The Assessment Plan adopted by the Computer Science program in the Fall 1996 semester has the following components:

- Capstone Course
- Performance Reviews
- Faculty Inventory
- Alumni Survey
- Student Survey
- Program Reviews
- GRE's and Graduate School Admissions
- Instructor/Course Evaluations

Below we will elaborate on each item.

**Capstone course (C435)**

This course has more computer science prerequisites than any other in our curriculum. It is typically taken by students after they have completed most of their course work in computer science.

The instructors (Dr. Wolfer, Dr. Russo and Dr. Hakimzadeh) have taught this course for many years, so they are well-positioned to assess the skills of the students who enter this course and to compare them with students who have taken the course in the past.

In the last number of years, the instructors have observed general improvement in the preparation and quality of the students enrolling in this course. In the early to mid 90's the instructors who taught the course found that students arrived with deficiencies in

1. manipulation of standard data structures such as linked lists,
2. organizing large programs,
3. basic programming skills (file I/O, dynamic allocation, etc.),
4. working together successfully in teams.

They attributed this to the fact that there had just been a change in the programming language we were
requiring students to use and the fact that some students were progressing so slowly in the program (due to full-time outside employment) that they had forgotten many of the skills they had been taught in earlier courses by the time they arrived at C435.

More recently, however, the majority of students seem to arrive with their fundamental programming skills intact. The addition of C308 (which involves a serious team project) as a prerequisite for C435 has improved the ability of the students to work in teams. Some problems remain, but they are probably intractable: a few students arrive with weak programming skills, and some students try to let others on their teams do all the work on the big project.

Performance Reviews

Three courses in the recent past have required students to present the results of significant projects to the instructor or to the class. The courses are C308 (System Analysis and Design), Y398 (Internship - Professional Practice) and B481 (Computer Graphics).

C308 is a team/project oriented class and acts as a gateway to our upper level courses. In the past four years, C308 has been taught as a 4 credit course. As the result of this change the instructor reports that he has been able to refine and add a number of new component to this course. In previous years a number of software tutorials have been developed to aid students in learning. These tutorials include, Computer Aided Software Engineering, Visual Basic and Database Management. In addition, the course involves 6 to 8 hours of in class group discussion and brainstorming. These sessions are highly interactive and simulate an analysis and design session common in industry. The brainstorming sessions are used to provide hands on help on issues related to the final project. The project in this course is a substantial undertaking for the students to plan, analyze, design and implement a large scale and complex information system. Student are required to present their final implementation in front of the entire class.

Students in Y398 are required to be fairly far along in the computer science curriculum. They are placed in jobs in various high-tech firms in the Michiana region and required to perform work that uses the latest in computer technology.

The experiences that these students report give the Computer Science faculty significant feedback on the ability of our majors to make use of what they have learned in our courses. The internship director conducts a weekly review with each student separately in which the student submits a standard form that he/she has filled out and then makes an oral report on their job activities. The students must also submit several 3 to 4 page reports on the projects they work on during the semester. Finally, they must submit a 20 to 30 page paper that elaborates on one of the shorter reports; this final report undergoes revision and is then posted in the department.

Most of the students report initially that they feel overwhelmed and as if they don't really know what
they are doing, but they quickly discover (in almost every case) that they are quite capable of performing high level useful work for their company. Usually they must learn to use unfamiliar software on the job, and they sometimes tell us that they wish we offered such training in the computer science curriculum. Our standard reply is that there are so many different kinds of software in use in the workplace that it would be impossible for us to offer enough such training to be useful to every student. The interns do report that some of the courses they have taken have been useful (examples are the Advanced PC Techniques class, courses that use the UNIX operating system, the systems analysis and design class, and courses that involve computer networks or hardware such as C335 and C421).

The B481 computer graphics course, involves a significant project, requiring both research and implementation allowing the students to express their imagination and creativity. Typical projects involved two or three dimensional transformation of objects within a scene (i.e. modeling of the Solar System or navigating through a mazes). The instructor reported that students were well prepared for this course and the prerequisites were adequate to support the activities in the course.

**Faculty Inventory**

The entire computer science faculty meets on a monthly basis to discuss curriculum issues and ways to improve our delivery of our subject to the students. In these discussions we share our perceptions of student achievement and the information we have gleaned from instructor/course evaluations filled out by our students. We have on occasion included student representatives in our departmental meetings to get their perspectives. In addition, our discussions have to some extent been informed by student responses to the email survey that the student chapter of the ACM distributed to our majors. The responses from our alumni surveys will also have a impact on our decision making.

During the current academic year we have discussed the following issues relating to student performance and departmental objectives.

a. The introduction of new courses for non majors (A107 - Programming Within Applications and A150 - Understanding Operating Systems). Dr. Russo and Dr. Hakimzadeh will be offering these courses in the 2002 - 2003 academic year.

b. The introduction of a new operating systems course (C151 - Multiuser Operating Systems) at the freshman level. We discussed the impact of this course on our students and on other courses in the program. The faculty decided to make this course a requirement for the degree. Dr. Knight will be offering this course in the Fall of 2002.

c. Scheduling of advanced courses to allow for more variety in the CS elective area. Typically, our desire for a stable, well-established collection of standard advanced courses that students could depend on, conflicts with our desire to offer a variety of advanced courses on recent
developments in computing. The faculty discussed increasing the frequency of offering some elective courses to allow for more flexible schedule. More detailed discussion of this issue is planned for the Fall of 2001.

d. The introduction of a new Parallel Programming course at the senior level. This course would introduce our students to the world of parallel computing and takes advantage of our newly developed Beowulf cluster. Dr. Vrajitoru will be offering this course in the Spring of 2002.

e. Introducing our students to "professional issues" much earlier in the curriculum. Issues such as privacy, security, ethics, piracy, and the professional responsibilities of a computer scientist are discussed.

f. Offering courses for the master of science degree in Management of Information Technology (A505, A510, A515). These courses are under development and will be offered during 2001-2002 academic year.

g. Developing courses for the newly developed masters degrees in Applied Mathematics and Computer Science. The graduate committee is currently reviewing the courses to be developed for the first two years of this program. The program will begin accepting students for the Fall of 2002.

Alumni Survey

This year the graduating class of 1996 and 1999 were surveyed. A total of 20 surveys were mailed. Only two respondent completed and returned their surveys, both respondents indicated that they received their B.S. in computer science, one graduated in 1996 and the other in 1999. The following is a brief summary of their comments.

In response to the question “In general terms, what kind of work skills does your current job require?” The respondents indicated management of project teams, custom development, integration of projects, analysis, writing technical requirement, project plans and programming.

In response to the question “...does the work you do involve, to any extent, computer science skills and concepts you learned at IUSB...?” The respondents indicated that they do use the skill acquired at IUSB. Specifically, they mentioned programming skill, analytical, problem solving skills, management skills, understanding of databases, analysis of algorithms and program efficiency.

In response to the question “Are there computer science topics that were not covered when you were a student and that you now wish you had been able to study while at IUSB?” The respondents identified the following topics: web development, artificial intelligence and general
hardware and networking courses.

In response to the question “What suggestions do you have for improving the computer science program at IUSB?” The respondents indicated that more in depth study of the software life cycle would be desirable, preparing students for the real world, analysis, writing estimates and developing technical requirements were also mentioned.

In response to the question “What other comments would you like to make about computer science at IUSB?” The respondents indicated that they generally felt prepared for the work they were asked to perform, specially when they compared themselves with their peers at the job site. Some indicated that they would have benefitted from more focus on design and problem solving at large, they also felt that the internship was a beneficial component of their education.

Student Survey

In the past the student chapter of the ACM has distributed an email survey to current computer science students. The results were collected by officers of the chapter, and all information that could identify any individual students was stripped from the responses before they were made available to the computer science faculty. Unfortunately, the survey was distributed this year and therefore there is nothing to report.

Program Review

This procedure is carried out once every seven years. The last review was conducted in 1999 and was reported previously.

GRE's and Graduate School Admissions

We know of a number of students who have entered graduate program however, we have no knowledge of their GRE scores.

Instructor/Course Evaluation Forms

All computer science faculty members had each of their student fill out the department's official Instructor/Course Evaluation Form at the end of each semester for the past several years. Responses obtained from these forms are shared with other faculty members in the course of discussions of the kind reported under Faculty Inventory. This is one of our most powerful instruments for assessing how our students view our curriculum.
Attachments:

For your information, copies of the assessment instruments used are attached:

(a) the Instructor/Course Evaluation form adopted by the full department;

(b) the alumni survey form that we recently mailed.
Instructor / Course Evaluation Form

Department of Mathematics and Computer Science

Instructor ___________________________  Section Number ___________________________
Course _______ Semester & Year _____________  Meeting Time ___________________________

Please take the time to make a thoughtful evaluation of the course and instructor. Your responses will be of interest to both the instructor and the department. Your instructor will not have access to these forms until after grades have been reported.

PART I: Please give written comments on the instructor, course and textbook. Following each category is a list of possible items on which to comment.

INSTRUCTOR: (Providing explanations and examples; ability to kindle interest; handling of questions; being prepared for class; office hours; examinations, grading, fairness, etc.)

COURSE: (Adequacy of prerequisite courses; opportunity to acquire new skills and understandings; pace of the course; appropriateness of laboratory work (if applicable), etc.)

INSTRUCTIONAL SUPPORT MATERIALS: (Comment on any of the following that apply: textbook, handouts, computer software/hardware, graphing calculators, etc.)

(To finish, complete other side of this form)
1. What degree (B.S. or A.S.) did you earn at IUSB?

2. In what year (roughly) did you earn it?

3. In general terms, what kind of work skills does your current job require?

4. Do you use computers in your job? If so, does the work you do involve, to any extent, computer science skills and concepts you learned at IUSB? The more detail you provide here, the more helpful your answers will be. (If space is inadequate, please continue on the back.)

5. Are there computer science topics that were not covered when you were a student and that you now wish you had been able to study while at IUSB?

6. Are there computer science topics that were covered when you were a student and that you now wish you had been able to take?

7. What suggestions do you have for improving the computer science program at IUSB?

8. What other comments would you like to make about Computer Science at IUSB?