Program Outcomes Assessment

BA/BS in Computer Science

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General Information (Program Outcomes Assessment)

Standing Requirements

Mission Statement

The undergraduate computer science program at Indiana State University is a traditional computer science program. The program provides equal emphasis on providing students with a theoretical foundation for the subject and ensuring students have in depth programming experience. The program aims to ensure students are well-prepared either for (a) employment in software and technology positions, or (b) further studies in a graduate program in computer science. The department periodically reviews the curriculum to ensure it is in line with ACM and IEEE recommendations.

Outcomes Library

BA/BS in Computer Science Outcome Set- Effective 2013-2014

1. Programming and Problem Solving

The core objective of the computer science program is that the students are skilled programmers and problem solvers. The core CS sequence (CS 151, CS 201, CS 202, and CS 303) introduces and reinforces programming and problem solving skills needed by all computer scientists. The skills are reinforced further in later courses.

Outcome	Mapping
1A - Basic Programming Students should be able to use standard language constructs proficiently. This includes the basic programming elements that are standard in any programming language - functions, loops, conditionals, basic data types.	No Mapping
1B - Programming Paradigms Students should understand and be able to program proficiently in more than one programming paradigm. This should include at least two of the following: procedural/imperative, object oriented, functional, event driven, logic based, concurrent.	No Mapping
1C - Data Structures Students should understand and be able to use basic data structures, including lists, stacks, queues, binary search trees, and hash tables.	No Mapping
1D - Algorithms Analysis Students should be able to analyze the running time and correctness of standard algorithms which they have learned. As tools for this analysis, students should be able to reason about graphs, discrete probability, basic set theory, and basic number theory.	No Mapping

2. Specialized Knowledge and Skills

The second main objective is that students have more specialized knowledge and skills in a number of particular areas of computer science. The two concentrations of the computer science major differ in some of the areas that are emphasized and agree on others.

Outcome	Mapping

2A- Computer Systems Students should understand the basic internal working of computer systems, including both hardware and software. Students should understand the basics of assembly language and CPU design, especially with regards to how these influence program efficiency. Students should understand the issues inherent in any operating system, including synchronization and resource sharing, and how these issues influence program efficiency.	No Mapping
2B- Software Processes Students are exposed to the techniques for managing large software projects. Students should understand the difficulties that arise in working on large projects that involve many different programmers, and can utilize skills for dealing with these difficulties.	No Mapping
2C- Programming and Design in Specialized Areas Students should be proficient at programming in specialized areas that are very common in industry, including databases, web programming, networking, and advanced system administration. Students should understand the key algorithms, programming languages, and data structures used in each area, and be able to apply this knowledge to write efficient programs. Note: This outcome is specific to the Information Science concentration of the major.	No Mapping
2D- Advanced Algorithms and Theory Students should understand various models of computation and how these are used to model and efficiently solve various computational problems. Students should be exposed to computational problems that are difficult to solve in the worst case. Students should understand ways to deal with hard problems. Students should master the standard algorithm techniques of greedy, dynamic programming, and divide and conquer algorithms. Students should be proficient at programming and algorithms analysis using these techniques. Students should be proficient at programming and using basic graph algorithms such as those for shortest path and minimum spanning trees. Students should be exposed to some other algorithm techniques such as linear programming and randomized algorithms. Students should understand the process of proving program correctness, automated theorem proving, and be able to use automated theorem provers.	No Mapping

3. Professional and Interpersonal Skills

Another objective of the program is that the students develop professional and interpersonal skills.

Outcome	Mapping
3A- Working in a Group Students should have had some experience working on a programming project in a group setting.	No Mapping
3B- Presentation Skills Students should have given presentations in some of their classes, and should be aware of and have mastered basic presentation skills.	No Mapping

Old - BA/BS in Computer Science Outcome Set

1. Demonstrate knowledge of programming and software develop

Demonstrate knowledge of programming and software development.

Outcome	Mapping
1A. Apply standard programming constructs Students should be able to apply standard programming constructs to program problem solutions. This would include control structures, functions, objects and data structures.	No Mapping
1B. Describe and utilize software lifecyle models Students should be able to describe and utilize software lifecycle models.	No Mapping
1C. Describe and utilize programming paradigms Students should be able to describe and utilize several programming paradigms.	No Mapping

2. Demonstrate knowledge of computer systems.

Outcome	Mapping
2A. Utilize computer architecture Students should be able to describe and utilize computer architecture.	No Mapping
2B. Utilize assemblers, linkers, loaders, macro processors, Students should be able to describe and utilize assemblers, linkers , loaders, macro processors, and compilers.	No Mapping
2C. Uutilize operating systems Students should be able to describe and utilize operating systems.	No Mapping

3. Knowledge of Information Science topics (IS Track only)

Demonstrate knowledge of Information Science topics

Outcome	Mapping
3A. Describe and utilize databases Students should be able to describe and utilize databases.	No Mapping
3B. Describe and utilize web programming Students should be able to describe and utilize web programming	No Mapping
3C. Describe and utilize computer networks Students should be able to describe and utilize computer networks.	No Mapping

4. Knowledge of Computing Science topics (CS track only)

Demonstrate knowledge of Computing Science topics

Outcome	Mapping
4A. Describe and utilize algorithm analysis and design Students should be able to describe and utilize algorithm analysis and design.	No Mapping
4B. Utilize languages, grammars, automata, computability Students should be able to describe and utilize formal languages, grammars, automata, and computability.	No Mapping
4C. Utilize formal logic to solve problems Students should be able to describe and utilize formal logic to	No Mapping

solve problems in computer science.

Curriculum Map

Active Curriculum Maps

BA/BS in Computer Science (See appendix)
Alignment Set: BA/BS in Computer Science Outcome Set- Effective 2013-2014
Created: 04/15/2015 10:46:00 am CST
Last Modified: 04/15/2015 11:04:30 am CST

Old-BA/BS in Computer Science Outcome Set (See appendix)
Alignment Set: Old - BA/BS in Computer Science Outcome Set
Created: 02/03/2012 10:03:18 am CST
Last Modified: 04/15/2015 10:45:21 am CST

Communication of Outcomes

The department regularly assesses the success of the program in meeting its mission in general and in meeting program objectives in particular. These assessments are communicated with students and other stakeholders via the department website.

Archive (This area is to be used for archiving pre-TaskStream assessment data and for current documents.)

Archive

File Attachments:

1. **Computer Science** (See appendix)
   Computer Science Assessment Plan - 2007
2. **Math_CS_Undergrad_Programs_Assessment_May2011.pdf** (See appendix)

2011-2012 Assessment Cycle

Assessment Plan

Outcomes and Measures

Old - BA/BS in Computer Science Outcome Set

2. Demonstrate knowledge of computer systems.

2A. Utilize computer architecture

Students should be able to describe and utilize computer architecture.

Measure: Combinational Digital Circuits
Direct - Exam

Details/Description: Using performance on quiz or test questions, for each of these topics, a decision will be reached for each of these topics for each student, as follows:

Exceeds Expectations
Meets Expectations
Does Not Meet Expectations

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Measure: Computer Organization, Instruction Set Architecture, HDL
Direct - Exam

Details/Description: Using performance on quiz or test questions, for each of these topics, a decision will be reached for each of these topics for each student, as follows:

Exceeds Expectations
Meets Expectations
Does Not Meet Expectations

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Measure: CPU Design
Direct - Exam

Details/Description: Using performance on quiz or test questions, for each of these topics, a decision will be reached for each of these topics for each student, as follows:

Exceeds Expectations
Meets Expectations
Does Not Meet Expectations

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Measure: Input-Output System Design
Direct - Exam

Details/Description: Using performance on quiz or test questions, for each of these topics, a decision will be reached for each of these topics for each student, as follows:

Exceeds Expectations
Meets Expectations
Does Not Meet Expectations

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Measure: Memory System Design
Direct - Exam

Details/Description: Using performance on quiz or test questions, for each of these topics, a decision will be reached for each of these topics for each student, as follows:

Exceeds Expectations
Meets Expectations
Does Not Meet Expectations

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Measure: RISC, CISC, Pipelined and Parallel Systems
Direct - Exam

Details/Description: Using performance on quiz or test questions, for each of these topics, a decision will be reached for each of these topics for each student, as follows:

Exceeds Expectations
Meets Expectations
Does Not Meet Expectations

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Measure: Sequential Digital Circuits
Direct - Exam

Details/Description: Using performance on quiz or test questions, for each of these topics, a decision will be reached for each of these topics for each student, as follows:

Exceeds Expectations
Meets Expectations
Does Not Meet Expectations

Target:

Implementation Plan (timeline):

Responsible Individual(s):

2B. Utilize assemblers, linkers, loaders, macro processors,

Students should be able to

Measure: Assemblers
Direct - Exam

describe and utilize assemblers, linkers , loaders, macro processors, and compilers.

Details/Description: Using performance on quiz or test questions, for each of these topics, a decision will be reached for each of these topics for each student, as follows:

Exceeds Expectations
Meets Expectations
Does Not Meet Expectations

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Measure: Compilers
Direct - Exam

Details/Description: Using performance on quiz or test questions, for each of these topics, a decision will be reached for each of these topics for each student, as follows:

Exceeds Expectations
Meets Expectations
Does Not Meet Expectations

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Measure: Linkers and Loaders
Direct - Exam

Details/Description: Using performance on quiz or test questions, for each of these topics, a decision will be reached for each of these topics for each student, as follows:

Exceeds Expectations
Meets Expectations
Does Not Meet Expectations

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Measure: Macro Processors
Direct - Exam

Details/Description: Using performance on quiz or test questions, for each of these topics, a decision will be reached for each of these topics for each student, as follows:

Exceeds Expectations
Meets Expectations
Does Not Meet Expectations

Target:

Implementation Plan (timeline):

Responsible Individual(s):

2C. Uutilize operating systems

Students should be able to describe and utilize operating systems.

Measure: Memory Concepts: Paging
Direct - Exam

Details/Description: Using performance on quiz or test questions, for each of these topics, a decision will be reached for each of these topics for each student, as follows:

Exceeds Expectations = 3 (hits some fine points and all major points)
Meets Expectations = 2 (hits all major points)
Almost Meets Expectations = 1 (misses at most one major point)
Does Not Meet Expectations = 0 (misses 2 or more major points)

Overall = 0.7(#1) + 0.3(#2)

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Measure: Memory Concepts: Segmentation

Details/Description: Using performance on quiz or test questions, for each of these topics, a decision will be reached for each of these topics for each student, as follows:

Exceeds Expectations = 3 (hits some fine points and all major points)
Meets Expectations = 2 (hits all major points)
Almost Meets Expectations = 1 (misses at most one major point)
Does Not Meet Expectations = 0 (misses 2 or more major points)

Overall = 0.7(#1) + 0.3(#2)

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Measure: Memory Concepts: Virtual Memory
Direct - Exam

Details/Description: Using performance on quiz or test questions, for each of these topics, a decision will be reached for each of these topics for each student, as follows:

Exceeds Expectations = 3 (hits some fine points and all major points)
Meets Expectations = 2 (hits all major points)
Almost Meets Expectations = 1 (misses at most one major point)
Does Not Meet Expectations = 0 (misses 2 or more major points)

Overall = 0.7(#1) + 0.3(#2)

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Measure: Process Control: Concurrency
Direct - Exam

Details/Description: Using performance on quiz or test questions, for each of these topics, a decision will be reached for each of these topics for each student, as follows:

Exceeds Expectations = 3 (hits some fine points and all major points)
Meets Expectations = 2 (hits all major points)
Almost Meets Expectations = 1 (misses at most one major point)
Does Not Meet Expectations = 0 (misses 2 or more major points)

Overall = 0.7(#1) + 0.3(#2)

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Measure: Process Control: Context Switch
Direct - Exam

Details/Description: Using performance on quiz or test questions, for each of these topics, a decision will be reached for each of these topics for each student, as follows:

Exceeds Expectations = 3 (hits some fine points and all major points)
Meets Expectations = 2 (hits all major points)
Almost Meets Expectations = 1 (misses at most one major point)
Does Not Meet Expectations = 0 (misses 2 or more major points)

Overall = 0.7(#1) + 0.3(#2)

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Measure: Process Control: Dual Mode Operation

Details/Description: Using performance on quiz or test questions, for each of these topics, a decision will be reached for each of these topics for each student, as follows:

Exceeds Expectations = 3 (hits some fine points and all major points)
Meets Expectations = 2 (hits all major points)
Almost Meets Expectations = 1 (misses at most one major point)
Does Not Meet Expectations = 0 (misses 2 or more major points)

Overall = 0.7(#1) + 0.3(#2)

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Measure: Process Control: Mutual Exclusion, Progress, Bounded Wait
Direct - Exam

Details/Description: Using performance on quiz or test questions, for each of these topics, a decision will be reached for each of these topics for each student, as follows:

Exceeds Expectations = 3 (hits some fine points and all major points)
Meets Expectations = 2 (hits all major points)
Almost Meets Expectations = 1 (misses at most one major point)
Does Not Meet Expectations = 0 (misses 2 or more major points)

Overall = 0.7(#1) + 0.3(#2)

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Assessment Findings

Finding per Measure

Old - BA/BS in Computer Science Outcome Set

2. Demonstrate knowledge of computer systems.

2A. Utilize computer architecture

Students should be able to describe and utilize computer architecture.

Measure: Combinational Digital Circuits
Direct - Exam

Details/Description: Using performance on quiz or test questions, for each of these topics, a decision will be reached for each of these topics for each student, as follows:

Exceeds Expectations
Meets Expectations
Does Not Meet Expectations

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Findings for Combinational Digital Circuits

No Findings Added

Measure: Computer Organization, Instruction Set Architecture, HDL
Direct - Exam

Details/Description: Using performance on quiz or test questions, for each of these topics, a decision will be reached for each of these topics for each student, as follows:

Exceeds Expectations
Meets Expectations
Does Not Meet Expectations

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Findings for Computer Organization, Instruction Set Architecture, HDL

No Findings Added

Measure: CPU Design
Direct - Exam

Details/Description: Using performance on quiz or test questions, for each of these topics, a decision will be reached for each of these topics for each student, as follows:

Exceeds Expectations
Meets Expectations
Does Not Meet Expectations

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Findings for CPU Design

No Findings Added

Measure: Input-Output System Design
Direct - Exam

Details/Description: Using performance on quiz or test questions, for each of these topics, a decision will be reached for each of these topics for each student, as follows:

Exceeds Expectations
Meets Expectations
Does Not Meet Expectations

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Findings for Input-Output System Design

No Findings Added

Measure: Memory System Design
Direct - Exam

Details/Description: Using performance on quiz or test questions, for each of these topics, a decision will be reached for each of these topics for each student, as follows:

Exceeds Expectations
Meets Expectations
Does Not Meet Expectations

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Findings for Memory System Design

No Findings Added

Measure: RISC, CISC, Pipelined and Parallel Systems
Direct - Exam

Details/Description: Using performance on quiz or test questions, for each of these topics, a decision will be reached for each of these topics for each student, as follows:

Exceeds Expectations
Meets Expectations
Does Not Meet Expectations

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Findings for RISC, CISC, Pipelined and Parallel Systems

No Findings Added

Measure: Sequential Digital Circuits
Direct - Exam

Details/Description: Using performance on quiz or test questions, for each of these topics, a decision will be reached for each of these topics for each student, as follows:

Exceeds Expectations
Meets Expectations
Does Not Meet Expectations

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Findings for Sequential Digital Circuits

No Findings Added

2B. Utilize assemblers, linkers, loaders, macro processors,

Students should be able to describe and utilize assemblers, linkers , loaders, macro processors, and compilers.

Measure: Assemblers
Direct - Exam

Details/Description: Using performance on quiz or test questions, for each of these topics, a decision will be reached for each of these topics for each student, as follows:

Exceeds Expectations
Meets Expectations
Does Not Meet Expectations

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Findings for Assemblers

No Findings Added

Measure: Compilers
Direct - Exam

Details/Description: Using performance on quiz or test questions, for each of these topics, a decision will be reached for each of these topics for each student, as follows:

Exceeds Expectations
Meets Expectations
Does Not Meet Expectations

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Findings for Compilers

No Findings Added

Measure: Linkers and Loaders
Direct - Exam

Details/Description: Using performance on quiz or test questions, for each of these topics, a decision will be reached for each of these topics for each student, as follows:

Exceeds Expectations

Meets Expectations
Does Not Meet Expectations

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Findings for Linkers and Loaders

No Findings Added

Measure: Macro Processors
Direct - Exam

Details/Description: Using performance on quiz or test questions, for each of these topics, a decision will be reached for each of these topics for each student, as follows:

Exceeds Expectations
Meets Expectations
Does Not Meet Expectations

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Findings for Macro Processors

No Findings Added

2C. Uutilize operating systems

Students should be able to describe and utilize operating systems.

Measure: Memory Concepts: Paging
Direct - Exam

Details/Description: Using performance on quiz or test questions, for each of these topics, a decision will be reached for each of these topics for each student, as follows:

Exceeds Expectations = 3 (hits some fine points and all major points)
Meets Expectations = 2 (hits all major points)
Almost Meets Expectations = 1 (misses at most one major point)
Does Not Meet Expectations = 0 (misses 2 or more major points)

Overall = 0.7(#1) + 0.3(#2)

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Findings for Memory Concepts: Paging

No Findings Added

Measure: Memory Concepts: Segmentation

Details/Description: Using performance on quiz or test questions, for each of these topics, a decision will be reached for each of these topics for each student, as follows:

Exceeds Expectations = 3 (hits some fine points and all major points)

Meets Expectations = 2 (hits all major points)
Almost Meets Expectations = 1 (misses at most one major point)
Does Not Meet Expectations = 0 (misses 2 or more major points)

Overall = 0.7(#1) + 0.3(#2)

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Findings for Memory Concepts: Segmentation

No Findings Added

Measure: Memory Concepts: Virtual Memory
Direct - Exam

Details/Description: Using performance on quiz or test questions, for each of these topics, a decision will be reached for each of these topics for each student, as follows:

Exceeds Expectations = 3 (hits some fine points and all major points)
Meets Expectations = 2 (hits all major points)
Almost Meets Expectations = 1 (misses at most one major point)
Does Not Meet Expectations = 0 (misses 2 or more major points)

Overall = 0.7(#1) + 0.3(#2)

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Findings for Memory Concepts: Virtual Memory

No Findings Added

Measure: Process Control: Concurrency
Direct - Exam

Details/Description: Using performance on quiz or test questions, for each of these topics, a decision will be reached for each of these topics for each student, as follows:

Exceeds Expectations = 3 (hits some fine points and all major points)
Meets Expectations = 2 (hits all major points)
Almost Meets Expectations = 1 (misses at most one major point)
Does Not Meet Expectations = 0 (misses 2 or more major points)

Overall = 0.7(#1) + 0.3(#2)

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Findings for Process Control: Concurrency

No Findings Added

Measure: Process Control: Context Switch
Direct - Exam

Details/Description: Using performance on quiz or test questions, for each of these topics, a decision will be reached for each of these topics for each student, as follows:

Exceeds Expectations = 3 (hits some fine points and all major points)
Meets Expectations = 2 (hits all major points)
Almost Meets Expectations = 1 (misses at most one major point)
Does Not Meet Expectations = 0 (misses 2 or more major points)

Overall = 0.7(#1) + 0.3(#2)

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Findings for Process Control: Context Switch

No Findings Added

Measure: Process Control: Dual Mode Operation

Details/Description: Using performance on quiz or test questions, for each of these topics, a decision will be reached for each of these topics for each student, as follows:

Exceeds Expectations = 3 (hits some fine points and all major points)
Meets Expectations = 2 (hits all major points)
Almost Meets Expectations = 1 (misses at most one major point)
Does Not Meet Expectations = 0 (misses 2 or more major points)

Overall = 0.7(#1) + 0.3(#2)

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Findings for Process Control: Dual Mode Operation

No Findings Added

Measure: Process Control: Mutual Exclusion, Progress, Bounded Wait
Direct - Exam

Details/Description: Using performance on quiz or test questions, for each of these topics, a decision will be reached for each of these topics for each student, as follows:

Exceeds Expectations = 3 (hits some fine points and all major points)
Meets Expectations = 2 (hits all major points)
Almost Meets Expectations = 1 (misses at most one major point)
Does Not Meet Expectations = 0 (misses 2 or more major points)

Overall = 0.7(#1) + 0.3(#2)

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Findings for Process Control: Mutual Exclusion, Progress, Bounded Wait

No Findings Added

Overall Recommendations

No text specified

Overall Reflection

No text specified

2012-2013 Assessment Cycle

Assessment Plan

Outcomes and Measures

Old - BA/BS in Computer Science Outcome Set

1. Demonstrate knowledge of programming and software develop

Demonstrate knowledge of programming and software development.

1A. Apply standard programming constructs Students should be able to apply standard programming constructs to program problem solutions. This would include control structures, functions, objects and data structures.	*No measures specified*
1B. Describe and utilize software lifecyle models Students should be able to describe and utilize software lifecycle models.	*No measures specified*
1C. Describe and utilize programming paradigms Students should be able to describe and utilize several programming paradigms.	*No measures specified*

Assessment Findings

Finding per Measure

Old - BA/BS in Computer Science Outcome Set

1. Demonstrate knowledge of programming and software develop

Demonstrate knowledge of programming and software development.

1A. Apply standard programming constructs Students should be able to apply standard programming constructs to program problem solutions. This would include control structures, functions, objects and data structures.	*No measures specified*

1B. Describe and utilize software lifecyle models Students should be able to describe and utilize software lifecycle models.	*No measures specified*
1C. Describe and utilize programming paradigms Students should be able to describe and utilize several programming paradigms.	*No measures specified*

Overall Recommendations

No text specified

Overall Reflection

No text specified

Action Plan

Status Report

2013-2014 Assessment Cycle

Assessment Plan

Outcomes and Measures

BA/BS in Computer Science Outcome Set- Effective 2013-2014

1. Programming and Problem Solving

The core objective of the computer science program is that the students are skilled programmers and problem solvers. The core CS sequence (CS 151, CS 201, CS 202, and CS 303) introduces and reinforces programming and problem solving skills needed by all computer scientists. The skills are reinforced further in later courses.

1A - Basic Programming

Students should be able to use standard language constructs proficiently. This includes the basic programming elements that are standard in any programming language - functions, loops, conditionals, basic data types.

Measure: Major Field Test (MFT)
Direct - Exam

Details/Description: Students mastery of the concepts and skills within Objective 1 are also measured by the Major Field Test (MFT), which students take during their final year of study, and with an exit survey.

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Measure: Quiz
Direct - Exam

Details/Description: Because Objective 1 is the core objective of the program, we focus the most effort in assessing this objective. The main assessment tool is a not-for credit quiz given to students near the end of CS 151, 201, 202, and 303. The quiz is given not-for credit so that true knowledge can be measured, rather than "that which can be crammed and then forgotten". Quiz topics include Basic Programming, Data Structures, Programming Paradigms, and Algorithms Analysis. See attachment for details.

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Supporting Attachments:

CS Assessment Quiz details (Word Document (Open XML)) (See appendix)

1B - Programming Paradigms

Students should understand and be able to program proficiently in more than one programming paradigm. This should include at least two of the following: procedural/imperative, object oriented, functional, event driven, logic based, concurrent.

Measure: Major Field Test (MFT)
Direct - Exam

Details/Description: Students mastery of the concepts and skills within Objective 1 are also measured by the Major Field Test (MFT), which students take during their final year of study, and with an exit survey.

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Measure: Quiz
Direct - Exam

Details/Description: Because Objective 1 is the core objective of the program, we focus the most effort in assessing this objective. The main assessment tool is a not-for credit quiz given to students near the end of CS 151, 201, 202, and 303. The quiz is given not-for credit so that true knowledge can be measured, rather than "that which can be crammed and then forgotten". Quiz topics include Basic Programming, Data Structures, Programming Paradigms, and Algorithms Analysis. See attachment for details.

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Supporting Attachments:

CS Assessment Quiz details (Word Document (Open XML)) (See appendix)

1C - Data Structures

Students should understand and be able to use basic data structures, including lists, stacks, queues, binary search trees, and hash tables.

Measure: Major Field Test (MFT)
Direct - Exam

Details/Description: Students mastery of the concepts and skills within Objective 1 are also measured by the Major Field Test (MFT), which students take during their final year of study, and with an exit survey.

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Measure: Quiz
Direct - Exam

Details/Description: Because Objective 1 is the core objective of the program, we focus the most effort in assessing this objective. The main assessment tool is a not-for credit quiz given to students near the end of CS 151, 201, 202, and 303. The quiz is given not-for credit so that true knowledge can be measured, rather than "that which can be crammed and then forgotten". Quiz topics include Basic Programming, Data Structures, Programming Paradigms, and Algorithms Analysis. See attachment for details.

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Supporting Attachments:

CS Assessment Quiz details (Word Document (Open XML)) (See appendix)

1D - Algorithms Analysis

Students should be able to analyze the running time and correctness of standard algorithms which they have learned. As tools for this analysis, students should be able to reason about graphs, discrete probability, basic set theory, and basic number theory.

Measure: Major Field Test (MFT)
Direct - Exam

Details/Description: Students mastery of the concepts and skills within Objective 1 are also measured by the Major Field Test (MFT), which students take during their final year of study, and with an exit survey.

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Measure: Quiz
Direct - Exam

Details/Description: Because Objective 1 is the core objective of the program, we focus the most effort in assessing this objective. The main assessment tool is a not-for credit quiz given to students near the end of CS 151, 201, 202, and 303. The quiz is given not-for credit so that true knowledge can be measured, rather than "that which can be crammed and then forgotten". Quiz topics include Basic Programming, Data Structures, Programming Paradigms, and Algorithms Analysis. See attachment for details.

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Supporting Attachments:

CS Assessment Quiz details (Word Document (Open XML)) (See appendix)

2. Specialized Knowledge and Skills

The second main objective is that students have more specialized knowledge and skills in a number of particular areas of computer science. The two concentrations of the computer science major differ in some of the areas that are emphasized and agree on others.

2A- Computer Systems

Students should understand the basic internal working of computer systems, including both hardware and software. Students should understand the basics of assembly language and CPU design, especially with regards to how these influence program efficiency. Students should understand the issues inherent in any operating system, including synchronization and resource sharing, and how these issues influence program efficiency.

Measure: Alumni Survey
Indirect - Survey

Details/Description: The Alumni Survey is given after graduation.

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Supporting Attachments:

Alumni Survey (Word Document (Open XML)) (See appendix)

Measure: Exit Survey
Indirect - Survey

Details/Description: Exit survey will be given when students graduate.

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Supporting Attachments:

Exit Survey (Word Document (Open XML)) (See appendix)

Measure: Major Field Test (MFT)
Direct - Exam

Details/Description: Students mastery of the concepts and skills within Objective 1 are also measured by the Major Field Test (MFT), which students take during their final year of study, and with an exit survey.

Target:

Implementation Plan (timeline):

Responsible Individual(s):

2B- Software Processes

Students are exposed to the techniques for managing large software projects. Students should understand the difficulties that arise in working on large projects that involve many different programmers, and can utilize skills for dealing with these difficulties.

Measure: Alumni Survey
Indirect - Survey

Details/Description: The Alumni Survey is given after graduation.

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Supporting Attachments:

Alumni Survey (Word Document (Open XML)) (See appendix)

Measure: Exit Survey
Indirect - Survey

Details/Description: Exit survey will be given when students graduate.

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Supporting Attachments:

Exit Survey (Word Document (Open XML)) (See appendix)

Measure: Major Field Test (MFT)
Direct - Exam

Details/Description: Students mastery of the concepts and skills within Objective 1 are also measured by the Major Field Test (MFT), which students take during their final year of study, and with an exit survey.

Target:

Implementation Plan (timeline):

Responsible Individual(s):

2C- Programming and Design in Specialized Areas

Students should be proficient at programming in specialized areas that are very common in industry, including databases, web programming, networking, and advanced system administration. Students should understand the key algorithms, programming languages, and data structures used in each area, and be able to apply this knowledge to write efficient programs.

Note: This outcome is specific to the Information Science concentration of the major.

Measure: Alumni Survey
Indirect - Survey

Details/Description: The Alumni Survey is given after graduation.

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Supporting Attachments:

Alumni Survey (Word Document (Open XML)) (See appendix)

Measure: Exit Survey
Indirect - Survey

Details/Description: Exit survey will be given when students graduate.

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Supporting Attachments:

Exit Survey (Word Document (Open XML)) (See appendix)

Measure: Major Field Test (MFT)
Direct - Exam

Details/Description: Students mastery of the concepts and skills within Objective 1 are also measured by the Major Field Test (MFT), which students take during their final year of study, and with an exit survey.

Target:

Implementation Plan (timeline):

Responsible Individual(s):

2D- Advanced Algorithms and Theory

Students should understand various models of computation and how these are used to model and efficiently solve various computational problems. Students should be exposed to computational problems that are difficult to solve in the worst case. Students should understand ways to deal with hard problems.

Students should master the standard algorithm techniques of greedy, dynamic programming, and divide and conquer algorithms. Students should be proficient at programming and algorithms analysis using these techniques. Students should be proficient at programming and using basic graph algorithms such as those for shortest path and minimum spanning trees. Students should be exposed to some other algorithm techniques such as linear programming and randomized algorithms.

Students should understand the process of proving program correctness, automated theorem proving, and be able to use automated theorem provers.

Measure: Alumni Survey
Indirect - Survey

Details/Description: The Alumni Survey is given after graduation.

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Supporting Attachments:

Alumni Survey (Word Document (Open XML)) (See appendix)

Measure: Exit Survey
Indirect - Survey

Details/Description: Exit survey will be given when students graduate.

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Supporting Attachments:

Exit Survey (Word Document (Open XML)) (See appendix)

Measure: Major Field Test (MFT)
Direct - Exam

Details/Description: Students mastery of the concepts and skills within Objective 1 are also measured by the Major Field Test (MFT), which students take during their final year of study, and with an exit survey.

Target:

Implementation Plan (timeline):

Responsible Individual(s):

3. Professional and Interpersonal Skills

Another objective of the program is that the students develop professional and interpersonal skills.

3A- Working in a Group

Students should have had

Measure: Exit Survey
Indirect - Survey

some experience working on a programming project in a group setting.

Details/Description: Exit survey will be given when students graduate.

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Supporting Attachments:

Exit Survey (Word Document (Open XML)) (See appendix)

3B- Presentation Skills

Students should have given presentations in some of their classes, and should be aware of and have mastered basic presentation skills.

Measure: Exit Survey
Indirect - Survey

Details/Description: Exit survey will be given when students graduate.

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Supporting Attachments:

Exit Survey (Word Document (Open XML)) (See appendix)

Assessment Findings

Finding per Measure

BA/BS in Computer Science Outcome Set- Effective 2013-2014

1. Programming and Problem Solving

The core objective of the computer science program is that the students are skilled programmers and problem solvers. The core CS sequence (CS 151, CS 201, CS 202, and CS 303) introduces and reinforces programming and problem solving skills needed by all computer scientists. The skills are reinforced further in later courses.

1A - Basic Programming

Students should be able to use standard language constructs proficiently. This includes the basic programming elements that are standard in any programming language - functions, loops, conditionals, basic data types.

Measure: Major Field Test (MFT)
Direct - Exam

Details/Description: Students mastery of the concepts and skills within Objective 1 are also measured by the Major Field Test (MFT), which students take during their final year of study, and with an exit survey.

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Findings for Major Field Test (MFT)

No Findings Added

Measure: Quiz
Direct - Exam

Details/Description: Because Objective 1 is the core objective of the program, we focus the most effort in assessing this objective. The main assessment tool is a not-for credit quiz given to students near the end of CS 151, 201, 202, and 303. The quiz is given not-for credit so that true knowledge can be measured, rather than "that which can be crammed and then forgotten". Quiz topics include

Basic Programming, Data Structures, Programming Paradigms, and Algorithms Analysis. See attachment for details.

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Supporting Attachments:

CS Assessment Quiz details (Word Document (Open XML)) (See appendix)

Findings for Quiz

No Findings Added

1B - Programming Paradigms

Students should understand and be able to program proficiently in more than one programming paradigm. This should include at least two of the following: procedural/imperative, object oriented, functional, event driven, logic based, concurrent.

Measure: Major Field Test (MFT)
Direct - Exam

Details/Description: Students mastery of the concepts and skills within Objective 1 are also measured by the Major Field Test (MFT), which students take during their final year of study, and with an exit survey.

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Findings for Major Field Test (MFT)

No Findings Added

Measure: Quiz
Direct - Exam

Details/Description: Because Objective 1 is the core objective of the program, we focus the most effort in assessing this objective. The main assessment tool is a not-for credit quiz given to students near the end of CS 151, 201, 202, and 303. The quiz is given not-for credit so that true knowledge can be measured, rather than "that which can be crammed and then forgotten". Quiz topics include Basic Programming, Data Structures, Programming Paradigms, and Algorithms Analysis. See attachment for details.

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Supporting Attachments:

CS Assessment Quiz details (Word Document (Open XML)) (See appendix)

Findings for Quiz

No Findings Added

1C - Data Structures

Students should understand and be able to use basic data structures,

Measure: Major Field Test (MFT)
Direct - Exam

including lists, stacks, queues, binary search trees, and hash tables.

Details/Description: Students mastery of the concepts and skills within Objective 1 are also measured by the Major Field Test (MFT), which students take during their final year of study, and with an exit survey.

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Findings for Major Field Test (MFT)

No Findings Added

Measure: Quiz
Direct - Exam

Details/Description: Because Objective 1 is the core objective of the program, we focus the most effort in assessing this objective. The main assessment tool is a not-for credit quiz given to students near the end of CS 151, 201, 202, and 303. The quiz is given not-for credit so that true knowledge can be measured, rather than "that which can be crammed and then forgotten". Quiz topics include Basic Programming, Data Structures, Programming Paradigms, and Algorithms Analysis. See attachment for details.

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Supporting Attachments:

CS Assessment Quiz details (Word Document (Open XML)) (See appendix)

Findings for Quiz

No Findings Added

1D - Algorithms Analysis

Students should be able to analyze the running time and correctness of standard algorithms which they have learned. As tools for this analysis, students should be able to reason about graphs, discrete probability, basic set theory, and basic number theory.

Measure: Major Field Test (MFT)
Direct - Exam

Details/Description: Students mastery of the concepts and skills within Objective 1 are also measured by the Major Field Test (MFT), which students take during their final year of study, and with an exit survey.

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Findings for Major Field Test (MFT)

No Findings Added

Measure: Quiz
Direct - Exam

Details/Description: Because Objective 1 is the core objective of the program, we focus the most effort in assessing this objective. The main assessment tool is a not-for credit quiz given to students near the end of CS 151, 201, 202, and 303. The quiz is given not-for credit so that true knowledge can be measured, rather than "that which can be crammed and then forgotten". Quiz topics include Basic Programming, Data Structures, Programming Paradigms, and Algorithms Analysis. See

attachment for details.

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Supporting Attachments:

CS Assessment Quiz details (Word Document (Open XML)) (See appendix)

Findings for Quiz

No Findings Added

2. Specialized Knowledge and Skills

The second main objective is that students have more specialized knowledge and skills in a number of particular areas of computer science. The two concentrations of the computer science major differ in some of the areas that are emphasized and agree on others.

2A- Computer Systems

Students should understand the basic internal working of computer systems, including both hardware and software. Students should understand the basics of assembly language and CPU design, especially with regards to how these influence program efficiency. Students should understand the issues inherent in any operating system, including synchronization and resource sharing, and how these issues influence program efficiency.

Measure: Alumni Survey
Indirect - Survey

Details/Description: The Alumni Survey is given after graduation.

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Supporting Attachments:

Alumni Survey (Word Document (Open XML)) (See appendix)

Findings for Alumni Survey

No Findings Added

Measure: Exit Survey
Indirect - Survey

Details/Description: Exit survey will be given when students graduate.

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Supporting Attachments:

Exit Survey (Word Document (Open XML)) (See appendix)

Findings for Exit Survey

No Findings Added

Measure: Major Field Test (MFT)
Direct - Exam

Details/Description: Students mastery of the concepts and skills within Objective 1 are also measured by the Major Field Test (MFT), which students take during their final year of study, and with an exit survey.

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Findings for Major Field Test (MFT)

No Findings Added

2B- Software Processes

Students are exposed to the techniques for managing large software projects. Students should understand the difficulties that arise in working on large projects that involve many different programmers, and can utilize skills for dealing with these difficulties.

Measure: Alumni Survey
Indirect - Survey

Details/Description: The Alumni Survey is given after graduation.

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Supporting Attachments:

Alumni Survey (Word Document (Open XML)) (See appendix)

Findings for Alumni Survey

No Findings Added

Measure: Exit Survey
Indirect - Survey

Details/Description: Exit survey will be given when students graduate.

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Supporting Attachments:

Exit Survey (Word Document (Open XML)) (See appendix)

Findings for Exit Survey

No Findings Added

Measure: Major Field Test (MFT)
Direct - Exam

Details/Description: Students mastery of the concepts and skills within Objective 1 are also measured by the Major Field Test (MFT), which students take during their final year of study, and with an exit survey.

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Findings for Major Field Test (MFT)

No Findings Added

2C- Programming and Design in Specialized Areas

Students should be proficient at programming in specialized areas that are very common in industry, including databases, web programming, networking, and advanced system administration. Students should understand the key algorithms, programming languages, and data structures used in each area, and be able to apply this knowledge to write efficient programs.

Note: This outcome is specific to the Information Science concentration of the major.

Measure: Alumni Survey
Indirect - Survey

Details/Description: The Alumni Survey is given after graduation.

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Supporting Attachments:

Alumni Survey (Word Document (Open XML)) (See appendix)

Findings for Alumni Survey

No Findings Added

Measure: Exit Survey
Indirect - Survey

Details/Description: Exit survey will be given when students graduate.

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Supporting Attachments:

Exit Survey (Word Document (Open XML)) (See appendix)

Findings for Exit Survey

No Findings Added

Measure: Major Field Test (MFT)
Direct - Exam

Details/Description: Students mastery of the concepts and skills within Objective 1 are also measured by the Major Field Test (MFT), which students take during their final year of study, and with an exit survey.

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Findings for Major Field Test (MFT)

No Findings Added

2D- Advanced Algorithms and Theory

Students should understand various models

Measure: Alumni Survey
Indirect - Survey

of computation and how these are used to model and efficiently solve various computational problems. Students should be exposed to computational problems that are difficult to solve in the worst case. Students should understand ways to deal with hard problems.

Students should master the standard algorithm techniques of greedy, dynamic programming, and divide and conquer algorithms. Students should be proficient at programming and algorithms analysis using these techniques. Students should be proficient at programming and using basic graph algorithms such as those for shortest path and minimum spanning trees. Students should be exposed to some other algorithm techniques such as linear programming and randomized algorithms.

Students should understand the process of proving program correctness, automated theorem proving, and be able to use automated theorem provers.

Details/Description: The Alumni Survey is given after graduation.

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Supporting Attachments:

Alumni Survey (Word Document (Open XML)) (See appendix)

Findings for Alumni Survey

No Findings Added

Measure: Exit Survey
Indirect - Survey

Details/Description: Exit survey will be given when students graduate.

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Supporting Attachments:

Exit Survey (Word Document (Open XML)) (See appendix)

Findings for Exit Survey

No Findings Added

Measure: Major Field Test (MFT)
Direct - Exam

Details/Description: Students mastery of the concepts and skills within Objective 1 are also measured by the Major Field Test (MFT), which students take during their final year of study, and with an exit survey.

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Findings for Major Field Test (MFT)

No Findings Added

3. Professional and Interpersonal Skills

Another objective of the program is that the students develop professional and interpersonal skills.

3A- Working in a Group

Students should have had some experience working on a programming project in a group setting.

Measure: Exit Survey
Indirect - Survey

Details/Description: Exit survey will be given when students graduate.

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Supporting Attachments:

Exit Survey (Word Document (Open XML)) (See appendix)

Findings for Exit Survey

No Findings Added

3B- Presentation Skills

Students should have given presentations in some of their classes, and should be aware of and have mastered basic presentation skills.

Measure: Exit Survey
Indirect - Survey

Details/Description: Exit survey will be given when students graduate.

Target:

Implementation Plan (timeline):

Responsible Individual(s):

Supporting Attachments:

Exit Survey (Word Document (Open XML)) (See appendix)

Findings for Exit Survey

No Findings Added

Overall Recommendations

No text specified

Overall Reflection

No text specified

Action Plan

Status Report

2014-2015 Assessment Cycle

- **Assessment Plan**
- **Assessment Findings**
- **Action Plan**
- **Status Report**

2015-2016 Assessment Cycle

- **Assessment Plan**
- **Assessment Findings**
- **Action Plan**
- **Status Report**

2016-2017 Assessment Cycle

- **Assessment Plan**
- **Assessment Findings**
- **Action Plan**
- **Status Report**

2017-2018 Assessment Cycle

- **Assessment Plan**
- **Assessment Findings**
- **Action Plan**
- **Status Report**

2018-2019 Assessment Cycle

- **Assessment Plan**
- **Assessment Findings**
- **Action Plan**
- **Status Report**

2019-2020 Assessment Cycle

- **Assessment Plan**
- **Assessment Findings**
- **Action Plan**
- **Status Report**

Appendix

A. **BA/BS in Computer Science** (Curriculum Map)
B. **Old-BA/BS in Computer Science Outcome Set** (Curriculum Map)
C. **Math_CS_Undergrad_Programs_Assessment_May2011.pdf** (Adobe Acrobat Document)
D. **Computer Science** (Adobe Acrobat Document)
E. **Exit Survey** (Word Document (Open XML))
F. **Exit Survey** (Word Document (Open XML))
G. **Exit Survey** (Word Document (Open XML))
H. **Exit Survey** (Word Document (Open XML))
I. **Exit Survey** (Word Document (Open XML))
J. **Alumni Survey** (Word Document (Open XML))
K. **Alumni Survey** (Word Document (Open XML))
L. **Alumni Survey** (Word Document (Open XML))
M. **CS Assessment Quiz details** (Word Document (Open XML))
N. **CS Assessment Quiz details** (Word Document (Open XML))
O. **CS Assessment Quiz details** (Word Document (Open XML))
P. **CS Assessment Quiz details** (Word Document (Open XML))
Q. **Alumni Survey** (Word Document (Open XML))
R. **Exit Survey** (Word Document (Open XML))

Undergraduate Programs Assessment Plan
Department of Mathematics and Computer Science
May 1, 2011

Indiana State University Mission Statement:
Indiana State University combines a tradition of strong undergraduate education with a focus on community and public service. We integrate teaching, research, and creative activity in an engaging, challenging, and supportive learning environment to prepare productive citizens for Indiana and the world.

From the above goal follow these specific goals of the department:

1. A mastery of the course material. It is an objective of the Department that students be thoroughly grounded in the major intellectual components of the discipline – including the interplay of theory and applications, study in depth, and the construction of general theories and proofs – so as to prepare them for future study and/or employment.

2. Overall knowledge of the subject upon graduation. It is an objective of the Department that our students develop the attitudes of mind and the analytic skills required for the efficient use, appreciation, and understanding of mathematics and computer science, and that our students are prepared to communicate mathematical and computer science concepts effectively, both orally and in writing, to non-mathematical and non-computer science, as well as mathematical, and computer science audiences.

3. Understanding the basic principles in mathematics and computer science. It is an objective of the Department to develop mathematical and computer science maturity in our students, i.e., the ability to read and comprehend technically-based material so that they can learn mathematics and computer science independently.

4. Explore the ways that people use mathematics and computer science in modern society. It is an objective of the Department to prepare students who understand the increasing role that mathematics and computer science play in modern society and to prepare students to take advantage of the role computer technology occupies in all phases of mathematics and computer science.

5. Knowledge of material applicable to chosen field. It is an objective of the Department to improve the mathematical and computer science skills of students who will be or are already employed in technical jobs by developing their abilities to solve open-ended problems independently.

LEARNING OUTCOMES IN MATHEMATICS AND COMPUTER SCIENCE

1. Students will gain skills in quantitative and qualitative methods of analysis and problem-solving.
2. Students will understand major theories and content of mathematics.
3. Students will be able to apply their knowledge of mathematics to real-world problems.
4. Students will gain effective oral and written communication skills.
5. Students will gain knowledge of good program development skills.
6. Students will gain team building skills to successfully participate on teams to solve problems.
7. Students will gain knowledge of different programming languages/paradigms and different computing platforms.

BRIEF DESCRIPTION OF CURRENT DEPARTMENT PROGRAMS

The Department offers three majors: one in mathematics and one in mathematics education; and one in computer science. Generally, the above goals apply to all three majors. However, there could be differences in emphasis between mathematics, mathematics education and computer science

PROPOSED INSTRUMENTS OF ASSESSMENT

The following are the instruments of assessment to be used by the Department in assessing all of its undergraduate programs.

1. Review of course materials and instructors' course summaries. [Indirect Measure] Course summaries of all mathematics and computer science courses are reviewed each year by the appropriate curriculum committees to study issues brought up by instructors. These issues include (but are not limited to): topics covered, preparedness of students, changes in curriculum or textbooks, calculator policies, and success of students. These reviews will take place in the Fall semester of each year. Any areas of concern will be considered by the appropriate curriculum committees during the academic year. These reviews are especially effective at evaluating student mastery of course material and their understanding of the basic principles of the discipline. By focusing on specific core courses the department is able to assess student understanding of basic principles, of the uses of mathematics and computer science in the world, and of their application skills.

2. Exit Survey of all graduating seniors. [Indirect Measure] These interviews are to be conducted and documented by the appropriate curriculum committees in collaboration with the Department chair. The surveys will take place near the end of the Fall and Spring semesters each year. The results of the surveys will be summarized and made available to all faculty. The Department will discuss the results of the surveys near the beginning of each Fall semester and will consider further any comments students made that the Department believes need further attention or discussion.

3. ETS Major Field Test. [Direct and Objective Measure] The Educational Testing Service (ETS) Major Field Test in Mathematics and Computer Science will be given to mathematics and computer science majors near the end of the Fall semester of the students senior year. According to information on ETS's website: "The tests are…designed to assess mastery of concepts and principles, as well as knowledge expected of students at the conclusion of a major in a specific subject area." Also, from ETS's website: "Each test delivers an individual score report, plus the mean scale score and standard deviation for the group of students tested. Several of the tests deliver individually reliable sub-scores that denote the achievement within broad areas within the field. Most of the tests also deliver assessment indicators, or scores relating the performance of the group of students within subareas of the major field of study." The appropriate curriculum committees will review the results of the Field Tests each Winter semester. If the results of the exams show deficiencies in any part of our programs it is the responsibility of the appropriate curriculum committee to recommend changes to address the areas of deficiencies.

Exit Survey

1. What were the reasons that you attended Indiana State University?

2. What and/or who influenced you to major in mathematics; mathematics education; or computer science?

3. What and/or who was most encouraging for you during your time at Indiana State University?

4. In reviewing your course work at Indiana State University, what courses in your major were most beneficial? Which courses did you feel were not beneficial? Why?

5. In reviewing your course work at Indiana State University, what courses outside of your major were most beneficial? Do you think any of the required courses outside your major were not beneficial? Why?

6. Did you take any mathematics, mathematics education or computer science courses at Indiana State University for which you felt the prerequisite courses did not give you adequate preparation? Please explain if you experienced any deficiencies.

7. Were there any topics or areas of mathematics, mathematics education or computer science that you feel were not adequately covered in your classes at Indiana State University?

8. Would you please comment on the advising you received?

9. Would you please comment on the scheduling of courses with respect to their availability on a semester by semester basis and the time (day, evening) they were offered?

10. Did you find the Indiana State University library adequate for your needs in your mathematics, mathematics education, or computer science courses? If you feel the Indiana State University library was not adequate, would you please be specific and also explain how you overcame this deficiency?

11. Would you please comment on the adequacy of the computer facilities for your undergraduate work?

12. What are your future career goals? Do you feel that you are adequately prepared for your career goals?

13. What do you believe that either the University or the Department of Mathematics and Computer Science should do in the near future to improve the undergraduate experience at Indiana State University?

14. Are there any comments that you would like to make?

COMPUTER SCIENCE PROGRAM

Program Goals

The computer science program strives to meet the following goals:

1. To develop students' skills in Problem Solving , Applications, Theory and Systems.

2. To highlight the relevance of Computer Science in the real world.

3. To inculcate in the students , an appreciation of the need for rigor and precision.

Proposed Plan of Assessment:

1. A survey of incoming students will be conducted to assess their knowledge of Computer Science.

2. The Final Exam in CS 257 : Object –Oriented Programming (proposed course) will be used for assessment purposes. CS 257 will be a course in the proposed revised computer science major. Until the proposed revised major is in place, the Final Exam in CS 258 will be used for assessment, instead.

3. The Final Exam in CS 458 : Data Structures and Algorithms will be used for assessment purposes.

4. A survey of recent graduates will be conducted.

5. A Capstone Course in Computer Science is planned. In the future, this course may be used for assessment.

A result of comparison of predictions based on outcomes of exams with the final grades in Data Structures, CS 258, showed a slight discrepancy. As a result I have slightly changed the emphasis of projects in the course and changed slightly the assessment of the course to further emphasize the project work.

David Hutchison
David Hutchison
October 19, 2007

Assessment Report
Computer Science
Spring 2006

Even though our first report is a bit incomplete, we see that a quick inspection of the data and the totals indicate that there is a pretty strong correlation between the assessment data and the course grades. Since the final was comprehensive, we might expect this but in data structures an important component of the grade is the project work. This probably accounts for the seeming inconsistency that we see in the totals of students #4 and #5. In fact, this may indicate that in future assessment instruments we should probably include an assessment of the project work in a course such as data structures.

We enclose a copy of our Program Goals and Plan of Assessment along with the raw data from the assessment process. This is a preliminary attempt at implementation for the following reasons:

1. The Plan was developed in the Fall of 2005 and CS 458 is normally scheduled in the Spring. So we had no data

immediately available from the CS 458 final for use in assessment at the present time.

2. As is made clear on the Plan of Assessment, CS 258 is a kind of substitute for one of the courses to be used in assessment and this fall the enrollment happened to be unusually low. Normally, this class has an enrollment of 15 – 20 but this time it had only 9 or 10 and only 7 took the final.

3. We decided to do the surveys later when a more complete report was possible.

Assessment of

COMPUTER SCIENCE UNDERGRADUATE PROGRAM

Program Goals

The Computer Science program strives to meet the following goals:

1. To develop students' skills in Problem Solving, Applications, Theory and Systems.

2. To highlight the relevance of Computer Science in the real world.

3. To inculcate the students, an appreciation of the need for rigor and precision.

Proposed Plan of Assessment:

1. A survey of incoming students will be conducted to assess their knowledge of Computer Science.

2. The Final Exam in CS 257: Object-Oriented Programming (proposed course) will be used for assessment purposes. CS 257 will be a course in the proposed revised Computer Science major. Until the proposed revised major is in place, the Final Exam in CS 258 will be used for assessment instead.

3. The final exam in CS 458: Data Structures and Algorithms will be used for assessment purposes.

4. A survey of recent graduates will be conducted.

5. A Capstone Course in Computer Science is planed. In the future, this course may be used for assessment.

STUDENT	FINAL GRADE	QUESTION			TOTALS
		#3	#4	#5	
1	A	24	15	15	54
2	B+	19	12	11	42
3	B	18	11	12	41
4	B	16	12	5	33
5	C	17	156	6	38
6	C	12	11	8	31
7	D	15	6	3	24

Assessment Rubric

Course # CS 258
Semester Fall 2005

Student identifier _____
Problem # 3
Student course grade _____

1. Problem Solving Skills

7 Assessed in this problem
0 Not assessed

a. Identifies an effective method for solving problems:

1 (poor)	2	3	4	5 (excellent)	Not Relevant
0	0	3	3	1	0

b. Implements method chosen correctly:

1 (poor)	2	3	4	5 (excellent)	Not Relevant
0	1	4	1	1	0

c. Checks the reasonable nature of results:

1 (poor)	2	3	4	5 (excellent)	Not Relevant
0	1	3	3	0	0

2. Demonstrates Relevance to Real World Problems

0 Assessed in this problem
7 Not assessed

3. Demonstrates Appreciation of Need for Rigor and Precision

7 Assessed in this problem
0 Not assessed

1 (poor)	2	3	4	5 (excellent)	Not Relevant
0	0	5	1	1	0

4. Overall – Presents Work Clearly and in Detail:

7 Assessed in this problem
0 Not assessed

1 (poor)	2	3	4	5 (excellent)	Not Relevant
0	1	2	3	1	0

Assessment Rubric

Course # CS 258
Semester Fall 2005

Student identifier _____
Problem # 4
Student course grade _____

1. Problem Solving Skills

0 Assessed in this problem
7 Not assessed

a. Identifies an effective method for solving problems:

b. Implements method chosen correctly:

c. Checks the reasonable nature of results:

2. Demonstrates Relevance to Real World Problems

7 Assessed in this problem
0 Not assessed

1 (poor)	2	3	4	5 (excellent)	Not Relevant
0	1	1	3	2	0

3. Demonstrates Appreciation of Need for Rigor and Precision

7 Assessed in this problem
0 Not assessed

1 (poor)	2	3	4	5 (excellent)	Not Relevant
0	1	0	4	2	0

4. Overall – Presents Work Clearly and in Detail:

7 Assessed in this problem
0 Not assessed

1 (poor)	2	3	4	5 (excellent)	Not Relevant
0	1	1	3	2	0

Assessment Rubric

Course # CS 258
Semester Fall 2005

Student identifier _____
Problem # 5
Student course grade _____

1. Problem Solving Skills

0 Assessed in this problem
7 Not assessed

a. Identifies an effective method for solving problems:

b. Implements method chosen correctly:

c. Checks the reasonable nature of results:

2. Demonstrates Relevance to Real World Problems

7 Assessed in this problem
0 Not assessed

1 (poor)	2	3	4	5 (excellent)	Not Relevant
2	1	1	1	2	0

3. Demonstrates Appreciation of Need for Rigor and Precision

7 Assessed in this problem
0 Not assessed

1 (poor)	2	3	4	5 (excellent)	Not Relevant
1	3	2	0	1	0

4. Overall – Presents Work Clearly and in Detail:

7 Assessed in this problem
0 Not assessed

1 (poor)	2	3	4	5 (excellent)	Not Relevant
1	2	1	2	1	0