5 Year Plan (2003-2008)

This document attempts to explain the current state of the Department of Computer and Information Sciences and to project its expected growth in the next five years. The plan reflects the department's educational, research, interdisciplinary and outreach mission. It examines the following eight components:

1) New Degree Programs  
2) Students  
3) Faculty  
4) Laboratories (Hardware, Software and Network)  
5) Library Conspectus  
6) Community Outreach  
7) Accreditation  
8) Research Infrastructure

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1 Given the dynamic nature of our discipline, this plan will be reviewed and revised on an annual basis.
New Degree Programs

Current State / Recent Developments:

**M.S. in Applied Mathematics and Computer Science** was approved in 2001 and reaffirmed in 2002. Starting Fall 2002, the department began accepting applications for this program.

**M.S. in Management Information Technology** was approved in 1999. This program is a joint venture between School of Business and Economics and the Department of Computer and Information Sciences.

**Minor in Informatics:** the department has developed a new minor in Informatics. This minor can greatly enhance the job prospective of students in various disciplines by providing them the applied computer and technical expertise necessary for their chosen fields of study.

**Certificate Programs:** The department has developed a new graduate level Certificate in Technology for Administration. The thrust of this program is to provide timely and high quality technical expertise to employees in our regional business community. Starting Fall 2002, the department started offering this certificate.

**Certificate in Applied Informatics:** The department is developing a new graduate-level certificate in Informatics.

**Bachelor of Science in Informatics:** The department is planning to develop a proposal for a new B.S. degree in Informatics.

Future Goals:

**Master of Science in Computer Science:** The department will study the feasibility and impact of a new MS in Computer Science.

**Computer Certification for Education Majors:** The department is planning to study the feasibility and impact of a new certificate in computer science for education majors.

**Certificate in Software Engineering:** The department is developing a new graduate level Certificate in Software Engineering. The goal of this program is to provide post graduate expertise to students with computer science degrees, as well as those from other technical and engineering disciplines in our regional business community.

**Certificate in Computer Applications:** The department is developing a new Certificate in Computer Applications. The goal of this program is to provide computer training for non computer science majors, as well as those in our region who seek a comprehensive and meaningful computer proficiency and certification.
Current State:

Currently the computer science program has about 240 declared undergraduate majors. With the advances in technology and its effects on the job market, we anticipate that this number will grow. In addition to the growth in our undergraduate program, we project that our joint masters programs with Mathematics and Business and Economics will add about 30 to 50 graduate students to our program.

In order to better focus our efforts at recruitment, the department has formed an external affairs committee. This committee is active in a number of areas such as:

- Presentations at local high schools.
- Development and refinement of our departmental web site. Design of specific resource pages for high school students. Presentation of most departmental documentation on the web.
- Development and refinement of our departmental paper documentation.
- Development of departmental newsletters and Flyers.
- Faculty presentations (ACM, Dean’s Seminars, etc.).
- Invited speakers
- WVPE radio ads.

Future Goals:

In the next five years, the department hopes to double its undergraduate enrollment to approximately 500 students (300 FTE). This goal requires greater emphasis on recruitment of local and regional high school students for our undergraduate program. The department will also hopes to increase it female and minority enrollment. Similarly, we hope to develop a high quality and competitive graduate program in Applied Mathematics and Computer Science. Our goal is to recruit graduate students from local, national and international sources.
Currently the Department of Computer and Information Sciences has 9 full-time and a number of part time faculty. First and foremost, the department will work hard to improve its recruiting and retention efforts. In the past several years, the issue of pay equity has set back our efforts to grow our program. The department has worked hard with the administration to address these issues and we hope that in the next several years we will be able to improve our ability to compete and continue to attract the best and brightest faculty to our program. Our goal is increase the number of full time faculty in our department, so that we can better accommodate our existing and future programs and provide release time for our faculty to conduct and sustain their research. We feel at least 2 additional faculty members are needed to expand and complement our base of expertise, teach and advise undergraduate and graduate students and maintain a reasonable student / faculty ratio.

In Progress:
Currently, the department is hiring one or more faculty positions in support of our new Informatics major and the graduate program in Applied Mathematics and Computer Science.

Future Goals:
In accordance with our future goals in developing new programs and recruitment of students, the computer science department hopes to increase the number of full time faculty members to 11 by the year 2008.

We plan to seek support from our administrators to enhance our faculty recruiting and retention.

- Improved support for professional development
  - Increased funding for attending professional conferences.
  - Full support for presenting at professional conferences.

- Improved support for adjunct faculty development
  - Substantial increase in funding for salaries paid to adjunct faculty to reflect market value.
  - Inclusion of benefits such as health insurance for adjunct faculty.

- Improved support for the use of technology in our classrooms
  - Continued support for computer science laboratories.

- Increased funding for salaries and faculty hiring
  - Providing competitive salaries to better support departmental hiring efforts.
  - Periodic salary adjustments to reflect market value.
Currently our department supports and maintains 3 laboratories. Two of these are open to all undergraduates beyond C201. The third laboratory is used as a hardware lab and for special projects. We plan to add four more labs in the near future.

A) A new lab to support our undergraduate courses.
B) A new lab to support graduate students.
C) A new experimental laboratory for faculty and student research projects.
D) A new teaching/lab for the Informatics program.

In Progress:
Currently, a graduate laboratory is being developed in NS 205B and NS160 is being renovated for the Informatics laboratory. We hope to have both of these labs operational during the 2003-2004 academic year.

In addition, the department has developed plans for expanding the current computer laboratories. The plan include the creation of a new classroom with computer equipment.

Also in 2000, we made a number of proposals to our administration for funding to renew our laboratories as well as developing our new experimental research lab. These proposals have been favorably looked upon by the administration and were included in the $5,000,000 IUSB Campaign. We hope that in the near future we would be able to acquire the funds to implement these laboratories.

Future Goals:
In accordance with our future goals in developing new programs and recruitment of new undergraduate and graduate students, the computer science department hopes to increase the number of laboratories and improve their functionality. Our plans should address and provide for innovative and technology oriented teaching and research in areas of faculty expertise. In addition our future plans include real time distance learning facilities as well as the ability for local and wide area distributed computing. A floor plan for the new laboratories has been developed.
Future Informatics Lab
Floor Plan

Revised 4/29/2002
Lab Hardware:

Currently our department operates one Linux and one Windows NT servers. These computers serve a total of 60 Linux and NT workstations. All courses beyond C201 are supported by these machines in our laboratories. Currently, the department runs a 100 megabits switched network, as well as an experimental 20 megabits wireless network. Also, during the summer of 2003 the department upgraded the processors, memory and other necessary component in approximately 24 of its laboratory computers and servers.

Future Goals:

The department’s laboratory committee continually evaluates is hardware, software and networking facilities in our laboratories. We will continue to upgrade our hardware, software and networking. Such an upgrade may include support of wireless communication through out the Northside Hall, development of an AI research laboratory, upgrading and expansion of our current Beowulf cluster.
# Hardware Specifications

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Lab Software Environment:

Plans are currently underway to define a set of software systems required for our laboratories. These include operating systems, compilers, editors, debuggers, CASE tools, computer graphics tools and libraries, artificial intelligence tools, database tools, GUI tools, networking libraries and simulators for various courses.

In Progress:
The current Linux and Windows 2000 workstations provide the basic operating system and applications necessary to support the majority of the courses offered by the Department. However, a number of other courses such as programming languages, computer graphics, database systems, systems analysis and design and operating systems require additional software tools and libraries. Most of these tools are collected by the faculty responsible for teaching the course and installed and used on a case by case basis.

Future Goals:
Our goal is to provide the users with the software environment detailed in the accompanying Computer Science Software Specifications, adapting these specifications in response to the changing needs of our students as well as to more general changes within the discipline.

\(^2\) More details are provided later in this document. See Computer Science Software Specifications.
Computer Science Software Specifications

Operating Environment:
ë Operating System: Linux, Windows 2000/NT
ë Windowing Environment: X Window, Motif, Windows, etc.

Programming Environment:
ë Compilers and Interpreters:
  GNU C++, Visual C++, Pascal, Lisp, scheme, ADA, PROLOG, Visual Basic, Java
ë Editors: Vi, Emacs, ee, etc.
ë Debuggers: X window Debuggers, Visual C++ debugger, etc.
ë Libraries: (BSD Socket, Win-Sock, X-window, Light Weight Processes, Motif)

Software Engineering Tools:
ë Integrated code development environment for our primary language (currently C++)
  (Visual C++ IDE, .NET) (Cygwin, a Linux-like environment for Windows)
ë CASE tools (Structured and Object Oriented)
  Software that facilitates code sharing, communication and group work among students. Upper and Lower CASE tools, Analysis and design tools, Project planning and management tools. Code generators, reverse engineering tools, etc. (Easy CASE, Visual Analyst, Excellarator)
ë GUI tools
  Visual Basic, JAVA, Visual C++, Borland Delphi, C++ Builder
ë 4GL tools and program generators
ë Databases (Postgres, mSQL, MySQL, MS Access, SQL Server)

Office Automation Tools:
ë Word Processors (Latex, Word Perfect, MS-Word, Adobe Acrobat Writer, etc.)
ë Presentation Tools (Power Point, etc.)
ë Drawing Tools (WP-Draw, Visio, etc.)
ë Spread Sheets

Networking and WWW tools:
ë Berkeley Socket Library
ë Web Browsers (Masaic, Netscape, Internet Explorer, Lynx etc.)
ë Web Servers (Apache, etc.)
ë HTML editors(MS Front page, Netscape composer, Corel Web Designer, Macromedia Flash)
ë JAVA programming language (SUN’s JDK, MS Visual J++)
ë CGI and Pearl, Tcl/Tk.

Miscellaneous Libraries and tools:
ë Thread Libraries
ë File organization Libraries (ISAM, B-tree, etc.)
ë WordNet (A lexical database for the English language) (NLP tool)
Library Conspectus

Current Status:

The departmental library committee had made excellent progress in making the majority of ACM (Association of Computing Machinery) publications available to our students.

In Progress:

The department is currently working on increasing the library collection as it relates to graduate programs such as MS-MIT and MS in Applied Mathematics and Computer Science programs.

Future Goals:

Our goal is to continue to improve our library holding for our undergraduate and graduate programs in computer science. In addition, we will be actively engaged in developing the library holdings in the area of Informatics.
Community Outreach

In Progress:

Continue to support faculty and student volunteering efforts
  ò Continue to provide expertise in computer science to our local and regional non-profit organizations.

Increase our interaction with local and regional educational institutions
  ò Seminars, conference, lectures, etc.

Increase our course offering for non-majors and community members
  ò A107, A150, A201, A340 etc.

Increase departmental sponsorship of public presentations.

Creation of the first Endowed Scholarship in Computer Science.
  ò The John P. Russo Scholarship for Academic Excellence in Computer Science.

Future Goals:

Increase our technology transfer efforts
  ò Continue to provide relevant and timely course offering to meet the technical needs of our community.

Improve our fund raising for scholarships

Internship
  ò Increase student internships in local and regional organizations.

ò Implement a Faculty Internship initiative, whereby faculty will serve as a resident expert in one of the local or regional organizations. Studying information technology problems and conducting research.
The department hopes to prepare for accreditation of our Bachelor of Science in Computer Science by the Computer Science Accreditation Board (CSAB). Achieving accreditation will only serve to externally validate the quality that already exists in our BS program. We hope to initiate our accreditation process during the 2004-2005 academic year.
Current Status:

Our goal has been to develop an inexpensive multipurpose research laboratory at IUSB. Currently our plan calls for 16 Pentium or AMD based computers, however, in the future a 64 node cluster is envisioned. These machines will be used to develop a Beowulf class “super cluster”. Our goal is to create a multipurpose experimental test bed for parallel processing and high speed network experiments.

Research Application of Beowulf at IUSB

Numerous research projects can flourish by using such a distributed computing environment. These include research in massively parallel graphics applications such as graphical rendering, analysis of parallel search algorithms such as Internet search engines, database applications such as disk striping, distributed concurrency control algorithms and distributed homogenous database management, operation systems research such as load sharing and distributed shared memory, computer networking research such as high speed networking and performance analysis.

Future Goals:

Our goal is to develop the hardware, software, technical human resources, and other strictures necessary to promote research and scholarly activity. These goals include:

- The creation of the experimental research laboratory.
- Conducting departmental grant workshops
- Encouraging faculty internships
- Developing a peer review process for external research grant proposals
- Encouraging internal research grant proposal
- Developing research assistantship for graduate students