

PROGRAM ASSESSMENT REPORT

I. Background Information

1. Program Assessed

Program name: Computer Networking Operating Systems I

Program code: CVCNO

Division: Business

Department: CNT

Type of Award: A.A. A.S. A.A.S.
 Cert. Adv. Cert. Post-Assoc. Cert. Cert. of Completion

2. Semester assessment was administered (check one):

Fall 20_____
 Winter 2015
 Spring/Summer 20_____

3. Assessment tool(s) used (check all that apply):

Portfolio
 Standardized test
 Other external certification/licensure exam (please describe): _____
 Graduate Survey
 Employer Survey
 Advisory Committee Survey
 Transfer follow-up
 Externally evaluated performance or exhibit
 Externally evaluation of job performance (internship, co-op, placement, other)
 Capstone experience (please describe):
 Other (please describe):

4. Have any of these tools been used before?

Yes (Standardized Test)
 No

If yes, has this tool been altered since its last administration? If so, briefly describe changes made.

There are a number of things we've altered in order to provide a more complete and thorough evaluation.

We have increased the number of questions for each of the four outcomes to twenty, for a total of **80** questions compared with the 30 in the last program assessment. This was done in order to provide a ***FAR BETTER*** determination of student knowledge, understanding, and retention of the key concepts associated with each outcome.

The rubric has been modified, actually making it more rigorous by adding two more objectives and modifying one.

We have increased to four the number of objectives that have to meet a 70% goal, as you can see in the attached rubric:

- Overall test score average – **70% or above**
- Average test score for each objective – **70% or above**
- Percentage of students reaching the 70% overall goal – **70% or above**
- The number of questions that had a 50% correct or higher percentage – **70% or above**

PROGRAM ASSESSMENT REPORT

5. Indicate the number of students assessed/total number of students enrolled in the course.

There were originally 14 students enrolled. One dropped in the mid-semester, leaving a total of 13. All thirteen were evaluated.

6. Describe how students were selected for the assessment.

- a) Describe your sampling method.
 - i. All thirteen students in the class were tested – no better method than that.
- b) Describe the population assessed (e.g. graduating students, alumni, entering students, continuing students)?
 - i. All students were finishing their last course in this certificate program and all were working towards the Associate Degree in Computer Networking of which this certificate is a part.

II. Results

1. If applicable, briefly describe the changes that were implemented in the program as a result of the previous assessment.

Microsoft Windows Server/ Client Operating Systems are constantly evolving, and their certification levels/objectives have changed significantly twice since the last assessment. Because of this, all four courses have at their basic level significantly changed as well, resulting in two of the five changes, (IPSEC and ISA –Internet Security and Acceleration Server) which were to be implemented as part of the last assessment, totally disappearing from the present outcomes. However, three of five are still part of the program, and improvements are discussed below.

RAID – (Improve the differentiation between the various forms of RAID in both lecture and labs)
This improvement has been made. The lab project now involves the students configuring ALL THREE forms of RAID, 0, 1, and 5, plus we have added in the CNT211 class, a new storage concept called “Storage Spaces” which uses Logical Virtual Disks into which two of the three forms of RAID are integrated. Therefore, the students are seeing these concepts in two different classes at two different times, rather than the single time. The lectures, as well, are now more thorough on differentiation which is of course, covered twice also.

GROUP POLICY – (Re-emphasize how the policies are distributed and from where – lectures and labs).
The big improvement here is actually spreading Active Directory and Group Policies over all three of the server courses, rather than concentrating it all in a single intense course. This has given us opportunity to reemphasize concepts in each course, then building on that with new concepts. The review done in each has made a definite improvement in student understanding and comprehension of the really advanced concepts associated with Group Policies.

IIS – VIRTUAL DIRECTORIES – (Understanding of “Aliases” – IIS Web Server Virtual Directories)
Actually, along with IPSEC and ISA Server, Internet Information Systems in itself is no longer a specific certification objective for the three server certification courses. However IIS (Web Servers) is so integrated into all the other objectives, and includes creation of Virtual Directories using “Aliases” that it is included here. This again has been spread throughout all three courses, (CNT211 – Printers Lab, CNT223 – All Remote Access Services Lab Projects, and CNT224 – the Certificate Services Lab Projects and others). The exposure again to these concepts at three different times throughout the whole program has helped to such an extent, that it is no longer necessary to give specific detailed instructions to do these tasks by the time this tool is used in CNT224.

PROGRAM ASSESSMENT REPORT

2. State each outcome (verbatim) from the Program Assessment Planning or Program Proposal form for the program that was assessed.

Outcome #1 (CNT211)

Identify the steps and procedures for setting up and managing a Windows Server Active Directory environment including identification of the policies and procedure associated with implementation.

Outcome #2 (CNT223)

Identify the main Networking Server Services that can be implemented on Windows Server and their functions/options including DNS, Routing and Remote Access Server (RRAS) including Routing, VPN's, Network Policy Server including RADIUS Server, Network Policy Server, Windows Deployment Server, DFS Server, and WSUS Server.

Outcome #3 (CNT224)

Identify the steps in ASA – Advanced Server Administration capabilities including establishing and implementing Advanced DHCP and DNS configurations, Network Load Balancing, Certificate Server, Virtual Machine Migrations, Replicas, and Application Services in the Cloud.

Outcome #4 (CNT201)

Distinguish the management tools and their functions necessary to properly install and maintain Windows 7 Enterprise Workstations – the tools include control panel, computer management, and other administrative tools.

3. Briefly describe assessment results based on data collected during the program assessment, demonstrating the extent to which students are achieving each of the learning outcomes listed above. ***Please attach a summary of the data collected (as a separate document).***

The results shown are listed in order by rubric objectives – the rubric is attached. We met all rubric objectives.

- **“Overall average score including all students taking the exam will be equal to or exceeding 70%”**

The overall result, looking at all four outcomes together, was an impressive 75.62% with the average score being 60.5 questions answered correctly out of 80 questions total. The ranges of scores ran from a low of 33 to a high score of 74.

- **“Outcome will be considered successful if the average of all student scores for that part of the test was equal to or exceeded 70%.”**

Breaking it down by Outcome, the results were:

Outcome #1 Installing, Configuring Server 2012 (CNT 211), - 195 correct out of 260 possible for a **75%** average

Outcome #2 Server Administration (CNT223), 215 correct out of 260 possible for an **82.69%** average

Outcome #3 Advanced Server Administration (CNT224) 195 correct out of 260 possible for a **75%** average.

Outcome #4 Windows 7 Administration (CNT201) 182 out of 260 possible for a **70%** average.

- **“Number of the total number of students taking the test that get 70% or above will be 70% or above.”**

10 of the **13** students achieved a score of **70%** or better (56 correct out of a possible 80) which calculates to **76.9%**

- **“The number of questions that had a 50% correct or higher percentage – 70% or above”**

69 of the **80** questions were answered correctly more than **50%** of the time for an **86.25% Average**.

PROGRAM ASSESSMENT REPORT

A comment here - I was very pleased with these results, but to be honest, I was a little worried initially for two reasons. I put together this test with a much larger number of questions to achieve a much better indication of content retention and understanding of many more of the objectives of each outcome – in effect making the test more difficult. However, this particular group of students (the whole CNT224 class) had generally not done particularly well in the actual tests as part of this “Capstone” course, but they certainly surprised me with their performance. This indicated to me that indeed they have learned and retained more than I imagined.

4. For each outcome assessed, indicate the standard of success used, and the percentage of students who achieved that level of success. ***Please attach the rubric/scoring guide used for the assessment (as a separate document).***

From the attached rubric:

- “Outcome will be considered successful if the average of all student scores for that part of the test was equal to or exceeded 70%.”

We meet the goal of having the results from each outcome equal to or greater than 70% - Below are shown the overall percentage for each outcome, as well as the percentage of students exceeding the 70% mark since that was asked for, although that is not part of our rubric.

Outcome #1 CNT211 - Overall Percentage: **75% with 9 of 13 students (69.23%)** above 70%

Outcome #2 CNT223 – Overall Percentage: **82.69% with 10 of 13 students (76.9 %)** above 70%

Outcome #3 CNT224 – Overall Average: **75% with 10 of 13 students (76.9%)** above 70%

Outcome #4 CNT201 - Overall Average 70% **with 9 of 13 students (69.23%)** above 70%

5. Describe the areas of strength and weakness in students’ achievement of the learning outcomes shown in assessment results.

Strengths: The following were the general areas of strengths listed by the four different outcomes, and based on the test results:

- *Outcome #1 Installing and Configuring Server 2012*

Active Directory planning; Active Directory components; auditing; server administration and management tools; domain name services; user administration; group policy components, locations, and defaults; software installation; folder redirection

- *Outcome #2 Server Administration*

IP addressing, permissions, TCP/IP tools, domain name services, routing and routing protocols, remote access services, distributed file system, quotas, windows update services

- *Outcome #3 Advanced Server Administration*

Advanced DHCP, DHCP relay agents, and Superscopes; dynamic updates; disk fault tolerant techniques, (RAID); network load balancing, backup utilities, shadow copies, certificate server, cryptography, VM migration and replicas

PROGRAM ASSESSMENT REPORT

- Outcome #4 Windows 7 Administration.

User management and administration including password complexity, etc.; BitLocker; user account control for security, windows installation requirements; networking models and tools, features of different file systems, Windows 7 utilities.

Weaknesses: The best way to evaluate the weaknesses is to look at the questions that were missed by more than 50% of the students (our last rubric). These are listed below:

- Outcome #1 Installing and Configuring Server 2012

Kerberos Security – The question addressed the use of “tickets” with Kerberos for authentication.

Physical versus Logical Components of Active Directory – The question related “sites” to the physical component of A.D.

- Outcome #2 Server Administration

RAS Authentication Protocols – The question required choosing the correct RAS protocol for communication.

VPN Protocols - The question required recognizing a VPN tunneling protocol and its use.

- Outcome #3 Advanced Server Administration

Data Duplication - The question required the understanding of use for a new Server 2012 feature

Migration Authentication - The question required identifying the authentication protocol used with Virtual Machine migration.

Branch Caching – The question required identification of the two types of branch caching.

- Outcome #4 Windows 7 Administration.

127.0.0.1 - The question required knowing the use of this address with the **Ping** command.

User Profiles - The question required identifying a type of user profile that remains constant between sessions.

File Encryption – The question addressed the encryption status of files moved between file systems.

Printer and Component Installations - The question addressed identifying the tools for adding printers and new Windows components.

PROGRAM ASSESSMENT REPORT

III. Changes influenced by assessment results

1. If weaknesses were found (see above) or students did not meet expectations, describe the action that will be taken to address these weaknesses.

- In evaluating the eleven areas above, it is obvious that the use of various authentication protocols to access Windows machines under a variety of different conditions, i.e. Active Directory, remote access such as VPNS, over the LAN – Local Networking, migrating virtual machines, etc. is the greatest area of concern – actually **four of the eleven questions missed most dealt with some form of authentication.**

This topic occurs in all four classes actually, and I plan to significantly improve my lectures concerning this topic – in particular, contrasting **all together at once**, the various types of authentication – what each is and where it is used. As far as the other areas are concerned, each will be looked at – below is a summary for each:

- Sites and the differentiation between the physical and logical components of Active Directory is always a problem – this is addressed in two classes, but it will be reemphasized, particularly in the latter class where we have a lab project using them.
 - Two of the questions addressed new Windows features, (branch caching, and data deduplication), actually which, only one we spent any significant time on (it had a lab project too!!!). Obviously more emphasis needs to be put on each topic, particularly in lecture.
 - The last four areas, IP addressing, profiles, file encryption, and Windows utilities are from CNT201, (with the exception of profiles and which is also in CNT 211 and the IP Address, “127” which is in all four classes). The failure to recognize the 127.0.0.1 is rather surprising as it is used continuously throughout all classes – the test question will be looked at – the problem may be there. Encryption, profiles, and Windows utility uses all will be looked at, particularly in relation to the aspect addressed in each question, as all the areas are far more extensive than these questions address. Both lectures and lab projects will be evaluated, and changes will be made to put emphasis on these weak areas.
2. Identify any other intended changes that will be instituted based on results of this assessment activity (check all that apply). Describe changes and give rationale for change.

- a. Outcomes/assessments from Program Assessment Planning or Program Proposal form:

Improved emphasis on the importance of the various forms of Authentication and their relationship to overall system security will be emphasized under the “Learning Outcomes to be Assessed Area” for all four outcomes, as one of the objectives specifically to be obtained. This will be the main focus of changes in the planning form, as the other areas of weakness lie within the more general categories normally listed in the that form. However, as stated above in **Changes Influenced by Assessment Results**, all weaknesses will be addressed through review of the lectures and lab projects associated with each course.

- b. Program Curriculum:
- Course sequencing
 - Course deletion
 - Course addition
 - Changes to existing program courses (specify):

The changes actually have been outlined above under the **Changes Influenced by Assessment Results** section. I have explained exactly what I intend to do to improve student understanding of the concepts in which a lack of understanding exists in both lectures and lab projects.

PROGRAM ASSESSMENT REPORT

c. Other (specify):

3. What is the timeline for implementing these actions?

Each lecture is reviewed before it is given in class. The changes will be implemented at the time of lecture reviews during the school year. Where appropriate, changes to the lab projects also will be reviewed prior to use in the class the next time. Therefore, all should be implemented by the end of the Fall 2015 semester.

IV. Future plans

1. Describe the extent to which the assessment tools used were effective in measuring student achievement of learning outcomes for this program.

As in the last assessment we did, I would say the assessment tool was very effective. The assessment test used questions that were essential to showing a student's grasp of the key concepts involved in each of the outcomes for all four courses which are part of this program, Windows 7 Administration, Installing and Configuring Windows Server, Server Administration, and Advanced Server Administration. More importantly, implementing these concepts in real life situations that they will face in any Windows server environment is one of my main goals, and the results which the assessment tool brought out is a good indication of future success.

2. If the assessment tools were not effective, describe the changes that will be made for future assessments.

Not Applicable.

3. Which outcomes from Program Assessment Planning or Program Proposal form have been addressed in this report?

All X Selected _____

If "All", provide the report date for the next full review:

The next Full Review will take place three years from now, in the Winter Semester of 2018.

If "Selected", provide the report date for remaining outcomes:

Not Applicable.

PROGRAM ASSESSMENT REPORT

Submitted by:

Name: Walter R. DeLuca Date: 5/30/2015
Print/Signature
Department Chair: [Signature] Date: 6/1/2015
Print/Signature
Dean: [Signature] Date: 6/2/2015
Print/Signature

Please return completed form to the Office of Curriculum & Assessment, SC 257.

I. Background Information

1. Program Assessed

Program name: Computer Networking Operating Systems I

Program code: CVCNO

Division: Business

Department: CNT

Type of Award: A.A. A.S. A.A.S.
 Cert. Adv. Cert. Post-Assoc. Cert. Cert. of Completion

2. Semester assessment was administered (check one):

- Fall 20____
 Winter 20____
 Spring/Summer 2008

3. Assessment tool(s) used (check all that apply):

- Portfolio
 Standardized test
 Other external certification/licensure exam (please describe): _____
 Graduate Survey
 Employer Survey
 Advisory Committee Survey
 Transfer follow-up
 Externally evaluated performance or exhibit
 Externally evaluation of job performance (internship, co-op, placement, other)
 Capstone experience (please describe):
 Other (please describe):

4. Have any of these tools been used before?

- Yes (if yes, identify which tool)
 No

If yes, has this tool been altered since its last administration? If so, briefly describe changes made.
 No previous assessment of this program has been done.

5. Indicate the number of students assessed/total number of students enrolled in the course.
 9(Nine)/20(twenty)

6. Describe how students were selected for the assessment.

a. Describe your sampling method.

Cross-section of Students completing the four courses making up the certificate who have average grades spanning through the full range of the grading scale. This cross-section consisted of three – A students, four – B students, and two – C students which, percentage wise, is very representative of the grading scale each semester.

b. Describe the population assessed (e.g. graduating students, alumni, entering students, continuing students).

Three would be considered in the “Graduating” category, and six would be in the “Continuing” student category. The latter group is working toward the Associated Degree in Computer Networking Operating Systems as well as other Certificate/Degrees in other Disciplines (Security, Cisco, etc.).

PROGRAM ASSESSMENT REPORT

II. Results

1. If applicable, briefly describe the changes that were implemented in the program as a result of the previous assessment.
No Previous Assessment of this Program has been done.
2. State each outcome (verbatim) from the Program Assessment Planning or Program Proposal form for the program that was assessed.

Outcome #1

Identify the Steps and Procedures for setting up and managing a Windows Server 2003 Active Directory Environment including identification of the Policies and Procedures associated with implementation.

Outcome #2

Distinguish the Management Tools and their functions necessary to properly install and maintain Windows XP Professional Workstations – the tools include Control Panel, Registry Editor, Computer Management, and other Administrative Tools.

Outcome #3

Identify the main Networking Server Services that can be implemented on Windows Server 2003 and their functions/options including TELNET, FTP, HTTP (Web), DNS, DHCP, WINS, RRAS, VPN, Routers, IPSEC, NAT.

Outcome #4

Identify the steps in Installing and Configuring ISA (Internet Security and Acceleration Server) Firewall & Proxy Server, including establishing and implementing various Access Control Policies/Firewall Rules as well as Web Publishing, Web Page Caching, VPN pass-through, Remote Management and Monitoring.

3. Briefly describe assessment results based on data collected during the program assessment, demonstrating the extent to which students are achieving each of the learning outcomes listed above. ***Please attach a summary of the data collected.***

The overall result, looking at all four outcomes together, was a very impressive **86%** with the average score obtained being 26 out of 30 questions total. The ranges of scores ran from a low of 20 to a high of 30. Breaking it down by Outcome, the results were:

Outcome #1 Server Management (CNT211) - 65 correct answers out of 72 for a 90.3% average

Outcome #2 XP Administration (CNT201) - 58 correct answers out of 63 for a 92.1% average

Outcome #3 Network Management (CNT221) – 62 correct answers out of 72 for an 86.1% average

Outcome #4 ISA Administration (CNT224) - 49 correct answers out of 63 for a 77.8 % average.

A comment here – I am absolutely amazed that these students did this well. There was a 3-1/2 month time lapse between the time they finished the last course, which is part of this program, and the time they took the assessment test, which were all summer months. Also, during the summer all had taken a much more advanced Windows class, which would have tended to “push” earlier material out of their minds to some extent.

4. For each outcome assessed, indicate the standard of success used, and the percentage of students who achieved that level of success. ***Please attach the rubric/scoring guide used for the assessment.***

The rubric (from the attached planning form) which was used:

For each major part (Four Parts reflecting the four courses which made up the program),

- “Outcome will be considered successful if the average of all student scores for that part of the test was equal to or exceeded 70%.”

Based on this section of the rubric, we are successful in that the average of all student scores for each part of the program exceeded 70% with the lowest being 77% and the other three **significantly higher** than that. Breaking it down by individual students, since that is asked, although not in our rubric, we have for each outcome:

All Outcomes together: eight of nine students exceeded 70%; one student was slightly below at 67%

Outcome #1 - All nine students exceeded 70 %

Outcome #2 - Eight of the nine students exceeded 70%

Outcome #3 - Seven of the nine students exceeded 70%

Outcome #4 - Eight of the nine students exceeded 70%

- Individual questions answered correctly by more than 70% of the class in each of the four parts will be considered appropriate to that particular Outcome.

Of the thirty questions in the test, 25 of them were answered correctly by more than 70% of the students. Five questions were answered correctly by less than 70% of the students. Therefore 83% of the questions were answered correctly by more than 70% of the students.

5. Describe the areas of strength and weakness in students’ achievement of the learning outcomes shown in assessment results.

The results of this track exactly with results of the questions that were answered correctly by less than 70% of the students.

Strengths:

Outcome #1: Setup & Managing a Server: Active Directory, Windows Groups, Kerberos, Types of Permissions, Printing.

Outcome #2: XP Management Tools: Networking Models, XP File Systems, User Rights, VPN Protocols, Boot Process, File Encryption, Event View Options.

Outcome #3: Networking Server Services: OSI Model, IP Addressing, TCP Protocol, DHCP, DNS. TCP/IP Tools

Outcome #4: ISA Server Configuration, etc: NAT, Packet Filtering, ISA Web Publishing, ISA Policies

Weaknesses: Outcome #1: RAID, Group Policy

Outcome #2: None

Outcome #3 IPSEC

Outcome #4 IIS Virtual Directories, ISA VPN Network Rule

III. Changes influenced by assessment results

1. If weaknesses were found (see above) or students did not meet expectations, describe the action that will be taken to address these weaknesses.

RAID - Will review lecture notes and lab project to insure the differentiation between the different forms of RAID (Fault Tolerant Disks) is made very clear.

GROUP POLICY - One of the hardest concepts of Server Management – Need to reemphasize how these policies are distributed – from what shares, etc. – will review both lecture notes and the Group Policy Lab Project – in particular the questions associated with the SYSVOL folder.

IPSEC - Another involved concept, in particular the fact that it provides authentication and encryption independently of any upper layer application, which is the concept that was missed by some of those tested.

IIS – VIRTUAL DIRECTORIES - This is the only question missed by more than half the people taking the test, which was exceptionally surprising in that the term “Alias” is an extremely common acronym for a Virtual Directory and it’s uses are well known and covered completely in the ISA class. This is one question of the test that I need to review closely as I believe the problem lies in the wording of not only the question but also the answers from which they select.

ISA – VPN – Network Rules - Normally ISA is thought of as a NAT Server, however, a VPN is a direct connection to an internal network and therefore must be routed through the ISA server, not “Natted”. It is obvious that I need to emphasize the differences in these two ISA Network Rules to an even greater extent than I already have.

2. Identify any other intended changes that will be instituted based on results of this assessment activity (check all that apply). Describe changes and give rationale for change.

- a. Outcomes/assessments from Program Assessment Planning or Program Proposal form:

In the next revision of the Program Assessment Planning Form, I intend to provide:

Outcome One: more detail concerning Active Directory Group Policies needs to be introduced, as the Server Management course for Server 2008 is being changed by Microsoft into a totally Active Directory based scenario.

Outcome Three concerning Network Administration with Server: IIS (Internet Information Server) needs to be introduced here, as well as in the subsequent ISA Administration course, because of the importance of Web Services in today’s world, and the obvious problems that students had concerning the simple concept of Aliases and Virtual Directories.

Outcome Four, ISA Network Rules: need to be actually listed in the Outcome. We spend so much time on Firewall and System Policies, as well as Web Publishing that the very important rules that ISA uses to pass/handle information through itself needs to be addressed.

- b. Program Curriculum:
- course sequencing
 - course deletion
 - course addition
 - changes to existing program courses (specify): The changes actually have been outlined above under the **Weaknesses** section. I have explained exactly what I intend to do to improve student understanding of the concepts in which a lack of understanding exists.
 - other (specify):
- c. Other (specify):

After reviewing the actual questions used in this test, in particular, the five that were missed by more than more than 30% of the people taking the test, one of the questions needs to be changed – the one concerning virtual directories. The question is not specific enough in what is asked, and this change will be made.

2. What is the timeline for implementing these actions?

All Program Assessment Planning changes will be implemented the next time the Program Assessment Plan is due for review.

All course changes will be implemented immediately in the appropriate class lecture/labs for the Fall 2008 semester.

IV. Future plans

1. Describe the extent to which the assessment tools used were effective in measuring student achievement of learning outcomes for this program.

I would say they were very effective. The assessment test used questions that were essential to showing a student's grasp of the **key** concepts involved in each of the Outcomes concerning Server Management, XP Administration, Networking Server Services, and Internet and Security Acceleration Server and, more importantly, implementing these concepts in real life situations which they will face in any Windows Server Environment.

2. If the assessment tools were not effective, describe the changes that will be made for future assessments.

Not Applicable

3. Which outcomes from Program Assessment Planning or Program Proposal form have been addressed in this report? All X Selected

If "All", provide the report date for the next full review:

As outlined in the Program Assessment Planning Form, the next Full Review will take place three years from now – in the Winter of 2011.

If "Selected", provide the report date for remaining outcomes:

Not Applicable.

PROGRAM ASSESSMENT REPORT

Submitted by:

Name: Willie P. Paulson Date: 10/25/08
Print/Signature

Department Chair: _____ Date: _____
Print/Signature

Dean: Janet Wilson Date: 9/16/08
Print/Signature

Please return completed form to the Office of Curriculum & Assessment, SC 247.