic of certifications. The industry
        is offering them, and in many cases, customers and employers are looking for
        them. Its a sign that the industry is growing up and people with "official"
        credentials are regarded as having demonstrated ...

1168   XML, HTML, JAVA, UNIX, network configuration and modification, and database
        design and development.

1202   I think that any 2 or 3 programming languages will give a CIS student some
        exposure on how to use logic, and where it comes into play in a real world
        environment. I also believe that a thorough networking/LAN class is important to
        allow a CIS student to understand connectivity and possibly become more
        interested in it. "Real world" scenarios in the classroom always seemed to help
        me learn better. I would omit RPG from the program, whether the staff believes it
        is still highly used or not, it's not. I would also omit the sales aspect from the CIS
        schedule, only a marketing or business major would benefit from this. Most
        companies will train you for presentation and/or sales skills. I think "some" of the
        teaching methods need to be improved and updated. There are many instructors
        that have the knowledge, but they don't know how to teach it. I also think that
        there are some instructors who show no concern for their students. This can
        make a big difference ...

1322   Systems/Network design, implementation and modification are important. More
        so in the modification area because most businesses systems are pre-existing
        and cannot start from scratch.

1331   Word Processing/ PC data base, Marketing Presentation Skills, Java language,
        visual basic, C or C++, Cobol, Systems analysis, Systems design and
        development, Professional responsibility/ ethics, Data base design, Web page
        design methods

1333   Web page design/HTML Telecom

134   Omit: Case tools-too specialized. Most important: Presentation skills, Network
        configuration & DESIGN, operating systems, systems analysis, professional
        ethics, understanding business, the web and all its associated parts. Tough call
        on COBOL & RPG-we are an RPG shop and have had trouble finding qualified
        candidates. Think there will always be a need. Seems like no one wants to
        program (in any language) and those that do don't have the logic skills necessary
        to break a program down into logical parts (need algebra skills?).

1443   Flexibility too learning new tools are 'hey'. Ability to manage to work with
        consultants. Need to be able to communicate both verbally and in writing.
        Always willing to learn something new.

1472 For the future all topics are important, I numbered item in 11, in order of importance.

1534 WEB and OO programming are important. Systems analysis is critical; doesn't matter what the deployment method is, you still need to be able to analyze requirements. Functional business area understanding is critical.

1540 I would suggest that Ferris take a real hard look at project management, in addition to a strong Systems Analysis background. Recently, I am feeling that college grads ALL want jobs focusing on new technology (you know the sexy stuff). Well, fact is, most of those jobs are going to existing / skilled staff who have already paid their dues for dedicated service to our organization. What we find is that recent college grads are disappointed when they find themselves working on batch/legacy systems written in COBOL. They are unhappy that they are not able to get into the "cool" jobs right away. You should make sure that not all companies have a total network solution.

1625 Ability to learn and adapt to new concepts (Methodologies), CASE tools, object oriented design Methods, understand functional areas of business, Project Management, Systems Design and Development, Systems Analysis, Systems Implementation

1639 I would like to see more CICS classes. Also DB2 is very helpful. Learning powerbuilder, C++, ORACLE is also good. COBOL is still used a lot. Any 4 GL language that is learned is ideal.

183   In depth understanding of all underlying technologies...OS, mainframes, midranges, desktops, network, communications media, equipment, and protocols, programming languages and methods. Some type of practicum, co-op, or other real world experience should be required. Problem-solving where a lot of independent reading and research is required—digging through manuals, searching knowledge bases, etc. Lectures by actual workers in the field. Rigorous logic and programming skills. Language doesn't matter as much as the concepts and techniques of design, testing, debugging, and documentation, and "real-world" aps. I am often disappointed at the "trivial" nature of programming assignments I see students (U of M/Flint, not FSC!) given...games, etc!! Lots of "business writing" and oral presentations to improve communication skills. Enough general business courses to get a good grasp of accounting and financial systems, general areas of a ...

195   CIS graduates seem to know computers better than people. New programmers need to be able to take discussions with customers and give them what they want, not something close. Too many want to hole up in their cube and code. They need to be able to deal with people and explain why things were done the way they were.

204   Integration of automated or electronic solutions into a business including managing and utilizing knowledge to increase performance or productivity. Marketing and sales to the extent that human resources are difficult to change and need an applied approach to managed change in an organization. Keeping up with the market and technology.

424   Some of the new languages & techniques need to be incorporated into the curriculum on a regular basis. This field is constantly changing & the instructor's need to be up on the current techniques & technologies. Continuing education for the instructors might also help funnel this rapidly changing environment on to future CIS grads.

435   It is extremely important for students to know the functional areas of business, systems design, development and implementations. From that point, learning a new language is very simple. Students should also be aware that presentation and professional skills are very important. A person needs to be able to stand out in the crowd, but in a good sense. If you need any more input, let me know. Ray Villalobos, Technical Resource Manager, Compuware Corporation, raymond.villalobos@compuware.com.

49   The biggest attribute is the ability to adapt to the environment you are working in.

52   List looks good.

572   SAP, PEOPLESOFT, ORACLE

605   Your survey was obviously directed to those graduates who are working in the CIS field. You neglected to include any check boxes for those of us who have chosen other career paths. I realize your primary interest is evaluating the present program to be able to meet the needs of the future. Yes, my bachelor degree is in CIS, however, I have never worked in the CIS field and did not feel adequately trained to enter the field upon graduation in 1986. Looking back upon my training at Ferris, I feel that there needs to be more emphasis upon the new technology. For example, I was at Ferris during the beginning of PC revolution. I remember asking my professors why we weren't learning anything about them, the response was "Don't worry about PC's, they are for playing video games only". When I tried to enter the CIS field in any sort of entry-level position, I felt my training at Ferris had been inadequate.

691   Professor relevancy of knowledge.
       Internships - particularly in multi-national businesses.
       Package configuration and package implementation.

837   Knowledge of mainframe concepts is a must to command a $$$ paying job.

9991   The Internet, obviously. I would refer to Question 9 instead. You can't teach O,
       that and knowing how to exploit what you learn to make yourself successful (not
       necessarily money). These are 'school of hard knocks' lessons.

9992   Internet business applications will continue to be important. Forth Generation
       languages continue to be used, such as PROIV, Progress, and Oracle.

9994   C and C++, JAVA, Ability to adapt & learn new concepts, database design,
       Understanding the functional areas of business, systems analysis and Systems
       design/development

608   In our environment (Banking) I see 4 routes.
       - Mainframe   JCL, Procs, Parms, VSAM, TSO, ROSCOE, COBOL
       - Network   Software load, Build network, routers, hubs, PCs.
       - Mid-Range   AS/400s, RPG, IBMs, telemarketing, telebanking, etc.
       - Internet/   WANS, LANs, web page building
         Intranet
       Now the line is very fuzzy as to where anyone stands on any field. My job is to
       take care of a mainframe DB2 application that has online and batch using
       COBOL/CICS/QMF for the major part. All things are done from a PC to
       mainframe connection across a LAN TCP/IP . We have Internet access as well
       as an Intranet access. We need to document many things so the PC apps are ·
       very useful and we place our documentation on the Web. As you can see, I use
       and need all 4 parts mentioned above.

1047   Systems Analysis, Design, Development and Implementation. Ability to learn
       and adapt to new concepts. Word processing and Technical knowledge skills
       (C++, JAVA, Internet ...).

Section 3

Employer Follow-up Survey

Section 3 - EMPLOYER FOLLOW-UP SURVEY

The CIS Academic Program Review Panel sent the surveys to all employers who use the services of Ferris' placement office. The employer had the option of either completing the survey online or sending a paper survey back to the CIS program using a postage-paid envelope. Each printed survey had a control number encoded on the first page of the survey. Respondents, who elected to complete the survey online, were asked to input the control number from the printed document. The CIS faculty used this control number to verify that duplicate or fraudulent surveys were not submitted.

Employer Survey

In August of 1999, as a part of the program review process, the Computer Information Systems Department sent out 1400 questionnaires to companies and organizations that have been identified as employers of Ferris CIS graduates. Thirty-seven completed questionnaires were returned. Examples of the Employer Follow-up survey (both online and printed formats) are included in this section.

The survey instrument was made up of four sections. Section one covered Current Academic Training and whether the graduates were well prepared to enter the work force in the computer technology and information systems area. The top five responses, weighted by response, revealed employers' perceptions of Ferris graduates:

Graduate's ability to carry out individual assignments	96
Graduate's ability to work in a team environment	96
Graduate's Degree to which graduate job expectations matched employers	90
Graduate's degree of professionalism	89
Graduate's ability to learn and adapt to new techniques	89

Section two covers future CIS academic training: What suggestions can you as an employer make to us for future computer training necessary for our students. The top five responses, weighted by response, revealed the need to place additional emphasis on these areas.

Database Applications (including programming)	101
Database concepts and architecture	94
Systems Design and Analysis	94
Group Project Assignments	88
Formal presentations	85

Section three covers future course training not related to computers: What suggestions can you as an employer make to us for future computer training necessary for our students. . The top five responses, weighted by response, revealed the need to place additional emphasis on these areas.

Business Presentations	99
Public Speaking	98
Organizational behavior	90
Advanced writing for business	88
Intermediate Algebra	79

Section four covers hiring information. A significant percentage of companies hire 1-5 Ferris graduates as employees

1-5 employees	40%
6-10 employees	20%
11-25 employees	4%
26 or more employees	3%

Manufacturing	27%
Marketing /Sales Systems	17%
Chemical	10%
Transportation	10%
Order Distribution	7%
Consulting	7%
Engineering Research	7%

The last section is employer information and is an optional section. Seventeen replied with general data, such as Name, Address, Email, etc.

Findings/Outcomes of Employer Follow-up Survey
Section I of the survey was designed to rate the performance of the CIS graduates after they had been hired. The survey asked 15 questions of the employer. The surveys revealed that our students fell in the good to excellent category in team project environment, carrying out individual assignments, and professionalism. All other categories were good to average. None were considered fair or poor.

Section II of the survey was designed to look at future academic training in the CIS area. The survey revealed the need for more database concepts and applications. Other areas considered desirable are eCommerce and networking.

Section III of the survey looked at future training that is not computer related. The survey revealed an important need for additional public speaking and business presentations.

Section IV of the survey summarized the type of employer hiring Ferris CIS graduates. Over half of the respondents have hired 6 - 10 Ferris CIS grads. This clearly shows the trend of increased employment in CIS.

Ferris State University

Computer Information Systems Employer Survey

As part of the Computer Information Systems (CIS) academic program review process, we are assessing employer perceptions of the program.

Please assist us by responding to the following questions regarding the CIS program at Ferris State University.

General Directions:

- This survey consists of 4 pages.
- When you submit a page, the next page will automatically load.
- After completing the 4 page survey, you will be asked to provide current information about yourself and your organization.
  Thank you for taking the time to help the Computer Information Systems program in the Academic Program Review.

STEP 1 - Please remember to input your control number.

| Input Control Number |

- Input the control number from the printed survey form.
  (If you don't have a control number, just enter a 6 character value.)
- Click on "Input Control Number" button.

STEP 2 - Begin EMPLOYER Survey

Go to Ferris State University Home Page

Thank you for participating in our survey of Computer Information Systems Employers.

If you have any questions, please contact Carole Kosanovich

email: kosanovc@ferris.edu
phone: (231) 592-2446

Ferris State University

Computer Information Systems Employer Survey

Control Number: subNull

Page 1 of Employer Survey
Section I: Current Academic Training

Legend
0 Not Applicable
1 Excellent
2 Good
3 Average
4 Fair
5 Poor

1. Please respond to the following statements using the following legend. If a question is "Not Applicable" to your organization, please choose zero (0).

A. *Graduate's knowledge and abilities in programming languages.*
`0 - Not Applicable ▾`

B. *Graduate's knowledge and abilities in systems analysis, design and implementation..*
`0 - Not Applicable ▾`

C. *Graduate's knowledge and abilities in telecommunications and data communications.*
`0 - Not Applicable ▾`

D. *Graduate's knowledge and abilities in database concepts and facilities.*
`0 - Not Applicable ▾`

E. *Graduate's ability in written communications.*
`0 - Not Applicable ▾`

F. *Graduate's ability in formal presentations.*
`0 - Not Applicable ▾`

G. *Graduate's ability to work in a team project environment.*
`0 - Not Applicable ▾`

H. *Graduate's ability to carry out individual assignments.*
`0 - Not Applicable ▾`

I. *Graduate's ability to learn and adapt to new technoques / technology.*
`0 - Not Applicable ▾`

J. *Degree to which graduate job expectations matched the employer.*
`0 - Not Applicable ▾`

K. *Graduate's degree of professionalism.*
`0 - Not Applicable ▾`

L. *Degree to which graduate salary expectations matched the employer.*
`0 - Not Applicable ▾`

M. *Degree to which graduates are prepared for advancement within your organization's Information systems Department.*
`0 - Not Applicable ▾`

N. Degree to which graduates are prepared for advancement in areas other than Information Systems.

O. Overall rating of Ferris' CIS graduates.

| 0 - Not Applicable | ▼ |

Submit

Ferris State University

Computer Information Systems
Employer Survey

Control Number: subNull

Page 2 of Employer Survey
Section II: Future Academic Training

Legend
1 Essential
2 Important
3 Desirable
4 Marginal
5 Not Needed

2. Please respond to the following statements using the legend shown above.

A. C++ Programming	1 - Essential ▼
B. Advanced C++	1 - Essential ▼
C. Java Programming	1 - Essential ▼
D. Advanced Java	1 - Essential ▼
E. Web page Design / HTML Programming	1 - Essential ▼
F. E-Commerce	1 - Essential ▼
G. COBOL Programming	1 - Essential ▼
H. AS-400 RPG	1 - Essential ▼
I. Operating Systems Concepts and JCL	1 - Essential ▼
J. Database Concepts and Architecture	1 - Essential ▼
K. Database applications (including programming)	1 - Essential ▼
L. Teleprocessing / Data Communications concepts	1 - Essential ▼
M. Networking	1 - Essential ▼
N. Systems Analysis, Design and Implementation	1 - Essential ▼
O. Advanced Systems Implementation (includes programming)	1 - Essential ▼
P. Client server	1 - Essential ▼

Q. Advanced COBOL - Online Programming with applications (CICS) | 1 - Essential ▼ |

R. Experience in fourth generation languages (FOCUS, Natural, SQL) | 1 - Essential ▼ |

S. Written Communications | 1 - Essential ▼ |

T. Formal Presentations | 1 - Essential ▼ |

U. Group Project Assignments | 1 - Essential ▼ |

V. Systems Project Management | 1 - Essential ▼ |

W. Visual Basic Programming | 1 - Essential ▼ |

X. Object-Oriented Design | 1 - Essential ▼ |

Y. Windows 2000 | 1 - Essential ▼ |

Z. UNIX | 1 - Essential ▼ |

AA. Novell | 1 - Essential ▼ |

AB. Office 2000 - WORD, Excel, PowerPoint | 1 - Essential ▼ |

AC. FrontPage | 1 - Essential ▼ |

AD. Oracle | 1 - Essential ▼ |

AE. Access Database | 1 - Essential ▼ |

Submit

Ferris State University

Computer Information Systems
Employer Survey

Control Number: subNull

Page 3 of Employer Survey
Section III: Future Course Training

Legend
1 Essential
2 Important
3 Desirable
4 Marginal
5 Not Needed

2. Please respond to the following statements using the legend shown above.

A. *Principles of Accounting*	1 - Essential ▼
B. *Contracts and Sales Law*	1 - Essential ▼
C. *Advanced Writing for Business*	1 - Essential ▼
D. *Financial Management*	1 - Essential ▼
E. *Principles of Marketing*	1 - Essential ▼
F. *Introduction to Statistics*	1 - Essential ▼
G. *Principles of Economics*	1 - Essential ▼
H. *Business Presentations*	1 - Essential ▼
I. *Management Science*	1 - Essential ▼
J. *Public Speaking*	1 - Essential ▼
K. *Intermediate Algebra*	1 - Essential ▼
L. *Small Business Management*	1 - Essential ▼
M. *Organizational Behavior*	1 - Essential ▼
N. *Trigonometry*	1 - Essential ▼
O. *Calculus for Business*	1 - Essential ▼
P. *Managerial Accounting*	1 - Essential ▼

Q. Cost Accounting	1 - Essential ▼
R. Project Management	1 - Essential ▼
S. Other course	1 - Essential ▼

_____

T. Other course	1 - Essential ▼

_____

Submit

Ferris State University

Computer Information Systems
Employer Survey

Control Number: subNull

Page 4 of Employer Survey
Section IV: Hiring Information

How many CIS graduates have you hired from Ferris State University?

   ◯   ◯   ◯   ◯

1 - 5   *6 - 10*   *11 - 25*   *26 or more*

Your organization works primarily in: (Check ALL that apply.)

- ☐ *A. Manufacturing*
- ☐ *B. Banking/Finance*
- ☐ *C. Order/Distribution*
- ☐ *D. Consulting*
- ☐ *E. Accountancy*
- ☐ *F. Marketing/Sales Systems*
- ☐ *G. Agriculture*
- ☐ *H. Chemical*
- ☐ *I. Transportation*
- ☐ *J. Education*
- ☐ *K. Engineering/Research Systems*
- ☐ *L. Plant/Warehouse*
- ☐ *M. Insurance*
- ☐ *N. Other*

Additional Comments:

_____

Submit

Ferris State University

Computer Information Systems
Employer Survey

Thank you for participating in our survey of Computer Information Systems Employers.

Below is a brief questionnarie concerning your organization.
This survey is not linked in any way to the survey you have just completed.
All the following information is for the internal use of the Computer Information Systems department.

Completion of this questionnaire is optional.

If you have any questions, please contact Carole Kosanovich

email: kosanovc@ferris.edu
phone: (231) 592-2446

General Directions:
Please fill in the blanks. (Maximum number of characters are in parentheses.)
Then press the "Submit Employer Information" button.

First Name (50) _____

Last Name (50) _____

Organization
Name (50) _____

Organization
URL (50) _____

Email (50) _____

Street (50) _____

City (50) _____

State (2) _____

Zip (10) _____

Phone _____

FAX _____

Submit Employer Information

Go to Ferris State University Home Page

Thank you for participating in our survey of Computer Information
Systems Employers.

If you have any questions, please contact Carole Kosanovich
:

email: kosanovc@ferris.edu
phone: (231) 592-2446

Ferris State University
Computer Information Systems Program
Survey of Employers and Advisors

As part of the **Computer Information Systems** (CIS) academic program review process. we are assessing alumni perceptions of the program. The survey is intended to enable the University to evaluate the CIS curriculum. This objective can only be reached if you answer all questions *carefully, sincerely, honestly, and fairly.* Information will be held in confidence. Your summary responses to this survey go directly to the ACIS Department Academic Program Review Committee.

General Directions:

Online: You may complete this questionnaire online at: **http://216.25.61.5/fsuemp/employer.asp.**
Please input your **control number** in the online form. The online form will be available from August 15, 1999 until September 8, 1999.

Paper Document: You may complete the paper form. Please check the appropriate boxes.
If you elect to complete the paper form, please return the questionnaire in the enclosed envelope by September 4, 1999 to:
Computer Information Systems Program
119 South Street
Ferris State University
Big Rapids, MI 49307
If you have any questions, please contact Carole Kosanovich: kosanovc@ferris.edu or (231) 592-2446.

Part L   Academic Training Currently
Please respond to the following statements using the following:
N/A - Not Applicable   1 - Excellent   2 - Good   3 - Average   4 - Fair   5 - Poor

N/A	1	2	3	4	5	Questions
O	O	O	O	O	O	1A. Graduate's knowledge and abilities in programming languages
O	O	O	O	O	O	1B. Graduate's knowledge and abilities in systems analysis, design & implementation
O	O	O	O	O	O	1C. Graduate's knowledge and abilities in telecommunications / data communications
O	O	O	O	O	O	1D. Graduate's knowledge and abilities in database concepts and facilities
O	O	O	O	O	O	1E. Graduate's ability in written communications
O	O	O	O	O	O	1F. Graduate's ability in formal presentations
O	O	O	O	O	O	1G. Graduate's ability to work in a team project environment
O	O	O	O	O	O	1H. Graduate's ability to carry out individual assignments
O	O	O	O	O	O	1I. Graduate's ability to learn and adapt to new techniques/technology
O	O	O	O	O	O	1J. Degree to which graduate job expectations matched the employer
O	O	O	O	O	O	1K. Graduate's degree of professionalism
O	O	O	O	O	O	1L. Degree to which graduate salary expectations matched the employer
O	O	O	O	O	O	1M. Degree to which graduates are prepared for advancement within your company's Information Systems Department
O	O	O	O	O	O	1N. Degree to which graduates are prepared for advancement in areas other than Information Systems Department

Part II. Future Academic Training					
Please respond to the following statements using the following:					
1 - Essential	2 - Important	3 - Desirable	4 - Marginal	5 - Not needed	

1	2	3	4	5	Questions
O	O	O	O	O	2A. C++ programming
O	O	O	O	O	2B. Advanced C++
O	O	O	O	O	2C. Java Programming
O	O	O	O	O	2D. Advanced Java Programming
O	O	O	O	O	2E. Web Page Design / HTML Programming
O	O	O	O	O	2F. E-Commerce
O	O	O	O	O	2G. COBOL Programming
O	O	O	O	O	2H. AS-400 RPG
O	O	O	O	O	2I. Operating Systems Concepts and JCL
O	O	O	O	O	2J. Database Concepts & Architecture
O	O	O	O	O	2K. Database applications (including programming)
O	O	O	O	O	2L. Teleprocessing/Data Communications concepts
O	O	O	O	O	2M. Networking
O	O	O	O	O	2N. Systems Analysis, Design & Implementation
O	O	O	O	O	2O. Advanced Systems Implementation (includes programming)
O	O	O	O	O	2P. Client server
O	O	O	O	O	2Q. Advanced Cobol - Online Programming with applications (i.e. CICS)
O	O	O	O	O	2R. Experience in fourth general languages (i.e. Focus, Natural, SQL)
O	O	O	O	O	2S. Written Communications
O	O	O	O	O	2T. Formal Presentations
O	O	O	O	O	2U. Group Project Assignments
O	O	O	O	O	2V. Systems Project Management
O	O	O	O	O	2W. Visual Basic
O	O	O	O	O	2x. Object Oriented Design
O	O	O	O	O	2Y. Windows 2000
O	O	O	O	O	2Z. Unix
O	O	O	O	O	2AA. Novell
O	O	O	O	O	2AB. Office 2000 Word, Excel, PowerPoint
O	O	O	O	O	2AC. FrontPage
O	O	O	O	O	2AD. Oracle
O	O	O	O	O	2AE. Access

Part III.   **Future Course Training**

Please respond to the following statements using the following:

    1 - Essential   2 - Important   3 - Desirable   4 - Marginal   5 - Not Needed

1	2	3	4	5	Courses
O	O	O	O	O	3A. Principles of Accounting
O	O	O	O	O	3B. Contracts and Sales Law
O	O	O	O	O	3C. Advanced Writing for Business
O	O	O	O	O	3D. Financial Management
O	O	O	O	O	3E. Principles of Marketing
O	O	O	O	O	3F. Introduction to Statistics
O	O	O	O	O	3G. Principles of Economics
O	O	O	O	O	3H. Business Presentations
O	O	O	O	O	3I. Management Science
O	O	O	O	O	3J. Public Speaking
O	O	O	O	O	3K. Intermediate Algebra
O	O	O	O	O	3L. Small Business Management
O	O	O	O	O	3M. Organizational Behavior
O	O	O	O	O	3N. Trigonometry
O	O	O	O	O	3O. Calculus for Business
O	O	O	O	O	3P. Managerial Accounting
O	O	O	O	O	3Q. Cost Accounting
O	O	O	O	O	3R. Project Management
O	O	O	O	O	3S. Other _____
O	O	O	O	O	3T. Other _____

Part IV.

How many CIS graduates have you hired from Ferris State University?

○ 1-5   ○ 6-10   ○ 11-25   ○ 26 or more

Your firm works primarily in (Select ALL that apply):

○ Manufacturing	○ Banking/Finance	○ Distribution
○ Consulting	○ Accountancy	○ Selling/Marketing
○ Agriculture	○ Chemical	○ Transportation
○ Education	○ Research	○ Plant / Warehouse
○ Insurance	○ Other _____	

Any additional comments (including comments about this survey):

Your Name: (Optional) _____
Organization Name _____
Your E-Mail: (Optional) _____

General Directions:

Online: You may complete this questionnaire online at: **http://216.25.61.5/fsuemp/employer.asp**.
Please input your **control number** in the online form.

Paper Document: You may complete the paper form. Please check the appropriate boxes.
If you elect to complete the paper form, please return the questionnaire in the enclosed envelope to:
Computer Information Systems Program
119 South Street
Ferris State University
Big Rapids, MI 49307
If you have any questions, please contact Carole Kosanovich: kosanovc@ferris.edu or (231) 592-2446.

Employer Follow-up Survey Comments

1060   Retail Sales, Area of interest is Pharmacy, Students and graduates not IT

1137   Scientific/Not technical

115   valued added reseller

1201   Construction

369   Printing/Publishing. Like most organizations, our IT Strategy is definitely leaning
       towards Web base applications using shared databases.

38   Visual C++, Advanced Unix and Linux

398   Ferris Students seem to have salary requirements that are far above market
       standards. They must remember that college courses do not equal real-world
       experience.

432   Mortgage software

816   psychology

879   criminal justice/ software

943   Logic (intro to)

97   Tax Accounting, Intermediate Accounting, Government, The students that we
       have hired have all been as interns. We have had three interns and they have all
       been very good employees.

Section 4

Student Evaluation of Program

Section 4 - STUDENT EVALUATION OF PROGRAM

Findings/Outcomes of Student Opinion of Overall Instruction

The evaluation instrument included 18 questions using a 5 point scale. The survey was given to all (freshman to seniors) majors in the CIS program.

The survey results show that 94-99% of the students feel the faculty are helpful, sensitive to problems, and treat them with respect. (questions 1-4)

Also, the results point out the classroom procedures, materials, presentations, are acceptable with 88-100% of the students. (questions 5-12)

As to the grading procedures, the classroom equipment (monitors and pc's). and overall rating of the faculty, the results were 89-97% favorable. The lowest 89% was in the area of equipment used work properly. (questions 13-18)

Student Opinion of Overall Instruction

Question #	Response Number					Total	% of responses 4&5	% of responses 3-5
	1	2	3	4	5			
1	0	2	17	63	25	107	82%	98%
2	0	3	42	44	18	107	58%	97%
3	0	6	24	46	31	107	72%	94%
4	0	1	18	50	38	107	82%	99%
5	2	7	20	49	29	107	73%	92%
6	0	0	19	53	35	107	82%	100%
7	1	3	29	45	29	107	69%	96%
8	1	7	29	41	29	107	65%	93%
9	2	10	20	47	28	107	70%	89%
10	3	10	24	43	27	107	65%	88%
11	2	12	37	39	17	107	52%	87%
12	1	8	23	41	34	107	70%	92%
13	1	3	23	46	34	107	75%	96%
14	0	4	20	46	37	107	78%	96%
15	1	5	26	48	27	107	70%	94%
16	3	9	21	39	35	107	69%	89%
17	4	6	21	36	40	107	71%	91%
18	0	3	7	32	65	107	91%	97%
						1926	average	average
Totals	21	99	420	808	578	1926	72%	94%
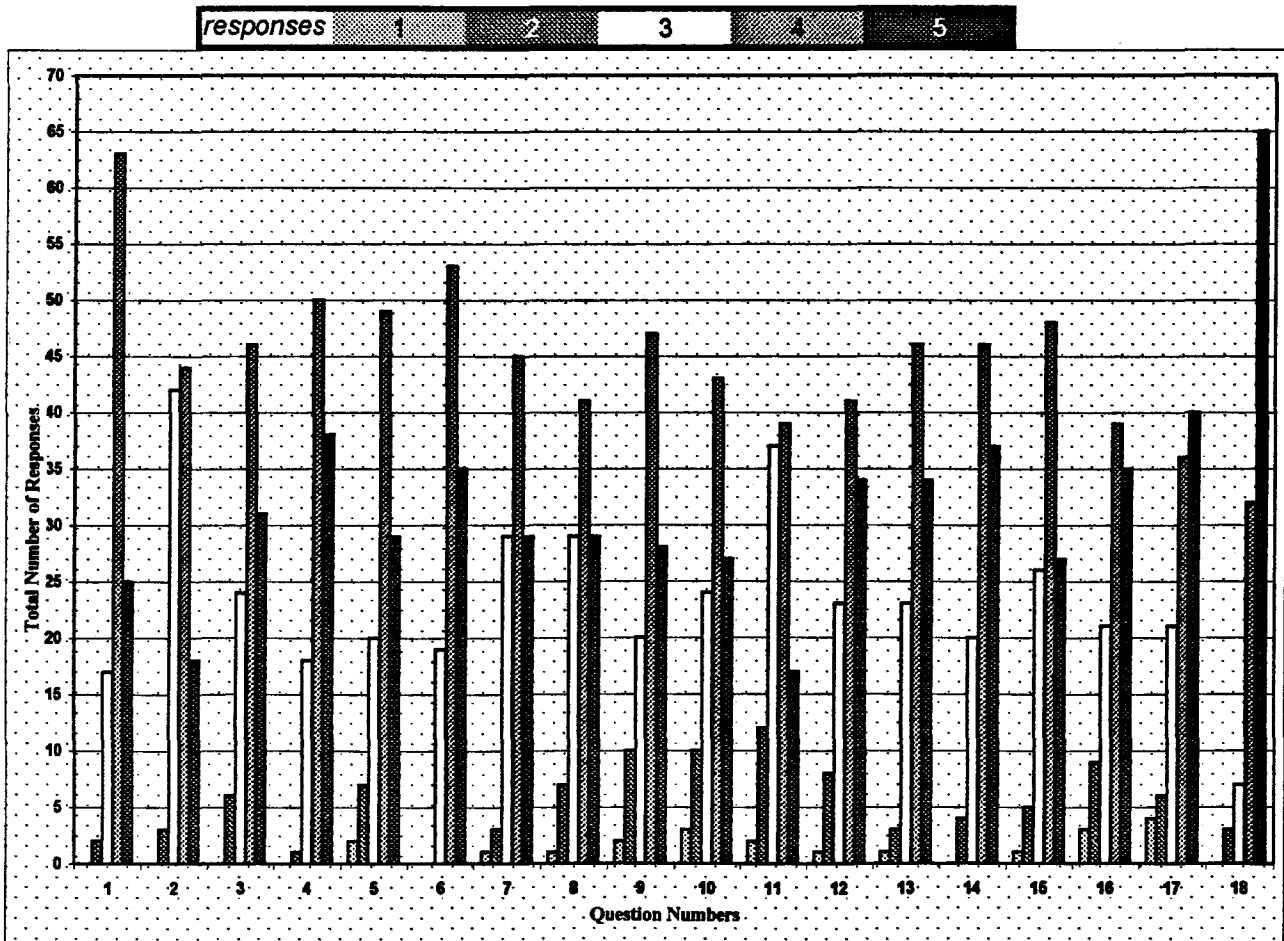
1999 CIS Program Review
Student Survey Comments

- More explanation from the teachers about course.
- The print on the monitors is too small to follow along. You must sit very close or have binoculars in the back now to follow along.
- I am just about to finish my 4th year here at FSU and my 3rd year in the CIS program. I feel that there is a very big problem among the faculty in CIS. With the exceptions of one or two faculty members, they are all very poor motivators. They do not present their material in an interesting way that makes you want to consume the information and truly learn it. Don't get me wrong most of the faculty knows an awful lot about the subject that they are teaching, but they are not teachers. We all know that just because you know something doesn't mean we can teach it! I think that if Ferris really wants to put its name out their as a leader for the current faculty or be more selective I the criteria for hiring new teachers. I hope you take seriously, and take a hard look at the present teaching network.
- My first semester in CIS has been trouble free.
- More lab time needed for hands on work. It is easier to learn if students are able to do instead of watching someone else do it.
- The equipment worked most of the time but not all of time. Furthermore terminals should be added to the classroom. It would make the learning process easier.
- They use Syllabus but don't always provide all sufficient info for classes.
- The CIS program needs to increase the pace of reaction to current market and business conditions. The rapid pace of change in CIS would suggest a turn-a-round time of 1 yr. from recognition of needed changes to implementation of new curricula.
- Late A lot!
- I feel that the use of monitors in a programming made it hard to learn. Students should be in front of individual PC's to be able to do what the instructor is doing during class. This would make it easier to learn. I would really like to see this change occur. I have been in other institutions where every student taking a hands on course like programming was in front of a computer where we could work on what the instructor was doing. It just makes more sense to do this. I also feel that putting an instructor in a class that hasn't taught the course in over 10 years was not a good decision. You might as well not have offered the class. I learned the same thing. It didn't even come close to my expectations of a programming class. I have never seen an instructor leave almost always, a 1 and 1/2 hour class 45 minutes or more early. When in class the instruction time was not interesting at all. I had the feeling that the instructor was relearning the course as the person going along. This class was a waste of my time and money.
- Please get more computers in the computer labs instead of spending thousands of dollars on security cameras. The lab is always full. I don't see any reason why there can't be more computers in the lab when I see that the school is too cheap to spend $.10 to send grades home. Think about priority. What's more important stupid stuff that can wait or more educational machines that could help students? Why is the COB lab two different colors? Why do I see people who work for the school always sitting and talking and doing nothing productive? Think again where the money is going, could there be more computers?

Student Opinion of Overall Instruction

Each of the items below deals with a characteristic of instructors which students feel to be important. Indicate your rating of the CIS faculty by circling the appropriate number.

(A 5 is the highest possible rating, a number 1 is the lowest rating.)

1. Are most faculty helpful when students have difficulty?

   1   2   3   4   5
   Not helpful   Actively helpful

2. Do most CIS faculty appear sensitive to feelings and problems of students?

   1   2   3   4   5
   Unaware   Responsive

3. Are most CIS faculty fair and impartial in their dealings with the students?

   1   2   3   4   5
   Unfair   Fair

4. Do most CIS faculty treat students with respect?

   1   2   3   4   5
   Disrespectful   Respectful

5. Do most faculty possess speaking ability adequate for teaching?

   1   2   3   4   5
   Unintelligible   Good

6. Do most CIS faculty make the students feel free to ask questions, disagree, express ideas, etc.?

   1   2   3   4   5
   Intolerant   Encourage Student Ideas

7. Do most CIS faculty exhibit enthusiasm for the subjects?

   1   2   3   4   5
   Seems uninterested   Seems interested

8. Do most CIS faculty use examples and illustrations to clarify the materials?

   1   2   3   4   5
   None   Many

9. Are most CIS faculty presenting current, relevant material in a well-organized fashion?

   1   2   3   4   5
   Disorganized   Well Organized

10. Do most CIS faculty stimulate thinking?

    1   2   3   4   5
    Uninterested   Stimulating

11. Do most CIS faculty put his/her material across in an interesting way?

    1   2   3   4   5
    Uninterested   Very Interesting

12. Do most CIS faculty clarify the objectives of the course?

    1   2   3   4   5
    Unclear   Clear

13. Was the examination process fair?

    1   2   3   4   5
    Unfair   Fair

14. Were grading procedures clarified?

    1   2   3   4   5
    Unclear   Clear

15. Considering everything, how well would you rate the CIS faculty as a whole?

    1   2   3   4   5
    Very Bad   Fair   Very Good

16. When the CIS faculty used the classroom PC's and monitors for presentations, did the equipment work properly?

1	2	3	4	5
Very Rarely		Sometimes		Every Day

17. Were you able to see and read the classroom monitors?

1	2	3	4	5
Very Rarely		Sometimes		Most of Time

18. Do most CIS faculty use a syllabus?

1	2	3	4	5
Very Rarely		Sometimes		Most of Time

Please clarify any of the above or provide additional comments, if you feel it necessary.

Section 5

Faculty Perceptions of Program

CIS faculty was asked to write comments concerning the CIS program. Faculty comments are detailed by topic.

Strong points of CIS program
- Huge demand for our graduates. Our program fills a need.
- Business orientation. Students understand more that "just computers".
- Faculty have business (not just academic) experience.
- We generally have current hardware and software - what industry uses.
- We are attracting better students (higher ACT scores).
- CIS program is strong.
- Enrollment is increasing.
- Beginning to see better-prepared students enter the program.

Curriculum
- The proposed changes to the curriculum are a define move in the right direction. We have a need for keeping equipment and software current, but we must also remember the basics.
- The program continues to address current trends in industry.
- The focus of the CIS program is to prepare students to enter the IT profession as entry-level programmer / analysts for the transaction-based enterprises.
- As enterprise transactions move to the Web, our program is strategically placed to be on the forefront of this opportunity. In order to accomplish this, our faculty has modified the curriculum to include the Web, as the "transaction entry" medium of choice. This is exemplified at Ferris by the Web registration system, which feeds all the other IT systems that deal with the student enrollment on a semester by semester basis.

Workload
- Workload for faculty is high due to high demand for CIS courses (over 4 FTE adjunct working and most tenure-track faculty have been teaching overloads each semester for the last three years.
- The number of full-time faculty needs to be increased and monies made available for faculty to avail themselves of the new training requirements of the Web-based transaction systems.
- Faculty is aging. We need to replace them as they retire.
- Some faculty is spread too thin and lacks in-depth knowledge (they need more training and fewer preps.)
- Dependence on some faculty in key areas (such as, AS/400 and UNIX). A loss of a key faculty member could cripple the program.

Workload (Continued)
- Many faculty released from teaching for administration or support positions. Too many classes are covered by adjunct or part-time faculty.
- We are in need of more full-time tenure track people. Adjuncts are fine for short-term periods, but Ferris wants to go with the inexperienced part-timers. We need fresh blood. New people between 20 and 30 years of age. Most of us are over 45 and some are approaching 60. We don't have training money so we have to hire younger people with the experience.

Equipment
- Equipment support remains the key problem that needs to be dealt with. Having a requirement for students to have their own PCs (notebooks) would greatly improve this situation.
- Equipment and software requirements for the program are difficult to keep current, due to the fast changes in the industry.
- Need on-going budget for hardware and software (to remain current) and for technical support.
- We need more direct control of hardware and software to respond to change and industry demands.
- Lag time imposed by College of Business Computer Usage Committee (former advisory body) and Business Technology Consortium (new entity) in installing upgrades, plug-ins, etc. keep CIS program from state-of-the-art success.
- Security is an important concern, but CIS majors need access to control panel, need ability to install and evaluate software, and need ability to publish vial the Web.
- Ferris needs to establish a budget for computer hardware and software for each college. The movies should be enough to replace all equipment and software on a 3-year basis. Any more than three years would be detrimental to the university.
- Students should have better equipment and software in some cases.
- Ferris should consider a computer fee or require the students to come to FSU with a PC and required software.
- Technology is changing and FSU must recognize this and respond positively with dollars or require PC purchase by students.
- Time frame for approval is SAD. 1 year to 2 years with budget initiatives, etc. By the time, we get approval; the equipment and software are out of date.

Faculty Development or Professional Development
- There is a need for funds / resources for faculty development for CIS faculty.
- Faculty spends many hours each semester to learn new skills for fast-changing industry.
- Faculty must upgrade skills - more resources needed for training to industry levels.

Faculty Development or Professional Development (continued)

- Due to rapidly changing technology, CIS faculty needs much more Professional Development. Each CIS faculty needs opportunity to upgrade skills each year. We need to be more visible at conferences, such as COMDEX,

Enrollment

- Need to attract more students. With thousands of jobs in CIS, too few students pursue careers in the field.

Section 6

Advisory Committee
Perceptions of Program

Section 6 - ADVISORY COMMITTEE PERCEPTIONS OF PROGRAM

The CIS Academic Program Review Panel sent the surveys to all employers who use the services of Ferris' placement office and all CIS program advisors. The employer had the option of either completing the survey online or sending a paper survey back to the CIS program using a postage-paid envelope. Each printed survey had a control number encoded on the first page of the survey. Respondents, who elected to complete the survey online, were asked to input the control number from the printed document. The CIS faculty used this control number to verify that duplicate or fraudulent surveys were not submitted.

Advisory Committee Survey

In August of 1999, as a part of the program review process, the Computer Information Systems Department sent out 37 questionnaires to members of the CIS Advisory Committee. Eleven (11) questionnaires were returned. Examples of the surveys (both online and printed formats) are included in section 3 - Employer Follow-up Survey.

The survey instrument was made up of four sections. Section one covered Current Academic Training and whether the graduates were well prepared to enter the work force in the computer technology and information's systems area. The top five weighted responses on the survey revealed Advisory Committee perceptions of Ferris graduates:

Graduate's knowledge and abilities in programming	44
Graduate's ability to work in a team environment	41
Graduate's knowledge of ability in Systems Design	40
Graduate's ability to carry out individual assignments	40
Graduates ability to learn and adapt to new technology	40

Section two covers future CIS academic training. What suggestions can you as an advisor/employer make to us for future computer training necessary for our students. The top five weighted responses on the survey revealed we need to place additional emphasis on these areas.

Group Project Assignments	48
Written Communications	47
Database Applications (including programming)	47
Database Concepts Architecture	46
Systems Design & Analysis	45

Section three covers future course training not related to computers. What suggestions can you as an employer make to us for future computer training necessary for our students. The top five weighted responses on the survey revealed we need to place additional emphasis on these areas.

Project Management	52
Public Speaking	46
Business presentations	42
Intro to Statistics	35
Organizational behavior	31

Section four covers hiring information. A significant percentage of companies hire 1-5 Ferris graduates as employees

1-5 employees	29%
6-10 employees	29%
11-25 employees	14%
26 or more employees	28%

1.	Transportation	4
2.	Manufacturing	3
3.	Consulting	3
4.	Order Distribution	2
5.	Accounting	2
6.	Plant/Warehouse	2

Findings/Outcomes of Advisor Survey

Section I of the survey was designed to rate the performance of the CIS graduates after they had been hired. The survey asked 15 questions of the advisor. The surveys revealed that our students fell in the good to excellent category in team project environment, carrying out individual assignments, and professionalism. All other categories were good to average. None were considered fair or poor.

Section II of the survey was designed to look at future academic training in the CIS area. The survey revealed the need for more database concepts and applications. Other areas considered desirable are eCommerce and networking.

Section III of the survey looked at future training that is not computer related. The survey revealed an important need for additional public speaking and business presentations.

Section IV of the survey summarized the type of employer hiring Ferris CIS graduates. Over half of the respondents have hired 6 - 10 Ferris CIS grads. This clearly shows the trend of increased employment in CIS.

Advisor Comments

A001 Logic course

A16 Healthcare Information

A32 We have not been on campus the last two years. However, when we were on campus our biggest hurdle in recruiting Ferris CIS graduates has been their minimal knowledge of the consulting industry and specifically Andersen Consulting. The Ferris graduates that we have hired have done extremely well and seem to have a good core set of skills.

Lee Y. Good morning,

I have responded to the recent questionnaire regarding the CIS graduates and would like to offer some more thoughts. I was a Winter 1994 graduate with a B.A.S. in Computer Information Systems/Marketing Dual. For the 2 previous meetings, I have enjoyed working with the CIS Advisory Committee meetings and will hopefully be allowed to continue to do so.

The first thought I have is regarding the curriculum. For the most part, the curriculum stays with a good base of required classes to provide students with enough diversity in knowledge to help them adapt to whatever situation arises. Currently there appears to be a shift of IT moving from mainframes towards IBM midrange products or PC networks. This should not predict a shift away from teaching the mainframe classes since some of the larger West Michigan companies continue to work with mainframes. Beyond this other platforms are able to process COBOL, CICS, etc. The current technological shifts could be portrayed by a "slight" shift in the curriculum to add classes or begin placing emphasis on classes associated with such technologies.

The most important thought that I have is diversity. Ferris should not devote too much time to any subject within the IT field. Students should understand concepts and techniques to a full extent and then be shifted to a new subject. For instance, students should have a good understanding of E-commerce, QS-9000, and other important business practices surfacing within recent years, but too much emphasis (time) on 1 such subject should not sacrifice understanding such concepts and techniques of each. This diverse understanding allows students to view big pictures of organizations that use such technologies and the importance to business.

The last thought that I have is motivation. In some way, each instructor (early in the classes) needs to gain motivation of a good part of the class rather than having students being motivated to just attaining a letter grade to graduate. Such motivation occurs when instructors can apply such knowledge, techniques, and concepts to the world outside the classroom. Maybe this happens by sharing

personal experiences in the field before teaching or some other method, but students should not feel that the knowledge they are getting is just book knowledge.

The last statement is where Ferris stands far ahead of other universities. Many professors are able to motivate their students along with sharing past IT field experiences displaying the importance of the knowledge.

If you would like to reply or have any further questions, feel free to reply to: leey@net-port.com --or--leey@dynamiccomputers.com
Lee Yarrington

Section 7

Labor Market Analysis

The Bureau of Labor Statistics[1] (BLS) is an agency within the U.S. Department of Labor. The BLS has published the 1998-99 edition of the *Occupational Outlook Handbook*[2]. This document was helpful in preparing the Labor Market Analysis.

The fastest growing occupations for 1998-2006 are:
- Database administrators, computer support specialists, and all other computer scientists
- Computer engineers
- Systems analysts.

(Refer to Table 1)

In the following sections, the markets for these occupations are explored.

Computer Programmers - Job Outlook

Employment of programmers is expected to grow faster than the average[3] through the year 2006. Jobs for both systems and applications programmers should be plentiful in data processing service firms, software houses, and computer consulting businesses. These types of establishments are part of computer and data processing services, which is projected to be the fastest growing industry. As companies attempt to control costs and keep up with changing technology, they will maintain a need for programmers to assist in conversions to new languages and from one system to the next. In addition, numerous job openings for programmers will result from the need to replace programmers who move to other occupations or leave the labor force. Most programmers, who leave the labor force, transfer to other occupations, such as manager or systems analyst.

Despite numerous openings, however, the consolidation and centralization of systems and applications should continue to moderate growth, as will developments in packaged software, advanced programming languages and tools, and the growing ability of users to design, write, and implement more of their own programs to meet their changing needs. As the level of technological innovation and sophistication increases, programmers should continue to face increasing competition from programming businesses overseas where more of the routine work can be outsourced at a lower cost.

As programming tasks become more complex and increasingly sophisticated skills and experience are demanded by employers, graduates of 2-year programs, and people with less than a 2-year degree or its equivalent in work experience, should face stronger competition for programming jobs. Competition for entry-level positions, however, can even affect applicants with a bachelor's degree. Although demand fluctuates as employer's needs change with technology, prospects should be best for college graduates with knowledge of

and experience working with a variety of programming languages and tools, particularly C++ and other object oriented languages—such as Smalltalk, Visual Basic, Ada, and Java—as well as newer, domain-specific languages that apply to computer networking, data base management, and Internet applications. In order to remain competitive, college graduates should keep up to date with the latest skills and technologies.

Many employers prefer to hire applicants with previous experience in the field. Employers are increasingly interested in programmers who can combine areas of technical expertise or who are adaptable and able to learn and incorporate new skills. Therefore, individuals who want to become programmers can enhance their chances of doing so by combining the appropriate formal training with practical work experience. Students should try to gain experience by participating in a college work-study program, or undertaking an internship. Students also can greatly improve their employment prospects by taking courses such as accounting, management, engineering, or science—allied fields in which applications programmers are in demand.

With the expansion of client/server environments, employers will continue to look for programmers with strong technical skills who understand their business and its programming needs. Businesses also look for programmers who develop a technical specialization in areas such as client/server programming, multimedia technology, graphic user interface (GUI), and 4th and 5th generation programming tools. Programmers will be creating and maintaining expert systems and embedding these technologies in more and more products. Other areas of progress include data communications and the business application of Internet technologies. Networking computers so they can communicate with each other is necessary to achieve the greater efficiency organizations require to remain competitive. Demand for programmers with strong object-oriented programming capabilities and experience should arise from the expansion of Intranets, extranets and World Wide Web applications.

Computer Programmers - Earnings

Median earnings of programmers who worked full time in 1996 were about $40,100 a year. Starting salary offers for graduates with a bachelor's degree in the area of computer programming averaged about $35,167 a year in private industry in 1997, according to the National Association of Colleges and Employers.

According to Robert Half International Inc., starting salaries ranged from $32,500 to $39,000 for programmers and $47,500 to $60,000 for systems programmers in large establishments in 1997.

Computer scientists and systems analysts - Job Outlook

Computer scientists, computer engineers, and systems analysts are expected to be the three fastest growing occupations through the year 2006. Employment of computing professionals is expected to increase much faster than average[4] as technology becomes more sophisticated and organizations continue to adopt and integrate these technologies, making for plentiful job openings. Growth will be driven by very rapid growth in computer and data processing services, which is projected to be the fastest growing industry. In addition, thousands of job openings will result annually from the need to replace workers who move into managerial positions or other occupations or who leave the labor force.

Computer scientists, computer engineers, and systems analysts will need to continually upgrade their technical expertise and improve their ability to interact with users as the sophistication and complexity of technology advances. Increasingly, users are able to design and implement more of their own applications and programs. The result is a growing demand for computer support specialists, help desk personnel, and technical consultants.

The demand for "networking" to facilitate the sharing of information, the expansion of client/server environments, and the need for specialists to use their knowledge and skills in a problem solving capacity will be a major factor in the rising demand for systems analysts. Falling prices of computer hardware and software should continue to induce more businesses to expand computerized operations and integrate new technologies. In order to maintain a competitive edge and operate more cost effectively, firms will continue to demand computer professionals who are knowledgeable about the latest technologies and able to apply them to meet the needs of businesses.

New growth areas generally arise from the development of new technologies. Therefore, it is important for computer professionals at all levels to keep their skills up to date. The expanding integration of Internet technologies by businesses, for example, has resulted in a rising demand for a variety of skilled professionals who can develop and support Internet, Intranet, and World Wide Web applications. Growth in these areas is also expected to create demand for computer scientists, computer engineers, and systems analysts knowledgeable about network, data and communications security.

Since employers look for the most qualified applicants possessing a high level of technical expertise, individuals with an advanced degree in computer science, management information systems (MIS), computer engineering, or an MBA with a concentration in information systems should enjoy very favorable employment prospects. College graduates with a bachelor's degree in computer science, computer engineering, information science, or information systems should also enjoy very favorable prospects, particularly if they have supplemented their formal education with some level of practical experience. College graduates with

non-computer science majors, who have had courses in computer programming, systems analysis, and other data processing areas, as well as training or experience in an applied field, should also be able to find jobs as computer professionals. Those who are familiar with client/server environments, CASE tools and object-oriented programming, Internet, Intranet, and multimedia technology will have an even greater advantage, as will individuals with significant networking, database, and systems experience. Employers will continue to seek computer professionals who can combine strong programming and traditional systems analysis skills with good interpersonal and business skills.

Computer scientists and systems analysts - Earnings

Median annual earnings of computer systems analysts and scientists who worked full time in 1996 were about $46,300.

Starting salaries for computer scientists or computer engineers with a bachelor's degree can be significantly higher than starting salaries of bachelor's degree graduates in many other fields. According to the National Association of Colleges and Employers, starting offers for graduates with a bachelor's degree in information sciences averaged about $35,407 a year and in systems analysis, the starting offers averaged about $43,800 a year in 1997. Offers for those with the bachelor's degree vary by functional area for all types of employers, as shown in the following tabulation.

Computer programming	$35,167
Information systems	34,689
Systems analysis and design	36,261
Software design and development	39,190
Hardware design and development	41,237

According to Robert Half International Inc., starting salaries in 1997 for systems analysts employed by large establishments employing more than 50 staff members ranged from $46,000 to $57,500. Salaries for programmer-analysts ranged from $39,000 to $50,000 in large establishments and $33,500 to $43,000 in small establishments. Starting salaries ranged from $54,000 to $67,500 for data base administrators, from $36,000 to $55,000 for network administrators, from $25,000 to $36,500 for help desk support technicians, and from $49,000 to $67,500 for software development specialists.

Table 1. Fastest growing occupations covered in the 1998-99 Occupational Outlook Handbook, 1996-2006

(Numbers in thousands of jobs)

Occupation	Employment change, 1996-2006		Most significant source of training
	Number	Percent	
Database administrators, computer support specialists, and all other computer scientists	249	118	Bachelor's degree
Computer engineers	235	109	Bachelor's degree
Systems analysts	520	103	Bachelor's degree
Personal and home care aides	171	85	Short-term on-the-job training
Physical and corrective therapy assistants and aides	66	79	Moderate-term on-the-job training
Home health aides	378	76	Short-term on-the-job training
Medical assistants	166	74	Moderate-term on-the-job training
Desktop publishing specialists	22	74	Long-term on-the-job training
Physical therapists	81	71	Bachelor's degree
Occupational therapy assistants and aides	11	69	Moderate-term on-the-job training
Paralegals	76	68	Associate's degree
Occupational therapists	38	66	Bachelor's degree
Teachers, special education	241	59	Bachelor's degree
Human services workers	98	55	Moderate-term on-the-job training
Data processing equipment repairers	42	52	Post-secondary vocational training
Medical records technicians	44	51	Associate's degree
Speech-language pathologists and audiologists	44	51	Master's degree
Dental hygienists	64	48	Associate's degree
Amusement and recreation attendants	138	48	Short-term on-the-job training
Physician assistants	30	47	Bachelor's degree
Respiratory therapists	37	46	Associate's degree
Adjustment clerks	183	46	Short-term on-the-job training
Engineering, science, and computer systems managers	155	45	Work experience plus bachelor's and/or higher degree
Emergency medical technicians	67	45	Post-secondary vocational training
Manicurists	19	45	Post-secondary vocational training
Bill and account collectors	112	42	Short-term on-the-job training
Residential counselors	74	41	Bachelor's degree
Instructors and coaches, sports and physical training	123	41	Moderate-term on-the-job training
Dental assistants	77	38	Moderate-term on-the-job training
Securities and financial services sales workers	100	38	Bachelor's degree

Table 2. Occupations covered in the 1998-99 Occupational Outlook Handbook with the largest projected job growth, 1996-2006

(Numbers in thousands of jobs)

Occupation	Employment change, 1996-2006		Most significant source of training
	Number	Percent	
Cashiers	530	17	Short-term on-the-job training
Systems analysts	520	103	Bachelor's degree
General managers and top executives	467	15	Work experience plus bachelor's and/or higher degree
Registered nurses	411	21	Associate's degree
Salespersons, retail	408	10	Short-term on-the-job training
Truck drivers, light and heavy	404	15	Short-term on-the-job training
Home health aides	378	76	Short-term on-the-job training
Teacher aides and educational assistants	370	38	Short-term on-the-job training
Nursing aides, orderlies, and attendants	333	25	Short-term on-the-job training
Receptionists and information clerks	318	30	Short-term on-the-job training
Teachers, secondary school	312	22	Bachelor's degree
Child care workers	299	36	Short-term on-the-job training
Clerical supervisors and managers	262	19	Work experience in a related occupation
Database administrators, computer support specialists, and all other computer scientists	249	118	Bachelor's degree
Marketing and sales worker supervisors	246	11	Work experience in a related occupation
Maintenance repairers, general utility	246	18	Long-term on-the-job training
Food counter, fountain, and related workers	243	14	Short-term on-the-job training
Teachers, special education	241	59	Bachelor's degree
Computer engineers	235	109	Bachelor's degree
Food preparation workers	234	19	Short-term on-the-job training
Hand packers and packagers	222	23	Short-term on-the-job training
Guards	221	23	Short-term on-the-job training
General office clerks	215	7	Short-term on-the-job training
Waiters and waitresses	206	11	Short-term on-the-job training
Social workers	188	32	Bachelor's degree
Adjustment clerks	183	46	Short-term on-the-job training
Cooks, short order and fast food	174	22	Short-term on-the-job training
Personal and home care aides	171	85	Short-term on-the-job training
Food service and lodging managers	168	28	Work experience in a related occupation
Medical assistants	166	74	Moderate-term on-the-job training

ENDNOTES

[1] The Bureau of Labor Statistics is an agency within the U.S. Department of Labor.

[2] 1998-99 EDITION OF THE *OCCUPATIONAL OUTLOOK HANDBOOK*

Technical Information:	(202) 606-5700
Media Contact:	(202) 606-5902
USDL 98-44	For release: 10 A.M. EST, Thursday, February 5, 1998
Internet:	http://stats.bls.gov/ocohome.htm

[3] This explains how to interpret the key phrases used to describe projected changes in employment. It also explains the terms used to describe the relationship between the number of job openings and the number of job seekers. The descriptions of the relationship between the supply of and demand for workers in a particular occupation reflect the knowledge and judgment of economists in the Bureau's Office of Employment Projections.

Changing employment between 1996 and 2006

If the statement reads...	Employment is projected to...
Grow much faster than the average	Increase 36 percent or more
Grow faster than the average	Increase 21 to 35 percent
Grow about as fast as average	Increase 10 to 20 percent
Grow more slowly than average, or little or no change	Increase 0 to 9 percent
Decline	Decrease 1 percent or more

[4] Refer to Endnote 3

Section 8

Evaluation of Facilities and Equipment

Section 8 - EVALUATION OF FACILITIES AND EQUIPMENT

The faculty of the CIS program was sent an email questionnaire. The questions and faculty responses are detailed below.

Question 1:
    What equipment used by CIS majors is under your control? List.

Answer:
    The faculty of the CIS department currently maintains four servers:
    1. AS-400 model 251   CIS IBM partnership for mid-range computing
    2. COBNT01:   The College of Business internet server (Windows NT server)
    COBNT01 is a Pentium 166-megahertz computer with 64 megabytes of RAM and a 2-gigabyte hard drive.
    3. COBNT2:   CIS E-commerce development server (Windows NT server)
    COBNT2 is an AMD-K6-2-400 with 128 megabytes of RAM and a 9-gigabyte hard drive.
    4. BUSUN1:   CIS UNIX course server (UNIX server)
    BUSUN1 is a Pentium 166-megahertz computer with 32 megabytes of RAM and a 2-gigabyte hard drive.

    COBNT2 was recently acquired. Due to the high demand for instruction in Internet applications and increased demand for Internet courses an additional server was required.

Question 2:
    What software used by CIS majors do you control?

Answer:
    AS-400:
    All of OS 400, and all the software that IBM sells with OS/400 including Data warehousing software. In addition, the CIS program uses the entire application development tool set, RPG, COBOL, C, C++, PLI, JAVA, HTML, and TCPIP.

    COBNT01:
    Windows NT, Web server software, COB Internet pages -- the data/content.

    COBNT2:
    Windows NT and other applications planned -- currently none installed.

    BUSUN1:
    FreeBSD 2.1.6-RELEASE, Apache WebServer, FTP server (Version wu-2.4(3), NTP Server, UPSD Client, Telnet Daemon, ELM, echo, daytime, smtp, POP, talk.

Question 3:
    Describe problems associated with the hardware and software used by CIS
    majors.

Answer:
<u>Server specific comments</u>:

    AS - 400:
    None.

    COBNT01:
    The major problem is the equipment, which is slow by today's standards and
    probably not year 2000 compliant. Unsure of any software applications on the
    server that are date dependent. Not RTZ Rollover (Y2K) compliant.

    COBNT2:
    Needs software installation support.

    BUSUN1:
    Not RTZ Rollover (Y2K) compliant.

<u>General comments</u>:

    We do not have the latest software available in the labs on a timely basis. The
    CIS faculty believes that the software installed in the labs should be upgraded to
    the newest release one semester after the software release date. (The previous
    version should be available for one semester after upgrading.) CIS faculty
    should have new versions of software used in CIS courses available as soon as
    possible after a new version is released so they can learn to use the newer
    software and prepare updated course materials.

    Computer technology in the teaching labs within the College of Business should
    be upgraded.

    For example, the computers in the teaching lab, Business 118, should be
    upgraded. Many of the computers in B-118 don't work properly and all contain
    slow processors. Many newer software products won't run on these older,
    slower computers. The highest priority for B118 would be an overhead projector
    similar to the one in B116.

    In addition, the CIS faculty would like to see the equipment upgraded in one
    teaching or student lab each year. The CIS faculty needs high-speed computers
    in their offices.

    The CIS program offers courses off-campus and this presents its own set of
    problems with equipment and software. Students in each remote site, such as,

Dowagiac, Muskegon, and Traverse City, need to have the same hardware and software configuration and Ferris' on-campus students have available in the College of Business labs. The labs in the different locations have different hardware and software, as do the students' personal computers. Most off-campus students have full-time jobs and many have families. When their work and home schedules conflict with lab schedules at the remote, they have difficulty understanding and completing assignments.

Question 4:
What, in your estimation, are the future needs of hardware and software for the CIS program?

Answer:

Server specific comments:

AS - 400:
The lease on the AS-400 expires in June of 2000. The lease must be renegotiated or extended.

COBNT01:
We need a faster computer with additional memory and hard drive space and updated software. We will also need to upgrade to the newest version of Windows NT when the new version is released in 2000. COBNT01 is currently the College of Business Web server.

COBNT2:
We will also need to upgrade to the newest version of Windows NT when the new version is released in 2000.

BUSUN1:
The CIS faculty plan to upgrade to newer version of FreeBSD. The CIS faculty, based on input from employers, alumni, and advisors, has recommended that UNIX become part of the CIS program core. When that curriculum change is implemented many more students and faculty will use this server and hard drive space will become more critical. Due to changes in the CIS curriculum, which requires more hands-on experience with UNIX, the CIS faculty recommends that the BUSUN1 server is replaced with a faster computer with enough memory and disk storage to accommodate increased demand.

General comments:

To meet program requirements, we must always have the latest version of Microsoft Visual Studio (with Visual Basic, Visual C++, and Visual J++). This demands robust workstations in our offices, classrooms, and labs (Visual Studio

takes a lot of resources). We also need technical support to install and maintain these products.

Due to the rapidly changing nature of Information Technology, the CIS program experiences difficulties that are unique to such a technology-dependent program. Although the faculty meets frequently with employers, advisors, and alumni, we are not always able to determine what CIS program needs will be 5 or even 3 years ahead. We need to evaluate program, student, faculty, and employer needs on a continuing basis.

Our software needs to be upgraded, on average, every two years. Upgrading software is expensive both in terms of dollars and technical resources for installing and maintaining software. If each student were required to purchase or lease the software titles used in the CIS major, the expense of acquiring and upgrading software could be passed to the end-user. A number of universities currently require that students acquire their own software. The student cost would not be any greater than that of equipment required by some other programs here at Ferris. In many cases, student versions of software are available for a reduced price. One solution would be for each student to have a notebook computer with their own copy of the software and an Internet connection to any non-PC software or hardware, such as the mid-range computer (AS-400) and mainframe. The student's software would need to be . upgraded as they go through the CIS program.

Question 5:
What maintenance arrangements does the University have for computer hardware and software?

Answer:

Server specific comments:

AS - 400:
Maintenance of hardware and software is covered by our lease agreement.

COBNT01:
Supported by the CALL center.

COBNT2:
Supported first by CIS (ISYS-300 class -- hardware problems only) and then the CALL center.

BUSUN1:
Supported by the CALL center for hardware problems and by CIS faculty for software.

General comments:

    Lab, faculty, and classroom computers are supported by the CALL center. The biggest problem is the delay in obtaining new software on these systems.

Question 6:

    What budget concerns do you have which involve computer hardware and software for the CIS program?

Answer:

Server specific comments:

    AS - 400:
    The CIS program required funding to send teachers to IBM classes so they can learn how to use all the software available for this computer. The AS-400 has an extensive library of software solutions for all functional areas of business, the Internet, and general use. Learning to use these software products is a very time-consuming process.

    BUSUN1:
    The CIS program requires funding to replacing this server with one that is faster and has more memory and a larger hard drive. The older computer could then be retained for use in Advanced UNIX classes.

General comments:

    In addition to continual updating of equipment and software, the CIS program needs funds for faculty development.

    We are very concerned about computer equipment and support. The University does not have a plan to continually upgrade software and hardware. The College of Business should have a fixed amount of money to allocate to computers every year. Labs should be updated with new equipment on a schedule. One lab should be updated with new equipment each year. Software releases should be purchased and installed within six months of release!

    The software we currently use is Windows 95 and Office97, but we are approaching the year 2000. Students should be learning Windows 2000 and Office 2000 rather than Windows 95 and Office 97. The CIS program needs Windows 2000 & Office 2000 by the earliest possible date and no later than May 15th of 2000. We need additional technical support staff. All too often several hours pass before calls are returned. The technical support area has too few staff to support the 100's of computers used by CIS students in the College of Business.

The students have better equipment and software than we have in most labs. If we, the University are not going to provide the equipment and software, then let's require the students to come to Ferris with a current computer and software!

If we continue the way we are we will never get the equipment we need. The budget does not allow us to buy the state-of-the-art equipment frequently enough to maintain the ability to teach current technology.

Question 7:
Other comments or concerns for now or the future?

Answer:
Our program must constantly evolve. The CIS program, faculty, and students need to be supported with equipment, software, and professional development opportunities.

Section 9

Curriculum Evaluation

Section 9 - CURRICULUM EVALUATION

The Computer Information Systems (CIS) four year Bachelor of Science degree is designed to prepare students for positions as computer programmers, programmer/analysts, systems analysts, database administrators, network administrators, or microcomputer specialists in business and industry.

Depending on a student's background and area of interest, the degree is also available in several dual-major formats (CIS-Accountancy, CIS-Management, and CIS-Marketing) as well as in an accelerated three-year format (B.E.S.T.).

The CIS program at Ferris State University gives hands-on experience on mainframe, midrange, and microcomputer platforms. This assures employment opportunities with the highest potential salaries. Also, students can create an emphasis on any of these platforms by selecting the appropriate electives.

By requiring courses in the College of Business Core (Accounting, Business Communications, Business Law, Finance, Information Systems, Management, Marketing, and Quantitative Methods), the CIS program provides students with the necessary related business skills for immediate employment and for advancement to management positions.

Students earn credit through academic course work and may also earn credit through cooperative education. This industry experience permits students to learn in a hands-on atmosphere, applying theoretical knowledge to real-life situations.

Anticipated Curriculum Changes and Revisions

Careers in computer information systems are highly technical, rapidly changing, and represent the fastest growing career field of any occupational group (according to the U. S. Department of Labor). As employers demand new skills from our graduates, the CIS program must adapt to (and even anticipate) their requirements.

The future needs of employers are constantly being assessed. Based upon recommendations of the CIS Advisory Committee (an industry group), the *Occupational Outlook Handbook* published by the Bureau of Labor Statistics (an agency of the U. S. Department of Labor), and other sources (such as actual job postings), several curriculum modifications have either been submitted for adoption or are being prepared:

- An improved Computer Information Systems four-year Bachelor of Science degree with an increased emphasis on object-oriented techniques, Java programming, the Unix operating system, Internet-based systems, and e-commerce development.

- A new Management Information Systems (MIS) four-year Bachelor of Science degree. This degree will be fully accredited (meet ACBSP requirements), will appeal to management-oriented students, and be less technically challenging than the CIS degree.

- A new Computer Information Systems two-year Associate in Applied Science degree. This degree will prepare students for jobs in computer programming, microcomputer and network support, and Web development and will ladder into both the four-year CIS degree and the proposed MIS degree.

The Current CIS Curriculum

The following pages contain course descriptions and curriculum and course requirements (check sheets) for the Computer Information Systems degree program.

ISYS 101 INTRODUCTION TO PROGRAMMING (3 cr.) Stresses the importance of sound program design to speed development, reduce errors, and ease maintenance. Introduces structured and object-oriented program design methodologies. Visual BASIC is used to implement program designs. Prereq: None

ISYS 105 MICROCOMPUTER APPLICATIONS (3 cr.) Current microcomputer hardware and software. Microcomputer applications in business, industry, education and in the home will be explored. Opportunity to develop applications within an area of interest. Prereq: None

ISYS 200 DATABASE DESIGN AND IMPLEMENTATION (3 cr.) Introduces database concepts, design methodologies, and implementation procedures. Stresses the importance of sound database design to insure data integrity and flexibility. Common data structures, normalization techniques, integrity constraints, security features, query and report facilities are discussed. One or more popular commercial database management systems will be used to implement the designs. Prereq: ISYS 105 or equivalent and ISYS 202.

ISYS 202 PRINCIPLES OF INFORMATION SYSTEMS (3 cr.) Computer information systems in business. Emphasizing common business information needs, the system development and use, system security and integrity, and impact of such systems on careers and society. Preparation for future contact with and use of computer information systems. Prereq: None

ISYS 204 VISUAL BASIC PROGRAMMING (3 cr.) Visual BASIC, an Object-Oriented Event Driven (OOED) programming language, interwoven with logical problem solving will be used to create programs for Windows-based applications that are used in industry today. The program will include multiple forms, buttons, input boxes, IF then ELSE and loop processing, frames, and option buttons. Prereq: Recommend ISYS 105 or ISYS 202

ISYS 210 COMPUTER OPERATING SYSTEMS (3 cr.) Presents the functions and facilities of major operating systems and operating environments used on mainframe computers, midrange computers, and microcomputers. Emphasize what information system designers and developers must know to use operating system facilities wisely. Connectivity and the transfer of files across platforms is also presented. Prereq: ISYS 105 or equivalent and ISYS 202.

ISYS 212 INTRODUCTION TO C++ PROGRAMMING (3 cr.) Introduces major features of the C++ programming language. Common data types, looping and decision structures, functions, arrays, structures, pointers, string manipulation, I/O streams, and file processing are presented. A popular commercial C++ programming environment will be used to develop projects. Prereq: ISYS 101

ISYS 220 INTRODUCTION TO COBOL (3 cr.) Introduction to a common, business-oriented programming language. Coverage of COBOL Divisions and basic sequential access programs including input data edits, file updates, control breaks, and tables. Emphasis on structured programming methodology. A popular commercial COBOL programming environment will be used to develop projects. Prereq: ISYS 101 and prior or concurrent enrollment in ISYS 210

ISYS 300 MICROCOMPUTER HARDWARE SYSTEMS (3 cr.) Evaluate the acquisition, installation, maintenance, and troubleshooting of microcomputer equipment. Hands on activities directed to component problem resolution. Prereq: ISYS 105 or consent of professor

ISYS 301 DATABASE IMPLEMENTATION (3 cr.) Database management system implementation, to give students actual experience using database management software in a microcomputer environment. Not to be taken by students with credit for ISYS 200. Prereq: ISYS 105 for non-CIS majors only

ISYS 303 SYSTEMS ANALYSIS METHODS (3 cr.) Tools and techniques used by a system analyst from the end users perspective. The student will work within a group environment to design a business system. Course is for non-CIS majors. Prereq: ISYS 105 or 202

ISYS 304 ADVANCED VISUAL BASIC PROGRAMMING (3 cr.) Visual BASIC will be used to solve advanced business problems. These programs will include (OLE) interface to other programs, databases, business reports and error handling. The final program will include a program using setup, so that it can be used on any windows machine. Prereq: ISYS 101 or ISYS 204 – ISYS 200 is recommended.

ISYS 305 SOFTWARE SYSTEMS (3 cr.) Examines the use of commercial software products to meet an organization's information systems needs. Presents a methodology for analyzing information system requirements, evaluating competing software products, selecting and installing the product, training users, and supporting the product. Prereq: ISYS 105 or equivalent and ISYS 202

ISYS 308 PRINCIPLES OF COBOL PROGRAMMING (3 cr.) Introduction to business oriented high level programming language. COBOL divisions and basic COBOL statements. Students write and test basic programs. Several hours of computer time per student per week. Not to be taken by students with credit in ISYS 220. Prereq: ISYS 101; Non-CIS majors only

ISYS 309 PASCAL (3 cr.) Introduction to a business oriented high level programming language. PASCAL structure and basic statements are introduced. Students write and test basic programs. Several hours of computer time are required per student. Not to be taken by students with credit in CPSC 205. Prereq: ISYS 101

ISYS 310 LOCAL AREA NETWORKS (3 cr.) Lecture workshop experience with designing, planning, installing, and maintaining a local area network. Prereq: ISYS 105 (ISYS 305 co-req. recommended)

ISYS 311 INFORMATION SYSTEMS (3 cr.) Information Systems from the applied systems perspective. How Information Systems are used within various business disciplines. Course will have a case and project orientation. Prereq: ISYS 202 or equivalent and junior standing

ISYS 312 ADVANCED C++ PROGRAMMING (3 cr.) Object-oriented, C++ programming in a GUI environment. Introduces the use of classes, inheritance, polymorphism, exception handling, and Windows programming. A popular commercial C++ programming environment will be used to develop projects. Prereq: ISYS 212

ISYS 330 SYSTEMS ANALYSIS & DESIGN (3 cr.) The first course in structured methods of identifying the requirements for a system. This includes the analysis of current business operations and definitions of specific problems or opportunities. Goals, objectives, data, process design, and performance criteria are developed for the new system. Fulfills General Education "writing intensive course" requirements. Prereq: ISYS 200 and either ISYS 212 or ISYS 220.

ISYS 340 ADVANCED COBOL (4 cr.) Advanced COBOL techniques along with interactive and database programming. Students will write and test several programs using CICS and SQL along with VSAM files. Prereq: ISYS 220

ISYS 350 TELECOMMUNICATIONS (3 cr.) A study of telecommunication hardware, transmission media, networks, communication protocols, the Open System Interconnection model (OSI), and distributed networking/processing. The equipment, techniques, and software utilized in telecommunication systems are presented. Appropriate terminology and concepts utilized in telecommunications are introduced. A project requiring the design of a distributed data processing network will be assigned. Prereq: ISYS 210 and ISYS 310 is recommended

ISYS 360 MIDRANGE COMPUTING I (3 cr.) Discusses the reasons and placement of midrange computers in the organization. Messaging, connectivity, file creation and introductory RPG using SEU. AS/400 operating environment and AS/400 RPG are the primary topics. Covers fundamentals of RPG programming and RPG specification, logic and tools for interactive programming. Requires several hours of computer time per student per week. Prereq: ISYS 101

ISYS 365 MIDRANGE COMPUTING II (3 cr.) Screen design aid, on-line program development, RPG, menus, and help screens. Connectivity with PCs for data collection using PC support. Prereq: ISYS 360

ISYS 369 UNIX (3 cr.) A study of the UNIX Operating System. The architecture of UNIX, common features of the operating system, uses of UNIX, the evolution of UNIX, and comparisons of different versions of UNIX offered by software vendors are presented. Appropriate terminology and concepts of the operating system are introduced. Prereq: ISYS 105 or permission of the instructor

ISYS 400 CLIENT/SERVER IMPLEMENTATION (3 cr.) Emphasizes the advantages and requirements of client/server computing. A methodology for designing, developing, and maintaining client/server systems will be introduced. Client and server applications, connectivity, software development tools, and databases are discussed. A popular commercial client/server package will be used to develop a client/server system. Prereq: ISYS 200 and ISYS 310

ISYS 414 C++ AND DATABASE PROGRAMMING (3 cr.) Incorporates SQL with C++ and interactive techniques. Students will develop several SQL GUI programs. Several hours of computer time required per week. Prereq: ISYS 312

ISYS 430 SYSTEMS DESIGN AND IMPLEMENTATION (3 cr.) The second course in structured methods of defining, creating, and installing new information systems. This includes ISO9000 quality standards for software development. Methods of implementation, user manuals and responsibilities, and computer operations responsibilities are included along with test schedules, staffing and auditing requirements. Prereq: ISYS 330 and ISYS 350

ISYS 490 SPECIAL TOPICS (1-3 cr.) The study of current advanced topics not covered in other information systems courses. The course description will be provided for each offering. Prereq: Specific prerequisites will be provided when class is offered.

ISYS 491 CO-OP EDUCATION (1-9 cr.) Work experience relevant to the student's academic pursuits, personal development, and professional preparation with cooperating employer organizations in business, industry, government, and education. Must last a minimum of 15 weeks with the total hours worked approved by the Department Head. Prereq: department head approval

ISYS 499 ADVANCED SYSTEMS DESIGN AND IMPLEMENTATION (3 cr.) Team-oriented course designed to integrate systems analysis and design with programming. A computer application project, which is sufficiently difficult to require one semester, is assigned to a student team, for systems analysis, design, programming, and actual or simulated implementation. Prereq: ISYS 400 and ISYS 430

BACHELOR OF SCIENCE DEGREE IN BUSINESS

COMPUTER INFORMATION SYSTEMS - 128/130 Credits

NAME: _____   **SS#:** _____

REQUIRED		COURSE TITLE - PREREQUISITES SHOWN IN BRACKETS [ ]	CR HRS	GRADE
COMMUNICATION COMPETENCE - 9 Credits Required				
COMM	121	Fundamentals of Public Speaking - (None)	3	
ENGL	150	English 1 - (None)	3	
ENGL	250	English 2 - (ENGL 150 or equivalent)	3	
SCIENTIFIC UNDERSTANDING - 7-8 Credits Required				
		Select two courses from the following subject areas (one must be a lab course): ASTR, BIOL, CHEM, GEOG 111, GEOG 121, GEOL, PHSC, PHYS		
		Scientific Understanding with Lab	4	
		Scientific Understanding	3-4	
QUANTITATIVE SKILLS - 3 Credits Required				
MATH	115	Inter. Algebra - (MATH 110) - If MATH ACT score is 24 or higher, substitute a free elective.	3	
CULTURAL ENRICHMENT - 9 Credits Required				
		Select three courses from the following subject areas: ARCH 244, ARTH, ARTS, COMM 231, ENGL 322, FREN, GERM, HIST, HUMN, LITR, MUSI, SPAN, THTR At least one course must include at the 200 level or higher Global Consciousness requirement may be satisfied by either a Cultural Enrichment or Social Awareness course.		
		Cultural Enrichment Elective	3	
		Cultural Enrichment Elective	3	
		Cultural Enrichment Elective at the 200/300/400 level.	3	
SOCIAL AWARENESS - 9 Credits Required				
		Complete the courses listed below and select one course at the 300/400 level from the following subject areas: ANTH, GEOG (except 111 & 121), PLSC, PSYC, SOCY, SSCI Global Consciousness requirement may be satisfied by either a Cultural Enrichment or Social Awareness course.		
ECON	221	Principles of Economics 1 - (MATH 110 or proficiency)	3	
ECON	222	Principles of Economics 2 - (ECON 221)	3	
		Social Awareness Elective at the 300/400 level - Non-Economics	3	
RELATED COURSES - 6 Credits Required				
BUSN	209	Business Presentations - (COMM 121 and sophomore standing)	3	
STQM	341	Management Science 1 - (STQM 260, MATH 122 recommended)	3	

NOTICE REGARDING WITHDRAWAL, RE-ADMISSION AND INTERRUPTION OF STUDIES

Students who return to the university after an interrupted enrollment (not including summer semester)
must normally meet the requirements of the curriculum which are in effect at the time of their
return, not the requirements which were in effect when they were originally admitted.

NOTE: A 2.00 cumulative GPA is required for completion
of the Computer Information Systems degree.

5/1/97

REQUIRED		COURSE TITLE - PREREQUISITES SHOWN IN BRACKETS [ ]	S.H.	GRADE	GR. PTS.
COMPUTER INFORMATION SYSTEMS MAJOR - 43-44 Credits Required					
ISYS	101	Introduction to Programming - (None)	3		
ISYS	105	Microcomputer Applications or {pass proficiency test} - (None)	3		
ISYS	200	Database Design and Implementation - (ISYS 105 or equivalent and ISYS 202)	3		
ISYS	210	Computer Operating Systems - (ISYS 105 or equivalent and ISYS 202)	3		
ISYS	212	Introduction to C++ Programming - (ISYS 101)	3		
ISYS	220	Introduction to COBOL - (ISYS 101 and prior or concurrent enrollment in ISYS 210)	3		
ISYS	305	Software Systems - ISYS 105 or equivalent and ISYS 202)	3		
ISYS	310	Local Area Networks - (ISYS 105, ISYS 305 is recommended as co-requisite)	3		
ISYS	330	Systems Analysis and Design - (ISYS 200, ISYS 212 or ISYS 220)	3		
ISYS	350	Telecommunications - (ISYS 210 and ISYS 310 is recommended)	3		
ISYS	360	Midrange Computing 1 - (ISYS 101)	4		
ISYS	400	Client/Server Implementation - (ISYS 200, ISYS 310)	3		
ISYS	430	Systems Design and Implementation - (ISYS 330, ISYS 350)	3		
ADVANCED PROGRAMMING MAJOR COURSE - Select One Course					
ISYS	304	Advanced Visual Basic - (ISYS 101 or ISYS 204)	3		
ISYS	312	Advanced C++ Programming - (ISYS 212)	3		
ISYS	340	Advanced COBOL - (ISYS 220)	4		
ISYS	365	Midrange Computing 2 - (ISYS 340)	4		
BUSINESS CORE - 30 Credits Required					
ACCT	201	Principles of Accounting 1 - (MATH 110 with a grade of C- or better)	3		
ACCT	202	Principles of Accounting 2 - (ACCT 201 with a grade of C- or better)	3		
BLAW	321	Contracts and Sales - (None)	3		
ENGL	325	Advanced Writing for Business - (ENGL 250)	3		
FINC	322	Financial Management 1 - (ACCT 202, MATH 115)	3		
ISYS	202	Principles of Information Systems or {pass proficiency test} - (None)	3		
ISYS	499	Advanced Systems Design - (ISYS 400, ISYS 430)	3		
MGMT	301	Applied Management - (Junior standing or permission of professor)	3		
MKTG	321	Principles of Marketing - (ECON 221)	3		
STQM	260	Introduction to Statistics - (MATH 115)	3		
RELATED 300/400 LEVEL COURSES - 12 Credits Required					
		See recommendation below	3		
		See recommendation below	3		
		See recommendation below	3		
		See recommendation below	3		
RECOMMENDED COURSES: ACCT 310, 321, 322, 431, 441, ISYS 300, 304, 311, 312, 340, 365, 369, ISYS 490'S, 491, MFGE 441, MGMT 310, 371, 380, MKTG 466, 472, OSYS 409 (replacement pending)					

NOTE: A 2.00 GPA is required for both the major and business core.

5/1/97

BACHELOR OF SCIENCE DEGREE IN BUSINESS

ACCOUNTANCY/COMPUTER INFORMATION SYSTEMS - 139 Credits

NAME: _____   **SS#:** _____

REQUIRED		COURSE TITLE (PREREQUISITES SHOWN IN BRACKETS)	CR.	GRADE
COMMUNICATION COMPETENCE - 9 Credits Required				
COMM	121	Fundamentals of Public Speaking - (None)	3	
ENGL	150	English 1 - (None)	3	
ENGL	250	English 2 - (ENGL 150 or equivalent)	3	
SCIENTIFIC UNDERSTANDING - 7 Credits Required				
Select two courses from the following subject areas (one must be a lab course): ASTR, BIOL, CHEM, GEOG 111, GEOG 121, GEOL, PHSC, PHYS				
		Scientific Understanding with Lab	4	
		Scientific Understanding	3	
QUANTITATIVE SKILLS - 3 Credits Required				
MATH	122	Mathematical Analysis for Business - (MATH 115 with a grade of C- or better)	3	
CULTURAL ENRICHMENT - 9 Credits Required				
Complete the course listed below and select two courses from the following subject areas: ARCH 244, ARTH, ARTS, COMM 231, ENGL 322, FREN, GERM, HIST, HUMN, LITR, MUSI, SPAN, THTR				
LITR	287	Business in Literature - (ENGL 250)	3	
		Cultural Enrichment Elective - must be writing intensive at the 300 - 400 level.	3	
		Cultural Enrichment Elective	3	
SOCIAL AWARENESS - 9 Credits Required				
ECON	221	Principles of Economics 1 - (MATH 110 or proficiency)	3	
ECON	222	Principles of Economics 2 - (ECON 221)	3	
		Social Awareness Ele. 300 - 400 level non-econ. - Recom. GEOG 301, PLSC 323, 331 341.	3	

NOTE: A 2.00 cumulative GPA is required for completion
of the Accountancy/Computer Information Systems degree.

5/1/97

REQUIRED		COURSE TITLE - PREREQUISITES IN {} OR [] IN BRACKETS [ ]	S.H.	GRADE	GR. PTS.
		ACCOUNTANCY/COMPUTER INFORMATION SYSTEMS MAJOR - 69 Credits Required			
ACCT	310	Intermediate Accounting 1 - (ACCT 202 with a grade of C- or better)	3		
ACCT	312	Intermediate Accounting 2 - (ACCT 310)	3		
ACCT	321	Cost Accounting 1 - (ACCT 202 with a grade of C- or better)	3		
ACCT	350	Federal Income Tax 1 - (ACCT 202)	3		
ACCT	431	Accounting Systems and Controls 1 - (ACCT 310)	3		
ACCT	441	Auditing 1 - (ACCT 431)	3		
ACCT	561	Principles of Fund Accounting - (ACCT 312)	3		
ACCT		Accounting Elective - must be at the 300 level or above.	3		
ACCT		Accounting Elective - must be at the 300 level or above.	3		
ISYS	101	Introduction to Programming - (None)	3		
ISYS	105	Microcomputer Applications or {pass proficiency test} - (None)	3		
ISYS	200	Database Design and Implementation - (ISYS 105 or equivalent and ISYS 202)	3		
ISYS	210	Computer Operating Systems -(ISYS 105 or equivalent and ISYS 202)	3		
ISYS	212	Introduction to C++ Programming - (ISYS 101)	3		
ISYS	220	Introduction to COBOL - (ISYS 101 and prior or concurrent enrollment in ISYS 210)	3		
ISYS	310	Local Area Networks - (ISYS 105, ISYS 305 is recommended as co-requisite)	3		
ISYS		Advanced Programming Elective - ISYS 312 or ISYS 340 - (ISYS 212 or ISYS 220)	3		
ISYS	330	Systems Analysis and Design - (ISYS 200, ISYS 220)	3		
ISYS	350	Telecommunications -(ISYS 105 or equivalent and ISYS 202)	3		
ISYS	400	Client/Server Implementation - (ISYS 200, ISYS 310)	3		
ISYS	430	Systems Design and Implementation - (ISYS 330, ISYS 350)	3		
OSYS	209	Business Presentations - (COMM 121 and sophomore standing)	3		
STQM	341	Management Science 1 - (STQM 260, MATH 122 recommended)	3		
		BUSINESS CORE - 33 Credits Required			
ACCT	201	Principles of Accounting 1 - (MATH 110 with a grade of C- or better)	3		
ACCT	202	Principles of Accounting 2 - (ACCT 201 with a grade of C- or better)	3		
ACCT	599	Micro Applications in Accounting - (ACCT 312)	3		
BLAW	321	Contracts and Sales - (None)	3		
ENGL	325	Advanced Writing for Business - (ENGL 250)	3		
FINC	322	Financial Management 1 - (ACCT 202, MATH 115)	3		
ISYS	202	Principles of Information Systems or {pass proficiency test} - (None)	3		
ISYS	499	Advanced Systems Design - (ISYS 400, 430)	3		
MGMT	301	Applied Management - (Junior standing or permission of professor)	3		
MKTG	321	Principles of Marketing - (ECON 221)	3		
STQM	260	Introduction to Statistics - (MATH 115)	3		

**NOTE: To meet graduation requirements, an assessment examination
must be taken in both Accounting and Computer Information Systems.**

NOTE: A 2.00 GPA is required for both the major and business core.

5/1/97

BACHELOR OF SCIENCE DEGREE IN BUSINESS

COMPUTER INFORMATION SYSTEMS/MANAGEMENT - 153/154 Credits

NAME: _____   SS#: _____

REQUIRED		COURSE TITLE - PREREQUISITES SHOWN IN BRACKETS [ ]	S.H.	GRADE
COMMUNICATION COMPETENCE - 9 Credits Required				
COMM	121	Fundamentals of Public Speaking - (None)	3	
ENGL	150	English 1 - (None)	3	
ENGL	250	English 2 - (ENGL 150 or equivalent)	3	
SCIENTIFIC UNDERSTANDING - 7-8 Credits Required				
		Select two courses from the following subject areas (one must be a lab course): ASTR, BIOL, CHEM, GEOG 111, GEOG 121, GEOL, PHSC, PHYS		
		Scientific Understanding with Lab	4	
		Scientific Understanding	3-4	
QUANTITATIVE SKILLS - 6 Credits Required				
MATH	122	Mathematical Analysis for Business - (MATH 115 with a grade of C- or better)	3	
MATH	132	Calculus for Business - (MATH 122 with a grade of C- or better - recommend B- or better)	3	
CULTURAL ENRICHMENT - 9 Credits Required				
		Complete the course listed below and select two courses from the following subject areas: ARCH 244, ARTH, ARTS, COMM 231, ENGL 322, FREN, GERM, HIST, HUMN, LITR, MUSI, SPAN, THTR. Global Consciousness requirement may be satisfied by either a Cultural Enrichment or Social Awareness course.		
		Cultural Enrichment Elective	3	
		Cultural Enrichment Elective	3	
		Cultural Enrichment Elective at the 200/300/400 level.	3	
SOCIAL AWARENESS - 9 Credits Required				
		Complete the courses listed below and select one course at the 300/400 level from the following subject areas: ANTH, GEOG (except 111 & 121), PLSC, PSYC, SOCY, SSCI		
ECON	221	Principles of Economics 1 - (MATH 110 or proficiency)	3	
ECON	222	Principles of Economics 2 - (ECON 221)	3	
		Social Awareness Elective at the 300/400 level non-econ. - Recommended PLSC 323, 331, 341.	3	

NOTICE REGARDING WITHDRAWAL, RE-ADMISSION AND INTERRUPTION OF STUDIES

Students who return to the university after an interrupted enrollment (not including summer semester)
must normally meet the requirements of the curriculum which are in effect at the time of their
return, not the requirements which were in effect when they were originally admitted.

*NOTE: A 2.00 cumulative GPA is required for completion
of the Computer Information Systems/Management degree.*

6/1/99

REQUIRED		COURSE TITLE - PREREQUISITES SHOWN IN BRACKETS [ ]	S.H.	GRADE	GR. PTS
COMPUTER INFORMATION SYSTEMS/MANAGEMENT MAJOR - 79 Credits Required					
ACCT	205	Managerial Accounting - (ACCT 202 with a grade of C- or better)	3		
BLAW	301	Legal Environment of Business - (None)	3		
BUSN	209	Business Presentations - (COMM 121, sophomore standing)	3		
INTB	310	International Business System - (ECON 222)	3		
ISYS	101	Introduction to Programming - (None)	3		
ISYS	105	Microcomputer Applications or {pass proficiency test} - (None)	3		
ISYS	200	Database Design and Implementation - (ISYS 105 or equivalent and ISYS 202)	3		
ISYS	210	Computer Operating Systems - (ISYS 105 or equivalent and ISYS 202)	3		
ISYS	212	Introduction to C++ Programming - (ISYS 101)	3		
ISYS	220	Introduction to COBOL - (ISYS 101 and prior or concurrent enrollment in ISYS 210)	3		
ISYS	310	Local Area Networks - (ISYS 105, ISYS 305 is recommended as co-requisite)	3		
ISYS		Advanced Programming Elective - ISYS 312 or ISYS 340 - (ISYS 212 or ISYS 220)	3		
·YS	330	Systems Analysis and Design - (ISYS 200, ISYS 212 or ISYS 220)	3		
S	350	Telecommunications - (ISYS 105 or equivalent and ISYS 202)	3		
.S	400	Client/Server Implementation - (ISYS 200, ISYS 310)	3		
ISYS	430	Systems Design and Implementation - (ISYS 330, ISYS 350)	3		
MGMT	302	Organizational Behavior - (MGMT 301)	3		
MGMT	305	Supervision and Leadership - (Second semester sophomore standing)	3		
MGMT	355	Managerial Economics - (ECON 222, MGMT 301)	3		
MGMT	371	Production/Operations Management - (Junior standing)	3		
MGMT	373	Human Resource Management - (MGMT 301)	3		
MGMT	405	Management Decision - Making Lab 1 - (Senior standing)	1		
MGMT	447	Business Ethics and Social Responsibility - (Senior standing)	3		
STQM	351	Quality Control for Management - (STQM 260)	3		
		Recommended Elective - See below	3		
		Recommended Elective - See below	3		
		Recommended Elective - See below	3		

RECOMMENDED ELECTIVES

CIS Area: ACCT 310, 321, 322, 431, 441, MFGE 441, ISYS 305, 310, 312, 340, 360, 365, 370, 400, 405, 410, 414, 491, MKTG 365, 466, 472, OSYS 310, 409, PREL 340

MGT Area: ADVG 222, BLAW 421, FINC 323, INTB 320, 450, MGMT 310, 374, 375, 380, 491, 497, MKTG 410, 425, 466, 473, OSYS 409, STQM 322, 341, 352, 442

		BUSINESS CORE - 34 Credits Required			
ACCT	201	Principles of Accounting 1 - (MATH 110 with a grade of C- or better)	3		
ACCT	202	Principles of Accounting 2 - (ACCT 201 with a grade of C- or better)	3		
BLAW	321	Contracts and Sales - (None)	3		
ENGL	325	Advanced Writing for Business - (ENGL 250)	3		
FINC	322	Financial Management 1 - (ACCT 202, MATH 115)	3		
ISYS	202	Principles of Information Systems or {pass proficiency test} - (None)	3		
ISYS	499	Advanced Systems Design - (ISYS 400, ISYS 430)	3		
MGMT	301	Applied Management - (Junior standing or permission of professor)	3		
MGMT	499	Strategy and Business Policy - (FINC 322, MGMT 302, 371, MKTG 321)	4		
MKTG	321	Principles of Marketing - (ECON 221)	3		
STQM	260	Introduction to Statistics - (MATH 115)	3		

NOTE: A 2.00 GPA is required for both the major and business core.

6/1/99

BACHELOR OF SCIENCE DEGREE IN BUSINESS

COMPUTER INFORMATION SYSTEMS/MARKETING - 145/146 Credits

NAME: _____ SS#: _____

REQUIRED		COURSE TITLE - PREREQUISITES SHOWN IN BRACKETS ( )	S.H.	GRADE
COMMUNICATION COMPETENCE - 12 Credits Required				
COMM	121	Fundamentals of Public Speaking - (None)	3	
ENGL	150	English 1 - (None)	3	
ENGL	250	English 2 - (ENGL 150 or equivalent)	3	
ENGL	311	Advanced Technical Writing - (ENGL 211 or 250)	3	
SCIENTIFIC UNDERSTANDING - 7/8 Credits Required				
		Select two courses from the following subject areas (one must be a lab course): ASTR, BIOL, CHEM, GEOG 111, GEOG 121, GEOL, PHSC, PHYS		
		Scientific Understanding with Lab	4	
		Scientific Understanding	3-4	
QUANTITATIVE SKILLS - 3 Credits Required				
MATH	122	Mathematical Analysis for Business - (MATH 115 with a grade of C- or better)	3	
CULTURAL ENRICHMENT - 9 Credits Required				
		Select three courses from the following subject areas: ARCH 244, ARTH, ARTS, COMM 231, ENGL 322, FREN, GERM, HIST, HUMN, LITR, MUSI, SPAN, THTR These courses must include at least one course at the 200 level or higher		
		Cultural Enrichment Elective	3	
		Cultural Enrichment Elective	3	
		Cultural Enrichment Elective at the 200/300/400 level.	3	
SOCIAL AWARENESS - 9 Credits Required				
		Complete the courses listed below and select one course at the 300/400 level from the following subject areas: ANTH, GEOG (except 111 & 121), PLSC, PSYC, SOCY, SSCI		
ECON	221	Principles of Economics 1 - (MATH 110 or proficiency)	3	
ECON	222	Principles of Economics 2 - (ECON 221)	3	
		Social Awareness Elective at the 300/400 level non-econ. - Recommended PLSC 323, 331, 341.	3	

*NOTE: A 2.00 cumulative GPA is required for completion
of the Computer Information Systems/Marketing degree.*

5/1/97

REQUIRED		COURSE TITLE - PREREQUISITES SHOWN IN BRACKETS [ ]	S.H.	GRADE	CR. PTS
COMPUTER INFORMATION SYSTEMS/MARKETING MAJOR - 69 Credits Required					
ISYS	101	Introduction to Programming - (None)	3		
ISYS	105	Microcomputer Applications or {pass proficiency test} - (None)	3		
ISYS	200	Database Concepts and Facilities - (ISYS 105 or equivalent and ISYS 202)	3		
ISYS	210	Computer Operating Systems - (ISYS 105 or equivalent and ISYS 202)	3		
ISYS	212	Introduction to C++ Programming - (ISYS 101)	3		
ISYS	220	Introduction to COBOL - (ISYS 101 and prior or concurrent enrollment in ISYS 210)	3		
ISYS	310	Local Area Networks - (ISYS 105, ISYS 305 is recommended as co-requisite)	3		
ISYS		Advanced Programming Elective - ISYS 312 or ISYS 340 - (ISYS 212 or ISYS 220)	3		
ISYS	330	Systems Analysis and Design - (ISYS 200, ISYS 212, ISYS 220)	3		
ISYS	350	Telecommunications - (ISYS 105 or equivalent and ISYS 202)	3		
ISYS	400	Client/Server Implementation - (ISYS 200, ISYS 310)	3		
ISYS	430	Systems Design and Implementation - (ISYS 330, ISYS 350)	3		
MKTG	322	Consumer Behavior - (MKTG 321, PSYC 150)	3		
MKTG	365	Transportation - (MKTG 321)	3		
MKTG		MKTG 378 or MKTG 430 - (Both require MKTG 321, STQM 260)	3		
MKTG	425	Marketing Research - (MKTG 321, STQM 260)	3		
MKTG	441	International Marketing - (MKTG 321, senior standing) - (G)	3		
MKTG		MKTG 473 - (MKTG 321) or MKTG 476 - (MKTG 425, senior standing)	3		
MKTG		Marketing Elective - See below	3		
MKTG		Marketing Elective - See below	3		
MKTG		Marketing Elective - See below	3		
MKTG		Marketing Elective - See below	3		
Marketing Electives: ADVG 486, MKTG 341, 375, 383, 410, 436, MKTG 466, 472, 485, 491, PREL 340, RETG 337					
OSYS	209	Business Presentations - (COMM 121, sophomore standing)	3		
BUSINESS CORE - 33 Credits Required					
ACCT	201	Principles of Accounting 1 - (MATH 110 with a grade of C- or better)	3		
ACCT	202	Principles of Accounting 2 - (ACCT 201 with a grade of C- or better)	3		
BLAW	321	Contracts and Sales - (None)	3		
ENGL	325	Advanced Writing for Business - (ENGL 250)	3		
FINC	322	Financial Management 1 - (ACCT 202, MATH 115)	3		
ISYS	202	Principles of Information Systems or {pass proficiency test} - (None)	3		
ISYS	499	Advanced Systems Design - (ISYS 400, ISYS 430)	3		
MGMT	301	Applied Management - (Junior standing or permission of professor)	3		
MKTG	321	Principles of Marketing - (ECON 221)	3		
MKTG	499	Marketing Policy - (Last semester senior or permission of professor)	3		
STQM	260	Introduction to Statistics - (MATH 115)	3		
ADDITIONAL - 3 Credits Required					
ADVG	222	Principles of Advertising - (None)	3		

(G) Meets Global Consciousness requirement.

NOTE: A 2.00 GPA is required for both the major and business core.

5/1/97

Ferris State University
B.S. in Business - Computer Information Systems
Three-Year Program

9

FIRST YEAR

Fall Semester

202	Princ. of Info. Systems	3____
101	Intro to Programming	3____
M 121	Public Speaking	3____
T 201	Princ of Acct I	3____
ral Enrichment Elective		3____
		15

Winter Semester

210	Operating Systems	3____
212	Intro C++ Prog	3____
T202	Princ of Acct II	3____
L 250	English 2	3____
M 260	Bus Statistics I	3____
		15

Summer Schedule

N 221	Princ. Of Economics	3____
T 301	Applied MGT	3____
ural Enrichment (200+)		3____
		9

SECOND YEAR

Fall Semester

OSYS 209	Bus Presentation	3____
ISYS 220	COBOL Programming	3____
ISYS 200	Data Base	3____
ECON 222	Princ of Econ 2	3____
ISYS 305	Software Systems	3____
		15

Winter Semester

ENGL 325	Adv Bus Wel	3____
ISYS 330	Systems Anal/Design	3____
ISYS 310	Local Area Networks	3____
MKTG 321	Princ of Marketing	3____
ISYS 360	Midrange Comput	4____
		16

Summer Semester

| ISYS 491 | Co-op | 9____ |

THIRD YEAR

Fall Semester

FINC 322	Financial Mgmt I	3____
ISYS 350	Telecommunications	3____
BLAW 321	Contracts and Sales	3____
ISYS 430	Systems Design / Impl	3____
ISYS NNN	Advance Language	4____
		16

Winter Semester

ISYS 400	Client/Server Impl	3____
ISYS 499	Advanced Systems	3____
STQM 341	Management Science	3____
Social Awareness not Economics**		3____
Related Electives (300+)		3____
		15

Total Hours Required for Graduation   128/130

ANCED PROGRAMMING MAJOR COURSE-Select One

irse		
304	Advanced Visual Basic-(ISYS 101 or ISYS 204)	
312	Advanced C++ Programming- (ISYS 212)	
340	Advanced COBOL- (ISYS 220)	
365	Midrange Computing 2- (ISYS 340)	

PLACEMENT CREDIT ASSUMPTIONS:

ENGL 150	English 150	3 cr.
Laboratory Science		4 cr.
Science Elective		4 cr.
MATH 115	Intermediate Algebra	3 cr.
ISYS 105	Microcomputer App	3 cr.
Cultural Enrichment		3 cr.
		20 cr.

(OVER, PLEASE)

uch as PLSC 323, PLSC 331, PLSC 341CLEP, PROFICIENCY, AND/OR ADVANCED

Section 10

Enrollment Trends Over the Past Five Years

# Section 10 - ENROLLMENT TRENDS OVER THE PAST FIVE YEARS

Enrollment
Demand for the CIS program remains high. Despite enrollment declines earlier this decade, enrollment is growing. Total enrollment has increased from 243 in 1994 to 306 in 1998. The popularity of the CIS program with off-campus and Internet students is, in part, responsible for this increase.

Although the demand for IT professionals is at an all-time high and demand predicted to grow for several years (see Labor Market Analysis), enrollments in Computer Information Systems programs throughout the nation have been declining or not keeping pace with the increased demand for graduates. CIS program graduates have had a history of high placement rates, but during the past several years most Ferris CIS program graduates have had several job offers from which to choose. In 1998 the placement rate for Ferris graduates was 100 percent.

The number of graduates has increased during the last year, mirroring the enrollment increases the CIS program has experienced recently.

	Fall 1994	Fall 1995	Fall 1996	Fall 1997	Fall 1998	Percent Increase (1995 to 1998)
On-Campus	243	226	241	234	260	14%
Off-Campus	0	13	25	45	46	254%
Total	243	239	266	279	306	28%
Graduates	50	50	41	32	47	

CIS Program Enrollment Data
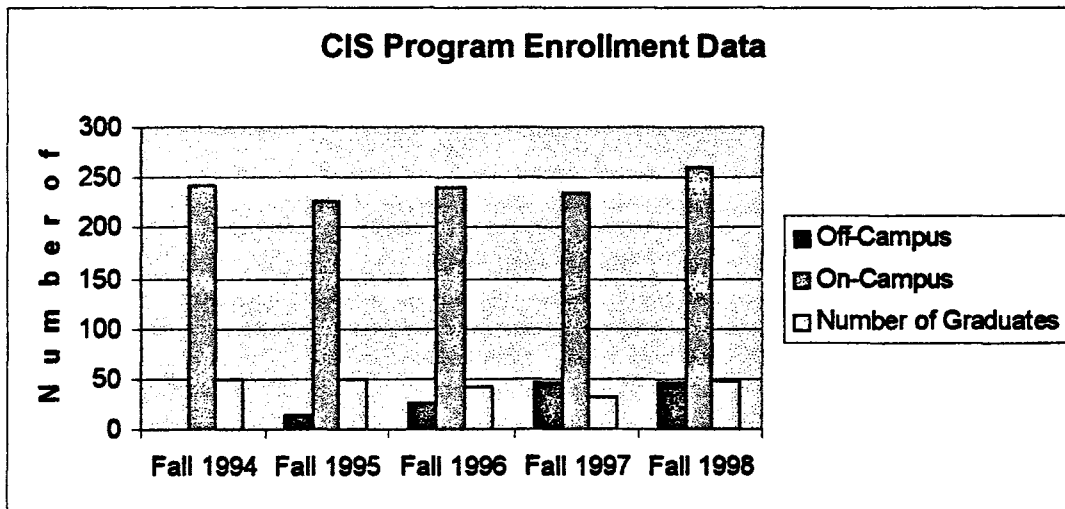
Section 11

Program
Productivity / Cost

Although the number of students has increased during the past five-year period, the number of full-time equivalent faculty has decreased. During the same five-year period the funds available for Supplies and Expense has been cut drastically.

Of primary concern is the number of Full Time Tenure Track faculty, currently 9.5, trying to teach all sections of CIS courses to majors and also teach the heavy service course load. The official Productivity Report for Ferris State University's CIS program is shown below.

	Fall 1994	Fall 1995	Fall 1996	Fall 1997	Fall 1998
Number of Faculty	21	20	13	14	9.5
Expenditures					
Supply & Expense	$63,756.00	$109,204.00	$34,198.00	$34,688.00	$23,792.00
Equipment					$15,361.00
Gifts and Grants			$ 3,555.00	$ 1,972.00	$ 6,069.00
Productivity	501.55	462.68	463.14	459.17	451.64

FERRIS STATE UNIVERSITY

Student Credit Hours (SCH), Full Time Equated Faculty (FTEF) and SCH/FTEF
Aggregated by Course Prefix within College and Department

Prefix	Year	Student Credit Hours				Full Time Equated Faculty				SCH/FTEF			
		Summer	Fall	Winter	F + W (a)	Summer	Fall	Winter	Avg F+W (b)	Summer	Fall	Winter	F + W (a/b)
College of Business													
Accountancy/Computer Info Systems													
OSYS	1998-99	0.00	87.00	0.00	87.00	0.00	0.40	0.00	0.20		217.50		435.00
STQM	1996-97	392.50	956.00	1,063.00	2,019.00	3.19	4.38	4.71	4.45	123.22	227.70	225.77	453.36
Computer Info Systems													
CISM	1994-95	247.00	160.00	284.00	444.00	2.73	2.54	3.08	2.81	90.52	63.09	92.11	158.03
CISM	1995-96	565.00	198.00	315.00	513.00	2.30	2.17	3.55	2.86	245.47	91.24	88.82	179.48
COQI	1995-96	39.00	60.00	0.00	60.00	0.38	0.92	0.00	0.46	104.00	65.45		130.91
CSYS	1994-95	108.00	256.00	222.00	478.00	0.67	2.67	2.33	2.50	161.19	95.88	95.28	191.20
CSYS	1995-96	96.00	92.00	37.00	129.00	1.00	1.73	2.00	1.86	96.00	53.26	18.50	69.22
ISYS	1994-95	1,118.00	3,903.00	4,309.00	8,212.00	5.52	13.00	15.47	14.23	202.54	300.23	278.57	576.92
ISYS	1995-96	1,043.00	4,222.00	4,211.00	8,433.00	3.91	15.20	15.19	15.19	266.52	277.79	277.23	555.02
OSYS	1994-95	276.00	831.00	815.00	1,646.00	1.39	4.00	4.46	4.23	199.16	207.75	182.93	389.34
OSYS	1995-96	155.00	624.00	549.00	1,173.00	1.25	2.77	2.67	2.72	124.00	225.05	205.25	430.66
STQM	1994-95	612.00	1,520.00	1,419.00	2,939.00	3.14	6.51	5.25	5.88	194.90	233.52	270.29	499.87
STQM	1995-96	435.00	1,129.00	1,137.00	2,266.00	2.38	3.77	4.33	4.05	183.16	299.25	262.59	559.32
Economics/Applied Statistics													
ECON	1997-98	519.00	1,716.00	1,935.00	3,651.00	2.50	4.42	5.00	4.71	207.60	388.53	387.00	775.43
ECON	1998-99	423.00	1,635.00	1,650.00	3,285.00	1.75	4.75	4.75	4.75	241.71	344.21	347.37	691.58
STQM	1997-98	450.00	973.00	1,005.00	1,978.00	2.75	4.53	4.17	4.35	163.64	214.63	241.20	454.71

1994-99 Productivity Report - Page 25

The CIS program conducts classes for CIS majors and service courses for programs within the College of Business and programs outside the College of Business.

Courses are offered, whenever possible, in labs with computer facilities for students to use during class. Due to the limited number of computers in the instructional labs and the limited number of lab-type classrooms, the CIS program must set caps on enrollment in each section offered.

Because the College of Business has too few instructional labs, some classes are offered in classrooms with one teacher workstation and a projection unit or monitor(s). In order for students to be able to see the screen, projection equipment is placed in classrooms that seat 30 or fewer students. Due to the visibility problem inherent with this teaching method, the CIS program must set caps on enrollment in each section offered in these classrooms.

The CIS faculty believes that the smaller class sizes improve the quality of both teaching and learning.

Section 12

Conclusions

Section 12 - CONCLUSIONS

The CIS Program is a strong, viable program whose graduates are in increasingly high demand in the workplace.

Strengths

1. The number of students enrolled in the CIS program is increasing. Many students are earning a Minor in Computer Information Systems and the Summer Computer Institute remains popular with practicing K-12 teachers.

2. The ACT score of the average CIS major is increasing. The Information Technology career is an exciting, challenging career choice. The Ferris graduate will help fulfill the need for intelligent and highly motivated workers in the workplace.

3. The placement rate for Ferris CIS Program graduates has increased over the last five years and, in 1998, the placement rate was 100%.

4. Ferris graduates have experienced large increases in entry-level salaries. In 1994 the average starting salary was less than $28,000, while in 1998 the average starting salary was $39,000. In 1998 some graduates earned more than $50,000 as their starting salary for an entry-level position.

5. Ferris Computer Information Systems graduates receive a strong background in multiple computer platforms including mainframe, mid-range, and microcomputers.

6. The CIS curriculum provides a strong background in systems analysis and design and database communication. In addition, Ferris students learn multiple software languages and complete advanced highly technical projects.

7. The CIS program is fortunate to have an active, interested Advisory Committee who provides guidance concerning the IT market, emerging technologies, and general input towards curriculum changes. Advisors represent a wide range of industries including manufacturing, government, consulting, insurance, banking, and more. More than one-third of the CIS advisory committee responded to the Advisor survey and many others responded as employers or alumni.

8. The Computer Information Systems Association (CISA) is the CIS program student organization. The CISA, with assistance from faculty advisors and the CIS program Advisory Committee, provides a forum to students, faculty, potential employers, and advisors to meet and discuss issues related to Information Technology.

9. The CIS program encourages students to acquire as much "hands-on" work experience as possible during the students' tenure at Ferris. The number of students participating in Co-op and Internship positions has increased.

Concerns

1. Professional development is a major area of concern to faculty and administrators of the CIS program. In the constantly evolving world of Information Technology, CIS faculty needs opportunities and resources for learning new technologies. Professional development funds for faculty training must be increased.

2. Currently, more than 50% of CIS courses are being taught by adjunct and part-time faculty or as overload courses. The CIS program does not employ enough full-time faculty to meeting growth expectations on and off campus.

3. The College of Business is in the process of seeking accreditation through the ACBSP. Accreditation requirements dictate that a certain percentage of courses are taught by faculty who has earned a terminal degree. Few CIS program faculty have earned Ph.D. or terminal degrees. Also, the need for this "disputed" by our advisory committee. They believe work experience and teaching skills are much more important than advanced degrees.

4. Technical support for existing and emerging technologies is a scarce resource. For a program like CIS that is dependent on electronic systems of software and hardware, this shortage of technical support staff is a detriment.

5. Another concern of the CIS program faculty is the ability to offer consistent, equitable instruction to off-campus students. Not only is there a lack of distance learning capabilities for off campus sites, but also off campus students do not have access to the necessary hardware and software in every class.

6. Additional budgetary support must be provided to address programmatic concerns that effect enrollment, delivery of instruction and perception of the CIS program by current and prospective students.

7. The faculty's' average age is 54. Within the next five years, more than half the faculty will probably retire.

8. Lab facilities for classroom instruction are outdated and will not meet projected needs for the next academic year.

Section 13

Recommendations

Section 13 - RECOMMENDATIONS

In order to meet the goals of the CIS program and exemplify the mission of Ferris State University, the CIS faculty have set forward the following goals and recommendations.

Goals	Recommendation
Increase faculty development funds so that professional development is a regular, ongoing part of each faculty member's activity.	Increase development funds for faculty to attend technology-training seminars.
Hire additional tenure track Ph.D. faculty	Add 3 FTE Ph.D. tenure-track faculty
Implement a new Bachelor of Science degree in Management Information Systems	This should improve retention of less technically-oriented students and satisfy ACBSP requirements.
Implement a new Associate degree in Applied Science (AAS) in Computer Information Systems	Ferris should provide resources to implement and disseminate information concerning two-year degree option.
Implement expanded CIS curriculum	
Establish a Computer Institute to combine the existing Summer Computer Institute (SCI), AS/400 Institute, High School Internet courses, and non-credit seminars as a profit-making Institute.	
Offer the existing AS/400 Institute at additional off-campus sites.	Offer the AS/400 Institute in Dowagiac, Muskegon, and Traverse City.
Implement improved support for technical services provided by faculty.	Provide at least .25 FTE release time to individual faculty for supporting and maintaining each server within the CIS program
Increase internship opportunities for students.	Increase travel funds to help faculty promote and supervise internship positions for CIS students in industry.
Faculty Development funds are available for each faculty member to get one full week of professional training per academic year.	Development funds of $3000 per faculty member - $2000 for one week of training, plus $1000 for travel.
Students, both on-campus and off-campus, should have access to equivalent technology, both hardware and software.	Require student purchase of notebook computers equipped with NIC card and software required in CIS program.

Appendix H

Program Review Panel Evaluation

PROGRAM REVIEW PANEL EVALUATION

Program: _Computer Informations Systems_

Instructions: Circle the number which most closely describes t he program you are evaluating.

1.   **Student Perception of Instruction**   Average Score _3.80_

5	4 X	3	2	1

Currently enrolled
students rate instructional
effectiveness as extremely high.

Currently enrolled students
rate the instructional
effectiveness as below average.

2.   **Student Satisfaction with Program**   Average Score _3.80_

5	4 X	3	2	1

Currently enrolled students are
very satisfied with the program
faculty, equipment, facilities, and
curriculum.

Currently enrolled students are
not satisfied with program faculty,
equipment, facilities, or curriculum.

3.   **Advisory Committee Perceptions of Program**   Average Score _4.40_

5	X 4	3	2	1

Advisory committee members
perceive the program curriculum,
facilities, and equipment to be of
the highest quality.

Advisory committee members
perceive the program curriculum,
facilities, and equipment needs
improvement.

4.   **Demand for Graduates**   Average Score _4.80_

5 X	4	3	2	1

Graduates easily find
employment in field.

Graduates are sometimes forced
to find positions out of their field.

5.   **Use of Information on Labor Market**   Average Score _5.00_

X	4	3	2	1

The faculty and administrators
use current data on labor market
needs and emerging trends in job
openings to systematically develop
and evaluate the program.

The faculty and administrators
do not use labor market data in
planning or evaluating the
program.

6.   Use of Profession/Industry Standards   Average Score _3.25_

5	4	X 3	2	1

Profession/industry standards
(such as licensing, certification,
accreditation) are consistently
used in planning and evaluating
this program and content of its
courses.

Little or no recognition is given to
specific profession/industry
standards in planning and
evaluating this program.

7.   Use of Student Follow-up Information   Average Score _3.50_

5	4	X 3	2	1

Current follow-up data on
completers and leavers are
consistently and systematically
used in evaluating this program.

Student follow-up information
has not been collected for use in
evaluating this program.

8.   Relevance of Supportive Courses   Average Score _4.00_

5	X	3	2	1

Applicable supportive courses
are closely coordinated with this
program and are kept relevant to
program goals and current to the
needs of students.

Supportive course content reflects
no planned approach to meeting
needs of students in this program.

9.   Qualifications of Administrators and Supervisors   Average Score _4.00_

5	X	3	2	1

All persons responsible for
directing and coordinating this
program demonstrate a high level
of administrative ability.

Persons responsible for directing
and coordinating this program
have little administrative training
and experience.

10.   Instructional Staffing   Average Score _2.25_

5	4	3	X 2	1

Instructional staffing for this
program is sufficient to permit
optimum program effectiveness.

Staffing is inadequate to meet the
needs of this program effectively.

11.   Facilities   Average Score _2.50_

5	4	3	X 2	1

Present facilities are sufficient
to support a high quality program.

Present facilities are a major
problem for program quality.

12.   **Scheduling of Instructional Facilities**   Average Score _3.00_

5	4	X	2	1

Scheduling of facilities and
equipment for this program is
planned to maximize use and be
consistent with quality instruction.

Facilities and equipment for this
are significantly under-or-over
scheduled.

13.   **Equipment**   Average Score _2.25_

5	4	3	X 2	1

Present equipment is sufficient
to support a high quality program.

Present equipment is not
adequate and represents a threat
to program quality.

14.   **Adaption of Instruction**   Average Score _3.75_

5	4 X	3	2	1

Instruction in all courses required
for this program recognizes and
responds to individual student
interests, learning styles, skills, and
abilities through a variety of instructional
methods (such as, small group or individualized
instruction, laboratory or "hands on" experiences,
credit by examination).

Instructional approaches in this
program do no consider individual
student differences.

15.   **Adequate and Availability of Instructional Materials
and Supplies**   Average Score _3.25_

5	4	X 3	2	1

Faculty rate that the instructional
materials and supplies as being
readily available and in sufficient
quantity to support quality
instruction.

Faculty rate that the instructional
materials are limited in amount,
generally outdated, and lack
relevance to program and student
needs.

Appendix H						
Question Number						Average
1	4	4	4	4	3	3.80
2	4	4	4	4	3	3.80
3	4	4	5	5	4	4.40
4	4	5	5	5	5	4.80
5	5	5	5	5	5	5.00
6	3	3	4	3		3.25
7	4	3	4	3		3.50
8	5	3	5	3		4.00
9	4	3	5	4		4.00
10	3	2	2	2		2.25
11	3	2	3	2		2.50
12	4	2	4	2		3.00
13	3	2	2	2		2.25
14	4	3	4	4		3.75
15	3	3	4	3		3.25