The CIS department is the largest department in CTIS and offers a number of degrees and certificates.

- The COMPUTER SCIENCE AS degree is offered as a transfer degree. All of it’s classes are properly articulated within the state college and university system.
- The COMPUTER SOFTWARE DEVELOPMENT AS degree is primarily a vocational degree, although many of its classes are articulated and can be used towards a four year degree. Within this degree three career certificates are offered, which also serve as major emphasis for the AS:
  - UNIX System Operations and Maintenance
  - Object-Oriented Programming Using C++
  - Object-Oriented Programming Using JAVA
- The DATABASE MANAGEMENT AS degree is also primarily a vocational degree, and, again, many of it’s classes ARE articulated. Within this AS degree there are four certificates available:
  - Oracle Database Administration (both skills and career certificates)
  - Oracle Database Developer (both skills and career certificates)

In addition, CIS also offers a collection of classes to be taken by non-CIS majors to complete their GE requirement in computer literacy.

A. ASSESSMENT OF INTERNAL AND EXTERNAL FACTORS AND STUDENT SUCCESS

EXTERNAL FACTORS:
The biggest external factor effecting the department (and the rest of the CTIS division) is the collapse of the hi-tech infrastructure in Silicon Valley and, to a lesser extent, the rest of the country. Here are the factors in more detail:

- The bust in the high technology sector has pushed a large percentage of programming (and related) jobs overseas. This cycle will end (one more year? Two?) but our students do not see the job market as attractive... and therefore do not sign up for classes. This is particularly true in the computer programming arena.
- Microsoft’s introduction of .NET, its distributed application framework, includes two new languages: C# and VB.NET. As .NET gains market share, demand for C# and VB.NET courses will likely increase, while demand for C++ and JAVA course may decline. This must be carefully monitored.
- UNIX remains the dominant language for use in larger servers, but LINUX is quickly catching up requiring curriculum adjustments.
- System administration remains a bright spot in both the job market, and not surprisingly, in enrollment. Although experiencing some decline, enrollment in UNIX System Administration and Oracle database administration classes remains strong.
- The large unemployed workforce has made it relatively easy to find qualified part time instructors in this area... but will this revert to form when the job market clarifies?
- Demand for more classes, certificates, and degrees online continues to spike.

INTERNAL FACTORS:
- CIS remains the largest department in CTIS and one of the largest at the college despite having experienced a 25% decline (from 50,000 WSCH to approx 40,000 WSCH)
- CIS students fall into one of three categories
  - Transfer students (HS continuation) who mainly attend classes in the morning
  - Working students upgrading their career skills who mainly attend afternoon and evening classes.
  - Students in other majors taking computer literacy for their GE requirement.
- Student enrollments are down in all areas with the hardest hit being programming (C++ and JAVA).
- Articulation of our transfer program (Computer Science), which continues to constitute about 15% of overall CIS enrollment is a constant struggle... but one which we are “winning” with the help of our excellent articulation officer.
- Responding to the online demand for education, we are putting an ever increasing variety of classes into ETUDES. Our faculty has responded to this thrust very well (and voluntarily). We should have one or more CIS certificates and degrees online by the end of this academic year.
Responding to the rapidly evolving technology roadmap, we have created classes in C#, VB.NET, Databases On the Web... and continue to modify and update existing classes. The pressure to do this will not abate in the foreseeable future.

A new degree path in database (Oracle) development has been added to respond to demand.

B. STUDENT SUCCESS EVALUATION
The last student success statistics available are 01/02 numbers and these show that CIS is running at about a 70% success rate. This is a full 14 points below the college-wide average. This may be partially explained by the unusually high withdrawal rate, running at about 19% (versus 9%) at the college level.

To address this issue, the LITES program (Learning Information Technology Environments) was set up at about the time these numbers were published. This program targets first time CTIS students and zeroes in on their SCAN skills as the first priority and the content-specific skills next. This program has been successful, but results to date have been anecdotal. A pretest has been designed, along with other means of measuring the numerical success of the program and data should be available by the end of calendar 2003.

C. STUDENT EQUITY/DIVERSITY ANALYSIS
Student success by ethnicity analysis shows that Native American (39%), Hispanic (59%), and Filipino (56%) students under perform the CTIS average success rate by 10-15%. The Asian population does the best at 73%.

The CTIS student population contains 15% more Asians, 1% fewer Blacks, 4.5% fewer Hispanics, and 13% fewer Whites than the at-large population. The male-female ratio is about the same as for the campus population.

D. ACTION PLANS AND PROPOSED PROGRAMMATIC CHANGES

1. Program Goals Related to Educational Master Plan and Partnership for Excellence:
   a. Improve the overall measure of student success by 5% over the next academic year
   b. Through outreach activities, increase the Hispanic and Black population in the CIS program each by 5%

2. Other Program Improvement Plans:
   a. Work with the college articulation officer to more completely articulate CIS classes with state and UC schools
   b. Develop two online certificates in CIS and one online degree program. This will require adding CIS 78 (computer software engineering) and the two UNIX systems administration classes (CIS 68C1 and CIS 68C2).
   c. Continue to update programs and classes to reflect the changing technology landscape. In particular C# will have to be evaluated for placement in the articulated CIS class alternatives for programming (which at this time only included C++ and JAVA)
   d. Develop a numerical assessment tool for the LITES program and have it in place for 03F, with results published by the Christmas break.
   e. Find additional funding sources for the LITES program so that it can continue beyond the end of this academic year.
   f. Work with IMPAC to better facilitate transfers to UC and CSU
   g. Look at better ways to improve student IT preparation, i.e. ICDL in preparation for 2004 Title 5 computer competency requirements.

E. ENROLLMENT AND PRODUCTIVITY GOALS
Productivity in all CTIS programs, and especially in CIS, has always been extremely high. Three years ago it was over 700, and two years ago it was over 600. Due to lower than expected enrollments, and the resulting smaller class sized productivity in the 02/03 year is estimated to be in the 550 range. By a combination of judicious scheduling and a targeted PR campaign, CIS goal for the coming academic year will be to, once again, hit the 600 level. In parallel to this, and to make the higher productivity possible, the enrollment (WSCH) will need to increase a bit, hopefully back to the 45,000 level.
F. SUMMARY OF RESOURCES REQUESTED

1. FULL-TIME EQUIVALENT FACULTY OR STAFF NEEDS:
   Faculty: The CIS department now has an FTEF of approximately 20.3 for the 02/03 year. The portion of this that is from full-time faculty is about 10.1. This results in 50% of the instruction being delivered by full-timers... but given the current levels of enrollment and the fast changing nature of the curriculum this is probably inevitable. This brings the new technologies and new ideas more quickly into the department. No additional full time faculty are anticipated at this time (not withstanding retirements et. al.).

   Staff: CTIS has nine laboratories and over 350 computers to maintain and update. This is accomplished by three laboratory coordinators (one full time assigned to the Middlefield Campus) and two instructional associates. Up until the end of the past academic year, there was a supervisor position, which was vacated due to a retirement. Enrollments are quite a bit down this year, which have made it possible to do without the supervisor for now. When this situation changes (enrollments pick up etc) then it will be critical to replace the supervisor.

2. FACILITIES NEEDS:
   All of our nine laboratories utilize furniture of WWII vintage. They are of different styles, and to a certain degree unstable and unsafe. When the buildings are renovated next year it would be wonderful if we could replace all or most of these chairs and tables.

   Most of my instructors use computer-driven projectors to augment their class presentations. Since most of the classrooms do not (at the moment) have ceiling mounted projectors, my lab staff must provide these projectors and demo units by placing them on rolling carts and bringing them to the classrooms. This is time consuming and hard on the projectors which have fragile and very expensive bulbs to replace. When the buildings are renovated, I would like to ceiling mount all of our projectors, outfitting both the 4300 and 4200 buildings with them. We already have the projectors.

   The computers in most of our labs are already getting obsolete. The money that has in the past been available to replace these machines on a three-year cycle is not going to be there for the next year or two at least. These machines very much need to be upgraded. For PC’s they need to be P4 machines, preferably with flat panel 17” displays. For Mac’s they need to be G4 machines... in the IMAC configuration.

   Software updates also need to take place on a regular basis. CTIS has improved this situation somewhat by developing a "license distribution scheme" which allows us to put software on all machines but only pay for a much smaller number of copies, which are then available on a first-come-first-served basis to the users. We have also been able to take advantage of less expensive upgrades through educational discount programs. Despite all this, we still need to spend upwards of $20,000 per year just to keep even with the pace...

3. MATERIALS AND SUPPLIES BUDGET AUGMENTATION:
   The discretionary budgets that can be used for supplies and materials have been decreased each year for the past 3 years. This is making it very difficult to buy the supplies necessary to hold classes (dry erase markers, paper, etc). Budgets need to be restored to two-year ago levels as a minimum, and be then subject to yearly COLA’s to take care of increased costs.

Evaluation of academic year 2002-03. Date of evaluation: 10/29/03
List names of participants assisting in this program review.
Primary program contact person: C. Lindauer Phone or email address: lindauerchuck@fhda.edu
Full-time faculty: all full time CTIS faculty have had an opportunity to provide inputs to this document
Part-time faculty:
Administrators: C. Lindauer
Classified staff:
Students:
PART B: PROGRAM PORTFOLIO WORKSHEET

PROGRAM NAME: Computer Software Development
Degree/certificate options available:
• AS in Computer Software Development
• Career Certificate in:
  o Unix System Operation and Administration
  o Object Oriented Software Using C++
  o Object Oriented Software Using JAVA

PROGRAM MISSION
The student should be prepared for a career in Computer Systems analysis, design, and management, using modern software tools. With some additional class work, students should be able to transfer to a number of four-year colleges to pursue a career in Computer Software. For the working professional, the program will update Computer Software skills & provide some hands-on experience in modern programming languages.

EXPECTED STUDENT OUTCOMES:
1) Student will understand the fundamentals of good software design and engineering
2) Student will be well versed in Object Oriented programming
3) Student will be prepared to write deliverable code in either C++ or JAVA
4) Student will be able to work in UNIX environments

INTENDED OR DIRECT OUTCOMES: Program-Specific Outcomes and Attributes Desired of Program Graduates

<table>
<thead>
<tr>
<th>PROGRAM CONTENT PROFICIENCIES/ COMPETENCIES</th>
<th>Desired Attributes: What should a student be able to do upon graduation?</th>
<th>REQUIRED PROGRAM COURSES related to this outcome: Where do students acquire experience?</th>
<th>OUTCOME MEASURES — Evidence or Sample Demonstrating Deep Learning: How do we know what a student has achieved?</th>
</tr>
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<tr>
<td>1) Fundamentals of Software Design Engineering</td>
<td>• Be able to operate with comfort on a Software Development Team • Understand the principles of good design</td>
<td>CIS 52A, CIS 78, MATH 22, CIS 52B2</td>
<td>• Success in class</td>
</tr>
<tr>
<td>2) Object Oriented Programming</td>
<td>• Be able to understand Object Oriented principles</td>
<td>CIS 27A, 27B or CIS 15A, 15B, CIS 12A, 12C, 19A</td>
<td>• Portfolio of successful projects</td>
</tr>
<tr>
<td>3) C++ and/or JAVA Code</td>
<td>• Be able to write good deliverable code in C++ and/or JAVA • Be able to debug other people’s code</td>
<td>CIS 27 A, B, C &amp; 15P or CIS 15A, B, C &amp; 27P</td>
<td>• Portfolio of successful projects</td>
</tr>
<tr>
<td>4) UNIX Environment</td>
<td>• Be comfortable as a user in a UNIX environment</td>
<td>CIS 68A, CIS 68B1</td>
<td>• Success in Class</td>
</tr>
</tbody>
</table>

CORE COMPETENCIES:
Outcomes and Attributes Distinct to This Program

| Communication | • Work on a Software Development team • Communicate ideas to a group • Work over a network collaboratively | CIS 78, 52A & 68A | • Outcome of CIS 78 Project |
| Computation | • Develop skills in formula as required in writing good code • Writing database scripts | MATH 22, CIS 27C or 15C, CIS 52B2 | • Success in class work • Portfolio of successful projects |
| Creative, Critical & Analytical Thinking | • Design of a large project • Implementation of code | CIS 78, CIS 27A, B, C, Or 15A, B or C | • Success in CIS 78 • Portfolio of successful projects |
| Community/ Global Consciousness & Responsibility | • Work with people in a helpful way | Assignment as lab assistant (optional) | • Success in lab with students |
PROGRAM NAME: Computer Science
Degree/certificate options available: AS Degree in Computer Science

PROGRAM MISSION:
Provide sound foundation in computer programming languages, problem solving, tool and mathematics to enable a student to either transfer to a four year college in Computer Science, or to enrich the career of a working professional

EXPECTED STUDENT OUTCOMES: A student completing this should be able to:
1) Understand the basics of modern computer science, including the technique of object oriented development
2) Be proficient in at least one modern programming language (C++ or JAVA)
3) Have a solid understanding of a second language
4) Have an understanding of the mathematics which under lies the science

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| 1) Modern Computer Science & Object Oriented development | • Understand object oriented development principles
• Work in a modern programming environment | CIS 78 (Elective)
CIS 27A & B or CIS 15A & B | • Success in class
• Problem oriented exams |
| 2) Modern Programming Language | • Be able to write code in either Java or C++ | CIS 27A, B & C or CIS 15 A, B or C | • Success in class
• Problem oriented exams |
| 3) Second Language | • Be conversant in a second object oriented language | CIS 27P Or CIS 15P
CIS 12C, CIS 19A | • Success in class
• Problem oriented exams |
| 4) Math Background | • Discrete Math & Calculus understanding | MATH 22
MATH 1A, 1B, 1C | • Success in classes |

CORE COMPETENCIES: Outcomes and Attributes Distinct to This Program

| Communication | • Understand underlying mathematics
• Be able to create formulas | MATH 1A, B & C
CIS 27C, 15C, 12C | • Success in class work
• Completed projects |
| Computation | • Be able to understand truth tables
• Able to design large programs | MATH 22
CIS 27A, B, C or CIS 15A, B, or C | • Portfolio of completed projects |
| Creative, Critical & Analytical Thinking | | | |
| Community/Global Consciousness & Responsibility | | | |
PROGRAM NAME: Database Management
Degree/certificate options available:
- AS Degree in Database management
- Certificates in
  - Oracle database administration
  - Oracle Database Developer
- Career Certificates in
  - Oracle database administration
  - Oracle Database Developer

PROGRAM MISSION:
Students who complete this program will be able to work as a database administrator or a database developer in a wide variety of business settings. The program’s emphasis on the Oracle Database does not preclude a deeper learning of database concepts, which applies just as well to all databases.

EXPECTED STUDENT OUTCOMES:
1) Student will demonstrate broad understanding of database principles & how they apply to real life situations
2) Students who specialize in database administration will be able to provide the care and feeding of an existing complex Oracle Database... and the knowledge should carry over to other non-oracle database products with a minimum of effort
3) Students who specialize in database development will be able to create a complex oracle database from custom specifications... and the knowledge should carry over to other non-oracle database products with a minimum of effort

INTENDED OR DIRECT OUTCOMES: Program-Specific Outcomes and Attributes Desired of Program Graduates

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<td>1) Understanding of Database principles</td>
<td>• Translate real life requirements into a database metaphor</td>
<td>• CNET 50, CIS 52A, 52B2, 52C, 68A</td>
<td>• Success in class work</td>
</tr>
<tr>
<td>2) Database Administration</td>
<td>• Administer a complex Oracle Database</td>
<td>CIS 52B2, 52E, 52F, 52G, 68A, 96Y</td>
<td>• Success in class work as may demonstrated by passing one or more Oracle DBA tests</td>
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<td></td>
<td>• Install and test database upgrades as required</td>
<td></td>
<td>• Successful Projects</td>
</tr>
<tr>
<td>3) Database Developer</td>
<td>• Create a complex database using the Oracle Product</td>
<td>CIS 52B2, 52J, 52C, 27A, 27B, 52I, COIN 78, 86, CIS 96Y</td>
<td>• Success in class work as may be demonstrated by passing one or more Oracle DBA developer test</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Successful project</td>
</tr>
</tbody>
</table>

CORE COMPETENCIES: Outcomes and Attributes Distinct to This Program

| Communication | • Deal with “Customers” to understand their needs                  | CIS 52A, 52B2, 52C, 96Y | • Project Success          |
|              | • Communicate and adjudicate problems as they arise               |                        | • Portfolio of databases designed |
| Computation  | • Create Formulae within the DB Context                            | CIS 52C, 27A, 27B, COIN 78, 86 | • Success in class work     |
|              | • Create DBA scripts to automate customer processes               |                        | • Success in portfolio creation |
| Creative, Critical & Analytical Thinking   | • Design a database to meet complex customer needs                | CIS 52A, 52C, 52J       | • Success in class          |
|                                            | • Solve problems as the arise                                     |                        | • Success in project        |
| Community/ Global Consciousness & Responsibility | • Work with non-profits in a project                             | CIS 96Y                | • Good experiences in project |