

Marshall Community & Technical College

Institutional Effectiveness & Outcome Assessment

IE/OA Tool Kit

Department or Service Area

Information Technology – Network Systems Security

Steps

Date Completed

- | | |
|---|--|
| 1. Department Mission Statement | February 2005
<hr/> May 2004 with revisions
May 2005 |
| 2. Statements of Intended Outcome | May 2004 with revisions
<hr/> May 2005 |
| 3. Service Audit | May 2004 with revisions
<hr/> May 2005 |
| 4. Assessment Measures | May 2004 with revisions
<hr/> May 2005 |
| 5. Assessment Timetable | May 2004 with revisions
<hr/> May 2005 |
| 6. Outcomes Assessment Tool (Feedback Loop) | February 2005 with
<hr/> revisions May 2005 |
| 7. Resources Requested for Department or Service Improvement (use space provided below) | <hr/> |

Students often complain about crowded lab conditions in Corbly Hall 335 and 336 as a barrier to effective hands-on training necessary for success with skills based labs. We've gotten smaller desks and may get smaller computers in the Summer of 2005; however, those classrooms are much smaller than Corbly Hall 4th floor classrooms. We have mounted most of the equipment on mobile racks to allow some flexibility. If a larger computer lab became available, we could certainly use the space.

As the end of each semester, a few students complain because there are no Cisco trained lab assistants available and there are very few open lab hours for skills based exam preparation. We should investigate the possibility of hiring a former student (who may still be on campus pursuing a B.S. or M.S) to be available 10 or 15 hours a week for assisting students.

Each time IT225, Fundamentals of Wireless LANs is taught, the classroom size (Corbly Hall 335 and 336) dictates that students are so close together that radio frequency interference occurs between access points and hosts arranged in pods throughout both class rooms. Students typically work in small groups of 3 to 5 students but can't successfully complete all exercises because they can't prevent their lab equipment from picking up radio frequency signals from the neighboring pods. We need larger classrooms for teaching Cisco classes because the amount of equipment is double that of other IT courses.

8. New Directions Recommended for Department or Service (IE Service Expansion, New Workforce Focus, etc.) (use space
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provided below)

Industry trends dictate constant revision of IT curriculum and laboratory equipment. Staying abreast of internetworking equipment maintenance, IOS revisions, security threats and countermeasures, and Cisco Academy required tasks requires significant time on the part of the Main Contact over and above class preparation, college activities, and student advising. The Main Contact needs release time to pursue strategies for developing further curriculum and enrollment.

Marshall Community & Technical College

Institutional Effectiveness & Outcomes Assessment

IE/OA 1. PROGRAM MISSION STATEMENT

Program-Degree or Certificate Information Technology - Network Systems Security
Option

Program or Department Name

Information Technology

Team Members

Sherri Vaseashta, Randy Jones, Tommie Kelley, Jack Locher, Scott Nicholas,
Rhonda Scragg

Date

February 5, 2004

Current Institutional Mission Statement

Marshall Community and Technical College is a comprehensive student-centered college focused on teaching and learning, and responsive to changing and diverse needs.

Program Mission Statement

The Information Technology (IT) program of the Marshall Community & Technical College is committed to the principle that each student can be empowered through education. The mission of the IT program is to provide the student with proactive and innovative academic experiences and learning opportunities that increase the state-of-the-market knowledge and technical skills required for employability and promotability in today's global workforce. Due to the constantly-evolving nature of the IT field, the student will develop a commitment to life-long learning and an appreciation for diversity.

Option Mission Statement

The Network Systems Security Option at Marshall Community and Technical College provides skills based training in network systems administration, development and security for first-time students, returning students, and working professionals. The program features courses sponsored by IT Industry leaders such as Microsoft, Cisco Systems, Hewlett Packard, and Sun Microsystems to ensure that students learn current industry standards and information security practices that enhance employability in network and information security occupations.

Marshall Community & Technical College

Institutional Effectiveness & Outcomes Assessment

IE/OA 2. STATEMENTS OF INTENDED OUTCOMES

Program-Degree or Certificate

Information Technology – Associate in Applied Science – Network Systems Security Option

Team Members

Sherry Vaseashta, Randy Jones, Tommie Kelley, Scott Nicholas, Jack Locher, Rhonda Scragg

Date

5/2/2004

Program Mission Statement

The Information Technology (IT) program of the Marshall Community & Technical College is committed to the principle that each student can be empowered through education. The mission of the IT program is to provide the student with proactive and innovative academic experiences and learning opportunities that increase the state-of-the-market knowledge and technical skills required for employability and promotability in today's global workforce. Due to the constantly-evolving nature of the IT field, the student will develop a commitment to life-long learning and an appreciation for diversity.

Option Mission Statement

The Network Systems Security Option at Marshall Community and Technical College provides skills based training in network systems administration, development and security for first-time students, returning students, and working professionals. The program features courses sponsored by IT Industry leaders such as Microsoft, Cisco Systems, Hewlett Packard, and Sun Microsystems to ensure that students learn current industry standards and information security practices that enhance employability in network and information security occupations.

STATEMENT OF INTENDED OUTCOME 1

Servers and Workstations - The student will install and maintain user workstations and servers with industry standard desktop and network operating systems according to organizational needs.

STATEMENT OF INTENDED OUTCOME 2

Internetworking Devices – The student will install and maintain Internetworking devices to support network communications according to organizational needs.

STATEMENT OF INTENDED OUTCOME 3

Information Assurance – The student will install and maintain network security devices and applications to assure confidentiality, integrity, and availability of information systems resources according to organizational needs.

STATEMENT OF INTENDED OUTCOME 4

Current General Education Outcomes:

- Communication Skills
 - Oral
 - Written
- Quantitative Skills/Science

- Technological Skills
- Critical Thinking Skills
- Ethical Behavior Awareness
- Diversity Awareness

	<ul style="list-style-type: none"> Ethical Behavior Awareness Diversity Awareness 																							
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*Modeled after Hatfield (1999) I = Introduced E = Emphasized R = Reinforced

<p>Introduces-Student is not familiar with content/skill, behavioral, or affective disposition. Instruction concentrates on introducing students to the content area/skill and bring them to some predetermined level of competence.</p>	<p>Emphasizes-Student should have brought basic content/skill to the component area. Instruction concentrates on enhancing content/strengthening skill and adding new content material/building more complex skills based on entrance competency.</p>	<p>Reinforces – Student bring reasonable knowledge/content/skill/competency to the situation as a result of content/skill being taught and/or emphasized at some previous point in their educational career. Instructional activity continues to build upon previous competency and reinforces content/skill competency.</p>
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Marshall Community & Technical College

Institutional Effectiveness & Outcomes Assessment

IE/OA 4. ASSESSMENT MEASURES

Program – Degree or Certificate

Information Technology – Associate in Applied Science – Network Systems Security Option

Team Members

Sherri Vaseashta, Randy Jones, Tommie Kelley, Scott Nicholas, Jack Locher, Rhonda Scragg

Date

5/2/2004

*For each Outcome assessment measure, designate the assessment result/level that indicates

- Student learning has exceeded standards
- Student learning has met standards
- Student learning is below standards

Statement of Intended Outcome 1

Servers and Workstations: The student will install and maintain user workstations and servers with industry standard desktop and network operating systems according to organizational needs.

Assessment Measure #1

Given objective and skills based exams, 80% of students will be able to competently install, configure, build, upgrade, troubleshoot, and repair personal computer compatible hardware achieving a minimum score of 78%. IT120, IT270.

Assessment Measure #2

Given objective and skills based exams, 80% of students will be able to competently install, install, configure, diagnose, and troubleshoot workstation and server operating systems (UNIX, Linux, Windows 9x, NT4.0 Workstation, 2000, 2003, and XP) achieving a minimum score of 78%. IT120, IT221, IT276, IT230, IT210, IT211, IT216, IT217.

Assessment Measure #3

80% of student interns and internship sponsors will report confidence in the intern's overall ability to install and maintain user workstations and servers with industry standard desktop and network operating systems according to organizational needs. IT299 Sample Question in Appendix A:

Statement of Intended Outcome 2

Internetworking Devices – The student will install and maintain Internetworking devices to support network communications according to organizational needs.

Assessment Measure #1

Given objective and skills based exams, 80% of students will be able to competently install, configure, and maintain routers, switches, and access points achieving a minimum score of 78%. IT131, IT141, IT231, IT241, IT225.

Assessment Measure #2

80% of student interns and internship sponsors will report confidence in the intern's overall ability to install and maintain Internetworking devices (routers, switches, and access points) to support network communications according to organizational needs. IT299 Sample Question in Appendix A:

Statement of Intended Outcome 3 Information Assurance – The student will install and maintain network security devices and applications to assure confidentiality, integrity, and availability of information systems resources according to organizational needs.

Assessment Measure #1

Given objective and skills based exams, 80% of students will be able to competently configure routers, switches, firewalls, and servers to secure, monitor, test, and improve security counter measures within the requirements of a network security policy achieving a minimum score of 78%. IT225, IT226, IT227.

Assessment Measure #2

80% of student interns and internship sponsors will report confidence in the intern's overall ability to competently configure routers, switches, firewalls, and servers to secure, monitor, test, and improve security counter measures within the requirements of a network security policy. IT299 Sample Question in Appendix A:

Statement of Intended Outcome 4 Current General Education Outcomes:

- Communication Skills
 - Oral
 - Written
- Quantitative Skills/Science
- Technological Skills
- Critical Thinking Skills
- Ethical Behavior Awareness
- Diversity Awareness

Assessment Measure #1

80% of student interns and internship sponsors will report confidence in the intern's overall ability to

- Communicate critically and effectively using both written and oral skills.
- Use mathematics and basic scientific concepts for problem solving activities.
- Become competent users of technology.
- Think critically and be open to examining new ideas.
- Develop an awareness of and a commitment to ethical behavior.
- Appreciate the diversity of the human experience
- Develop decision making skills and values for lifelong learning.

IT299 Sample Questions 4-10 are listed in Appendix A.

Assessment Measure #2

Work Keys Tests:

Reading for Information: All graduating students will score Level 5 or higher.

Applied Mathematics: All graduating students will score Level 5 or higher.

<ul style="list-style-type: none"> • Quantitative Skills/Science • Technological Skills • Critical Thinking Skills • Ethical Behavior Awareness • Diversity Awareness • . 	MAT145 MAT215 2 nd Year IT226 IT227 IT299 COM231 SS201 Work Keys Tests	MAT145 MAT215 2 nd Year IT226 IT227 IT299 COM231 SS201 Work Keys Tests	MAT145 MAT215 2 nd Year IT226 IT227 IT299 COM231 SS201 Work Keys Tests	MAT145 MAT215 2 nd Year IT226 IT227 IT299 COM231 SS201 Work Keys Tests	MAT145 MAT215 2 nd Year IT226 IT227 IT299 COM231 SS201 Work Keys Tests	MAT145 MAT215 2 nd Year IT226 IT227 IT299 COM231 SS201 Work Keys Tests	MAT145 MAT215 2 nd Year IT226 IT227 IT299 COM231 SS201 Work Keys Tests	MAT145 MAT215 2 nd Year IT226 IT227 IT299 COM231 SS201 Work Keys Tests
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Marshall Community & Technical College

IE/OA 6. OUTCOMES ASSESSMENT TOOLS (FEEDBACK LOOP)

An Outcomes Assessment Plan should be in accord with the College's Mission Statement, the Division's Mission Statement, and the Program's intended outcomes. Ongoing Assessment Techniques should assess the effects of the program and its services upon campus students and the workforce:

Marshall Community and Technical College Mission Statement

Marshall Community and Technical College is a comprehensive student-centered college focused on teaching and learning, and responsive to changing and diverse needs.

Operational Vision Statement

Marshall Community and Technical College will be learning centered, community-connected, & future focused. Marshall Community and Technical College strives to provide high-quality and relevant learning opportunities to meet the workforce, transfer, basic skills, and lifelong learning needs of the communities it serves.

Operational Values

In support of our vision and mission, Marshall Community and Technical College affirms the following values:

- *Learner-based education*
- *Broad-based and community-based partnerships*
- *Excellence and accountability*
- *Continuous program improvement*
- *Results-oriented decision-making.*

Program Mission Statement

The Information Technology (IT) program of the Marshall Community & Technical College is committed to the principle that each student can be empowered through education. The mission of the IT program is to provide the student with proactive and innovative academic experiences and learning opportunities that increase the state-of-the-market knowledge and technical skills required for employability and promotability in today's global workforce. Due to the constantly-evolving nature of the IT field, the student will develop a commitment to life-long learning and an appreciation for diversity.

Option Mission Statement

The Network Systems Security Option at Marshall Community and Technical College provides skills based training in network systems administration, development and security for first-time students, returning students, and working professionals. The program features courses sponsored by IT Industry leaders such as Microsoft, Cisco Systems, Hewlett Packard, and Sun Microsystems to ensure that students learn current industry standards and information security practices that enhance employability in network and information security occupations.

Program/Option/Unit Outcomes Upon completion of the program/option/service, What must students know?	Assessment Methods Used for Each Program/Option/Unit Outcome	What standards or benchmarks (such as %) did you use?	How did you use the assessment results in program/option/unit planning?	What dates were the assessment data reviewed and program/ curriculum/service revised?
<p>Servers and Workstations - The student will install and maintain user workstations and servers with industry standard desktop and network operating systems according to organizational needs.</p>	<p>Given objective and skills based exams, 80% of students will be able to competently install, configure, build, upgrade, troubleshoot, and repair personal computer compatible hardware achieving a minimum score of 78%. IT120, IT270.</p> <p>Given objective and skills based exams, 80% of students will be able to competently install, install, configure, diagnose, and troubleshoot workstation and server operating systems (UNIX, Linux, Windows 9x, NT4.0 Workstation, 2000, 2003, and XP) achieving a minimum score of 78%. IT120, IT221, IT276, IT230, IT210, IT211, IT216, IT217.</p> <p>80% of student interns and internship sponsors will report confidence in the intern's overall ability to install and maintain user workstations and servers with industry standard desktop and network operating systems according to organizational needs. IT299 Sample Question in Appendix A:</p>	<p>For Assessment Method 2, skills based exam scores from Jack Locher's IT120 classes were used. Of the 26 students enrolled in the class, the average score was 71%. Seven students (25%) had scores of 0 and nineteen students (75%) averaged scores of 97.</p> <p>Results from Tommie Kelley (IT270 & IT276) are pending. Results from Scott Nicholas (IT210, IT211, IT216, IT217) are pending.</p> <p>Results from Rhonda Scragg (IT299) are pending.</p>	<p>IT120 is the first IT course that students take beyond basic computer literacy in IT101 and IT107. As such, it is a course that exposes students to professional IT theory, concepts, and skills. Many students don't have a realistic idea of what Information Technology entails and this course helps them to discover if they have an aptitude for IT careers.</p> <p>Results are pending.</p>	<p>Fall 2004. IT120 Because students are 8% points below our benchmark, we are examining strategies that we can use to improve student performance to include less technical approaches to content and tutoring opportunities.</p>
<p>Internetworking Devices – The student will install and maintain Internetworking devices to support</p>	<p>Given objective and skills based exams, 80% of students will be able to competently install, configure, and maintain routers, switches, and</p>	<p>For Assessment Method 1, I used a skills based exam based on Cisco's recommendation. 79% of the students</p>	<p>Prior to this year, I had not required students to complete router configurations using simulations outside of class in addition to in-class laboratory</p>	<p>The Sybex simulation package was introduced in Fall 2004 and the</p>

<p>network communications according to organizational needs.</p>	<p>access points achieving a minimum score of 78%. IT131, IT141, IT231, IT241, IT225.</p> <p>80% of student interns and internship sponsors will report confidence in the intern's overall ability to install and maintain Internetworking devices (routers, switches, and access points) to support network communications according to organizational needs. IT299 Sample Question in Appendix A:</p>	<p>scored higher than 78. Those 15 students had an average score of 95. 21% of the students did not take the exam thus scoring a 0. The average score for all 19 students was 75.</p> <p>Results from Rhonda Scragg are pending.</p>	<p>exercises. This year I have obtained simulation packages from 2 different companies for students to practice with outside of class. The first product Sybex is introductory in nature and the second product Transcender reinforces concepts from the Sybex product and introduces more complex concepts, terminology, and skills for network infrastructure.</p> <p>I am developing an Intern and Intern Sponsor Survey specifically for the Network Systems Security interns that will be used in the Fall 2005 semester.</p>	<p>Transcender simulation package was introduced in Spring 2005.</p> <p>The Intern and Intern Supervisor surveys will be used in the Fall 2005 semester.</p>
<p>Information Assurance – The student will install and maintain network security devices and applications to assure confidentiality, integrity, and availability of information systems resources according to organizational needs.</p>	<p>Given objective and skills based exams, 80% of students will be able to competently configure routers, switches, firewalls, and servers to secure, monitor, test, and improve security counter measures within the requirements of a network security policy achieving a minimum score of 78%. IT225, IT226, IT227.</p>	<p>Eighteen students were given scenarios of a fictitious company and had to analyze the security requirements and produce the resulting configurations on routers and PIX firewalls. Only 4 students (25%) performed above 78% in the first router scenario so the instructor went over the scenario with the entire class. Afterwards, a second router scenario was given to the class that all students were able to complete without instructor assistance achieving scores of 78% or better.</p> <p>Students were given a take-home scenario for a fictitious company to analyze the security requirements and produce the resulting PIX firewall configuration. Similar to the router security scenario, only 4 students (25%)</p>	<p>For Assessment 1, it became evident that covering the Router and Firewall content was too much for a 16 week 4 credit class. Similar feedback from other instructors across the U.S. verified similar situations so Cisco divided the course into 2 separate courses on December 26th and we adjusted our curriculum to reflect the changes in January 2005 to become effective in Fall 2005.</p> <p>Jack Locher, the instructor teaching IT225, Fundamentals of Wireless LANs reported that many laboratory exercises and skills based exams could not be completed because of Radio Frequency Interference problems arising from the small classroom size. Similarly, the proximity to Drinko Library</p>	<p>October, 2004 Router Security Scenarios and December, 2004 PIX Firewall Security Scenarios.</p> <p>The RFI problem can be alleviated by finding a classroom that offers space to place equipment pods far from neighboring pods and the MU wireless LAN infrastructure. We are exploring alternative</p>

	<p>80% of student interns and internship sponsors will report confidence in the intern's overall ability to competently configure routers, switches, firewalls, and servers to secure, monitor, test, and improve security counter measures within the requirements of a network security policy. IT299 Sample Question in Appendix A and B.</p>	<p>completed the configuration successfully. The instructor worked through the scenario with the class and students configured the firewalls accordingly. Unfortunately, time did not allow for a 2nd scenario to be distributed. Of 40 lab assignments, 25 lab assignments were related to router security and 15 lab assignments were related to firewall security. Within in a 16 week class, we could only cover 31 of 40 lab assignments.</p> <p>For Assessment Method 3, see Rhonda Scragg for Spring 2005 data.</p>	<p>introduces Radio Frequency Interference problems arising from MU's wireless LAN devices.</p> <p>I am developing an Intern and Intern Sponsor Survey specifically for the Network Systems Security interns that will be used in the Fall 2005 semester.</p>	<p>locations for the class.</p> <p>Fall 2005</p>
<p>Current General Education Outcomes:</p> <ul style="list-style-type: none"> • Communication Skills <ul style="list-style-type: none"> Oral Written • Quantitative Skills/Science • Technological Skills • Critical Thinking Skills • Ethical Behavior Awareness • Diversity Awareness 	<p>80% of student interns and internship sponsors will report confidence in the intern's overall ability to</p> <p>Current General Education Outcomes:</p> <ul style="list-style-type: none"> • Communication Skills <ul style="list-style-type: none"> Oral Written • Quantitative Skills/Science • Technological Skills 	<p>For Assessment Method 1, see Rhonda Scragg for Spring 2005 data.</p> <p>Assessment Method 2, Work Keys Tests Results:</p> <p>Reading for Information: New Program thus no majors have graduated yet.</p> <p>Applied Mathematics: New Program</p>	<p>I am developing an Intern and Intern Sponsor Survey specifically for the Network Systems Security interns that will be used in the Fall 2005 semester.</p>	<p>Fall 2005 Intern Surveys</p>

	<ul style="list-style-type: none">• Critical Thinking Skills• Ethical Behavior Awareness• Diversity Awareness <p>IT299 Sample Questions 4-10 are listed in Appendix A AND B.</p> <p>Work Keys Tests: Reading for Information: All graduating students will score Level 5 or higher. Applied Mathematics: All graduating students will score Level 5 or higher.</p>	thus no majors have graduated yet.		
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PROGRAM ASSESSMENT METHODS	Would Like To Try This X	Have Used This X	Title of Course That Assessment Method Was Used In
PRE-ENTRY ASSESSMENT			
Application forms/Student Information		X	All IT courses
Placement Tests			
Competencies			
Other??			
MID-PROGRAM ASSESSMENT			
Internship/Fieldwork Performance Review		X	IT299
Skills Proficiency Tests		X	IT120, IT131, IT141, IT231, IT241, IT225, IT226, IT230
Student Focus Groups			
Other??			
END OF MAJOR ASSESSMENT			
Summary Project, Paper		X	IT231
Student GPA			
Portfolios			
Competency Exam		X	IT131, IT141, IT231, IT241
Oral Presentation	X		IT226
Are students performing better/worse than predecessors on Capstone Experience? Basis for judgment?			
Exit Interview, Oral and/or Written			
Licensure/Certification Practice Tests		X	<i>IT131, IT141, IT231, IT241</i>
Licensure/Certification Exam Pass Rates		X	IT131, IT141, IT231, IT241
Alumni Satisfaction Survey		X	
Community Needs Assessment			
Advisory Committees and Employer Feedback		X	
Placement Effectiveness			
Employment and/or Employer Satisfaction Measures		X	
Dropout and Non-Completer Rates	X		
Program Demographics – # Students Beginning, # Halfway, # Completes; % Change in Completes Over Time		X	
Program Review & Specialized Accreditation		X	
Other??			

CLASSROOM ASSESSMENT METHODS	Would Like to Try This X	Have Used This X	Title of Course that Assessment Method Was Used In:
Classroom Activities (handouts)		X	All Cisco Courses
Daily Assignments		X	All Cisco Courses
Evaluation Instruments From Other Sources		X	All Cisco Courses
Exam Evaluations			
Faculty Self-Assessment	X		
Notebooks			
Oral Presentation		X	IT231
Placement Tests			
Portfolio	X		
Pre-Test, Post-Test		X	All Cisco Courses
Prompts (Journals/Index Cards)		X	All Cisco Courses
Quizzes			
Student Evaluations using MCTC format		X	Every Semester
Student Focus Groups			
Student-Generated Test Questions	X		
Student Information		X	Every IT course
Student Self-Assessment		X	All Cisco Courses
Student Focus Groups	X		
Student Input – Free form oral and written		X	All Courses
Team Assessments by Students		X	IT241
Weekly Questions Drop Box	X		
Writing (Para, Essays, Reports, etc.)		X	IT299
Minute Paper (CAT)	X		All Cisco Courses
Muddiest Point (CAT)	X		All Cisco Courses
One-sentence Summary (CAT)	X		All Cisco Courses
Other CAT's			