1. What specific educational goals does your program have for its students?
   The primary goal of our program is to prepare our graduates to understand the field of computing, both as an academic discipline and as a profession within the larger context of society. We try to achieve this goal in several ways.

   General Knowledge Objectives:
   A) Ability to Understand Technical Material
   B) Written and Verbal Communication
   C) Dealing with Complexity

   Disciplinary Knowledge Objectives
   1) Hardware
   2) Data Representation
   3) Machine Language
   4) Interpreters and Compilers
   5) Concepts of Programming Languages
   6) Principles of Structure and Object Oriented Programming
   7) Performance and Optimization of Algorithms
   8) Operating System Concepts
2. What assessment techniques did your program use to measure the attainment of these goals in the last academic year? (e.g. pre and post testing, portfolios, juried performances, etc.) What were the results of these assessment measures?

The Department of Computer and Information Sciences uses several methods to assess our students; these include:

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

The Capstone course, performance reviews, faculty inventory and Instructor/Course evaluations were the primary techniques used during the past academic year.

3. How did these techniques help the department measure student learning and achievement? Please be explicit about how data collected objectively measure student outcomes. How does the data measure whether students understand the important concepts of a discipline?

**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.

Dr. Wolfer has taught this course since 2001, so he is 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. Dr. Wolfer reports that the majority of students seem to arrive with their fundamental programming skills intact, however he notes that while they seem generally motivated, many seem to lack the self-confidence necessary to aggressively approach a problem independently. This issue has been discussed and confirmed by other faculty and measures are being implemented to remedy it. Such remedies include assigning more independent programming assignments in which the students are required to produce a complete solution. Other problems still 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.

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¹Often in lower level computer science courses, the instructor will provide a partial solution to a problem and then will ask the students to work on a given component which is the focus of the assignment.
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 several of our upper level courses. In the past eight years, C308 has been taught as a 4 credit course. As the result of this change the instructors (Drs. Schwartz and Hakimzadeh) report that they have 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. Many of the students in this course express a greater interest in systems analysis and design or at least an appreciation for the people doing the design work.

Students in Y398 Internship 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 on the departmental internship web page. [http://www.cs.iusb.edu/internship/](http://www.cs.iusb.edu/internship/)

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.

The B481 computer graphics course, has been taught by Dr. Vrajitoru for the past 3
offerings. The 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 maze). The project replaced the usual homework assignments for the last 4 weeks of class and its goal was to develop their interest in the subject by working on a project of their choice, to increase their independence by allowing them to organize their work in a less supervised way than usual, and to encourage them to study additional material to the textbook. The instructor reported that students were well prepared for this course and the prerequisites were adequate to support the activities in the course. In general, the students responded well to being given extra responsibility in their work.

Faculty Inventory
The entire computer science faculty meets frequently 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 our informal as well as formal alumni surveys done annually.

Alumni Survey
This year the alumni survey was not conducted, however the department did receive continuous feedback from a number of alumni who work in the region. Some of their feedback was provided in the context of hiring our new graduates. Although employers were happy with the knowledge and quality of the candidates they interviewed, they commented that when compared with other candidates, our students seem to lack self confidence. The solution offered by our alumni was to create a course that teaches interviewing skills. The faculty is discussing ways to improve this situation.

The department has also proposed to develop a new tool for conducting electronic alumni surveys. If funded, this tool will make the process of conducting and reporting alumni surveys both faster and easier.

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. Appropriate information 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.

Electronic Course Evaluation: The department has been using an electronic evaluation system named (FAST). Although this system is an improvement over the traditional
paper method, the department has embarked upon the design and development of a new customizable evaluation system for IUSB. This system known as ‘IU-EVAL’ is currently in test phase and we plan to put it into production by Fall 2005.

4. For which goals did your students learn at or beyond your expectations? Which areas need improvement?

<table>
<thead>
<tr>
<th>Goal</th>
<th>Expectation</th>
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<tbody>
<tr>
<td>A) Ability to Understand Technical Material</td>
<td>Meets Expectation</td>
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</tbody>
</table>

5. How were the results of your assessment program analyzed and recorded?

a. How was department faculty involved?
The faculty engage in continuous discussion and feedback through the curriculum committee. In addition, faculty who teach the capstone, the internship, as well as number of other courses are interviewed periodically by the chair and associate chair to receive feedback.

b. How were students involved?
No student surveys were conducted, however faculty often receive feedback from students through their representatives from the ACM student chapter. In addition, students have the opportunity to provide direct feedback to faculty and the department chair through their course evaluations.
c. How were records kept?
The student portfolios and artifacts are kept by individual faculty members in the department. The department hopes to develop a central repository for this purpose. Given that we have approximately 175 students in the program, this may require extensive space. We plan to look into the development of electronic portfolios. Student evaluations are kept at the department’s office.

6. The Higher Learning Commission points out the obvious but important concept that Assessment cannot be static. In order to achieve excellence, assessment must be viewed with a constancy of purpose requiring never ending activity and revision.

S  Were any changes made this year in the assessment plan or the assessment techniques used by your department?

Our past assessment plan was developed in 1996, this year the plan was updated to reflect the latest recommendations of the IUSB assessment committee and the HLC’s Assessment Culture Matrix.

S  How does your assessment plan tie into your department’s strategic planning?
The activities described in our assessment plan gives the faculty in our department valuable information as we identify and apply refinements to our programs and curriculum.

S  How were these decisions made?
The faculty share and discuss the information gathered through various assessment activities. When problems are identified, programmatic changes will be recommended, considered and implemented as appropriate.

7. The Higher Learning Commission emphasizes that assessment must be used to improve academic operations and to achieve measurable improvements in student learning outcomes.

S  Were any changes made to your curriculum as a result of assessing your students?
The department considered the need for improving the outcome of our A106 course. Feedback from the Education and Business faculty seem to indicate that students completing A106 do not seem to have adequate file manipulation experience. Also, feedback from faculty in CSCI A107 seem to indicate a need for reinforcing more database concepts and exercises. As a result a task force was formed to work on this issues. The member of the task force (Dr. Surma, Dr. Hakimzadeh, Mrs. Hoffacker) met over spring and summer 2004 and developed a set of recommendations which are in the process of being implemented. These included a change in the laboratory text book, development of a set of assignments which reinforce file manipulation, including more
database coverage, and adding more integration assignments to the course.

**S** Do you anticipate making any program changes in the future as a result of your assessment activities?

Based on feedback from faculty, colleagues from other institutions and feedback from students, the department will be considering the use of Java programming language as an initial programming language in our program.

In addition, to better accommodate our students in the informatics program, we are considering the ramification of switching the C308 Systems Analysis and Design from 4 to 3 credits.

The department has also decided to increase its offering of C442, Database Management System. This is primarily due to enrollment pressure as well as feedback from both faculty and alumni who have articulated the importance of this subject for our graduates.

**S** What is the rationale for these changes?

See above.

**S** How are your assessment results tied to your budget or budget requests?

The assessment activities have been used in the past, and will continue to be used in the future to guide our program modification and development. Such modifications and development have a direct, but often delayed effect on our budget requests.