

Program Review

Network Technology and System Administration
Computer Studies

Preface by Richard Grotegut

The Network Technology and System Administration (NTSA) program is dynamic. Since the start of classes in 1998 and the approval of the AS degree in 2000, the program has undergone constant change. The NTSA program was designed to provide training for employees in the Information Technology industry. Program review for such a program is continuous. A six-year cycle would be disastrous. Learning outcomes change as technologies change. New programs with new outcomes emerge as the industry changes.

The focus of this review is on the NTSA AS degree program. Broad outcomes for degree recipients have been developed as well as more specific outcomes for individual areas of concentration. The work on these individual areas is ongoing. As a start program descriptions and outcomes have been provided in this report (Appendix A) for the Microsoft Systems Engineer and the Network Administrator Certificates of Achievement.

Indicative of the dynamic nature of this program is the current work on the split of the Computer Studies (CS) department into two departments: Computer Science (still CS) and Computers, Networks, and Emerging Technology (CNET). Work on this reorganization has kept NTSA faculty busy.

The CNET program will essentially be all of the Network Technology and System Administration (NTSA) courses. There will be several courses that support both areas and will be cross-referenced in both CS and CNET.

The Computer Studies department at Ohlone was created nearly 30 years ago. Over that time it has served as a nice umbrella for the development of computer related courses. As the industry grew so did the course offerings. Ohlone's Multimedia Program was originally part of CS. In fact I taught the first multimedia development course here at Ohlone as an adjunct instructor in 1996. It was then call CS150A. Multimedia is now a singular department having split from CS in 1998.

The Computer Studies program has continued to grow with the development of the NTSA program. The department is large with many course offerings. The following are the benefits that we have determined will result from the separation:

- The separation will more clearly address differences in the minimum qualifications that faculty must have to qualify to teach in each area. Presently although all CS faculty teach in the same department, there are different minimum qualifications for new adjunct faculty based on the CS course(s) they are assigned. The new departments will be more clearly aligned with such minimum qualifications. Computer Science and Computer Information Systems are two program areas that the state has already uniquely identified and determined what the minimum qualifications should be.

- Scheduling of sections in both areas will be more simplified. Each department will be responsible for recommending scheduling of courses designated in their area and will also be able to schedule some sections of courses that are shared between departments.
- There already exists a functional split between CS and NTSA. The opening of Ohlone College Newark Center in two years will make this split more obvious, with Computer Science remaining on the Fremont campus and Computer Technology & Networking relocating to the Newark Center.

Work has begun on the broadening of what will be the new Computers, Networks, and Emerging Technologies (CNET) department. Course development in technician training and automation is underway. New courses in Robotics and Voice over IP have been developed for this academic year. A new general technology course (How Technology Works) is being developed for the fall 2006 semester and will focus on the application of technology not only to Information Technology, but also Biotech, Health Science, and Environmental Science.

Program/Discipline: _____

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Review & Dissemination Team: _____

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Division Dean: _____

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Executive Assistant

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Program Description and Scope

As American businesses continue to compete in a global economy, the need for high-speed communication systems is increasing. Today, new communication systems must transmit and share information instantaneously, and often over long distances. Computers, the cornerstones of new communication systems, connect networks that link information through fiber optic, microwave telephone, or satellite media. The Network Technology and Systems Administration (NTSA) degree, certificates of achievement, and certificates of completion continue to prepare students to build and support these communication systems - the communication highways.

The NTSA programs will provide students with intensive hands-on instruction in computer network design, implementation, and management. The program includes classroom and laboratory instruction where students can develop extensive experience in Windows XP/2003 networks, UNIX/Linux System Administration, and Cisco Systems Internetworking technologies. Courses cover computer-operating systems, network operating systems, networking strategies, network cabling systems, and internetworking of multi-vendor and divergent systems. These skills are directly applicable to existing job requirements and provide valuable experience applicable to employment opportunities.

Students can earn an Associate of Arts Degree in Network Technology and Systems Administration and/or a Certificates of Achievement in one of the following concentration areas: Technical Support Specialist; Network Administrator; Desktop Support Technician; Microsoft Systems Engineer; Cisco Certified Network Professional; Oracle Database Administrator; and Unix/Linux Systems Administrator. The Desktop Support Technician is the new name for the PC Technician track that was part of the original degree program in 2000. The Network Technician track has been temporarily suspended because of the elimination of the Electronics program, which in part supported this track.

In addition to the AS Degree and Certificates of Achievement, students can earn a Certificate of Completion in any of the following areas:

- Cisco Certified Network Associate (CCNA)
- Cisco Certified Network Professional (CCNP)
- Database Administration
- Desktop Support (A+, Net+, MCP, MCDST)
- Linux Administration (Linux+)
- SQL Database Administrator (MCDBA)
- Windows MCSA
- Windows MCSE
- Network Security (Security+)
- Wireless Networks
- IP Telephony and VOIP

Individual program descriptions, scopes, and student learning outcomes will be prepared for each of the Certificates of Achievement and Certificate of Completion programs.

How does the program specifically serves students, faculty, staff, and/or the community?

Because of our proximity to Silicon Valley, Ohlone's NTSA program offerings are important resources for Information Technology (IT) skill-enhancement. The NTSA program was created to address long-term workforce development needs in the IT sector. The skills developed by students provide them job opportunities, and employers reap the benefits of the new skills of students who become employees.

How does the program address current needs and apply current technologies?

We incorporate input from the both community and the students as we review and update the program. For example, our Advisory Board consists of many community members that show great interest in our program and offer us valuable advice about how to modify our program to improve our students' skills. This advice is taken into consideration as we fine-tune our current courses and develop new ones.

In addition to the annual (increased to twice a year this year) advisory meetings, NTSA faculty rely on industry supported needs assessment. Industry sponsored certifications, both proprietary and non-proprietary, help to establish curricular guidelines for all of the NTSA program offerings. (See Appendix A for a listing of each of the industry certifications that NTSA students can be prepared for.)

What is the impact of the program on the college and the impact the college and/or other college programs have on the program being reviewed?

Ohlone College's NTSA program has a strong reputation among students, faculty colleagues, and industry partners. The program has had quite a bit of positive impact on the College over the years. The program breadth has few rivals in the Bay Area. Faculty members from neighboring community colleges have come to Ohlone to learn about our offerings, best-practices, and labs as they have established similar programs at their institutions.

The UNIX/Linux program here at Ohlone was identified as the model for all Bay Area community colleges. The focus on both proprietary UNIX operating systems and open-sourced Linux has made the program unique and valuable to students and employers.

Ohlone's Cisco Networking Academy program and faculty have been recognized and selected to deliver training to Cisco system employees both here and abroad. During this summer Ohlone College was selected as one of two Northern California schools to deliver IP Telephony and VOIP courses. An NTSA faculty member was able to attend a free week-long train-the-trainer program at Cisco Systems corporate office this summer in preparation for the delivery of this training to Ohlone students. In September, 2005 Ohlone was selected to host an industry sponsored job fair for all Bay Area students.

With a modified delivery system, Ohlone once again becomes one of the few community colleges to offer an entire Microsoft Certified System Engineer (MSCE) training program. Low enrollments in key capstone courses in the series led to several cancellations of course during the past year. The new self-paced open entry/exit approach allows us to offer these courses even if they are “low enrolled”, making them available to the students who need them to complete program requirements. This benefits both the school and the students.

What has been the impact of the program on the community and the impact of the community on the program?

The Advisory Board is one channel through which the community expresses its needs and the program responds. The CS/NTSA Advisory Board began meeting twice a year this year.

The Advisory meetings are organized to present the instructional program to a variety of employer representatives who are responsible for hiring Information Technology professionals. The goal of these meetings is to solicit and gather member responses and opinions regarding the program content and instructional methods. We request answers to questions like these: Are we training in the right areas?; What are the most important skills we should be focusing on?; Is a two year degree appropriate? What value do you place on industry certifications? Will our graduates be employable?

Without dissent, the Advisory committees have supported the NTSA program over the years. They believed that the program teaches necessary knowledge and skills in a manner which should be effective at producing qualified networking and system administration professionals.

Relationship to Ohlone College Mission and Goals

College Goal 1

Promote appreciation for and understanding of diverse races and culture by expanding the diversity of college personnel, international education offerings and exchanges, cross-cultural curricula, and ethnic/cultural events.

NTSA staff, both full-time and adjunct, mirror the diversity of Ohlone College’s student body and community. Although the recent downturn in IT and the resulting downturn in IT course offerings have led to a decrease in the number of faculty, those that remain display continued diversity of personnel.

NTSA course offerings have been expanded for alternative delivery through the College’s Contract Education department. One member of the Ohlone NTSA faculty has taught students in India, and we continue to look for opportunities to do training in this format.

College Goal 2

Develop across the curriculum the Learning College Model, utilizing methods and technologies that hold the most promise for improving student course and program completion success rates.

Within the NTSA Program there is no “typical student,” as there may be in the classes designed for transfer to a four-year college. Many students in the Program already have jobs and are trying to balance work schedules with personal schedules. This makes it difficult for them to adhere to the traditional rigid schedule of a class. In addition, their need for training often does not follow a traditional calendar. With this in mind, faculty members in the NTSA Program have worked hard to create a “flexible schedule,” using an assortment of techniques:

Short Term Classes – Most courses within the NTSA program follow a nine week schedule. The shorter term has improved student retention and completion rates.

Web Enhanced Teaching – Use of web-based technologies (specifically the Cisco Academy, Ohlone NetLab, and WebCT), industry sponsored software distribution (Microsoft IT Academy and MSDNAA), virtual labs and eLabs have “taken the commute out of the loop”. Students can do much of their course work off campus and on their own schedule. Online curriculum and online testing allow students to keep up with the class when they miss a session.

Remote Labs - The CS-NTSA NetLab allows students who miss lab sessions to do most, if not all, of their laboratory exercises from home or office. The Ohlone College NetLab is a set of Servers and Networking Equipment available to students 24/7. Student work is logged and emailed to instructors for assessment.

Self Paced Learning - With many of the classroom activities (hands-on labs, assessments, review of material) no longer necessarily a part of a class meeting, students can meet the requirements of the class at their own pace. The teacher becomes more of a facilitator who can concentrate on the classroom activities most beneficial in an organized classroom gathering, such as group/team work projects, demonstrations, and “ad-hoc” lectures on topics of general interest to students enrolled in the same courses.

Self-paced course delivery was implemented experimentally for the second-tier and higher courses in the Microsoft and Cisco programs this Fall 2005 term. Despite the awkwardness in the scheduling of such course offerings, the experiment has been generally successful. Course cancellation in both programs was eliminated, and overall enrollment in NTSA courses is significantly higher than a year ago.

College Goal 3

Develop strategies to increase the proportion of full-time students including learning communities, cohort groups, enhanced facilities, and improved course availability.

Several of the strategies identified in the previous section (remote labs, a web-enhanced curriculum, and self-paced instruction) have contributed to improved course availability.

The establishment of the Associate of Science Degree in Network Technology and System Administration (NTSA) was an important first step toward increasing the proportion of full-time students. Approximately eight to ten degrees have been awarded each year since 2001, with emphasis distributed over the seven concentration areas.

NTSA Faculty have become aware of the increasing requirements for a four-year degree in Information Technology. High demand IT jobs in current labor market statistics indicate that a four-year degree is required:

IT-Related Occupations	Number Employed 2002 (000's)	Number Employed 2012 (000's)	Numeric Change (000's)	Change %	2002 Median Annual Earnings	Postsecondary Education & Training
Network systems and data communications analysts	186	292	106	57.0%	\$58,420	Bachelor's degree
Computer software engineers, applications	394	573	179	45.5%	\$70,900	Bachelor's degree
Computer software engineers, systems software	281	409	128	45.5%	\$74,040	Bachelor's degree
Database administrators	110	159	49	44.2%	\$55,480	Bachelor's degree
Computer systems analysts	468	653	185	39.4%	\$62,890	Bachelor's degree
Network and computer systems administrators	251	345	94	37.4%	\$54,810	Bachelor's degree
Computer and information systems managers	284	387	103	36.1%	\$85,240	Degree plus work experience
Computer programmers	499	571	72	14.6%	\$60,290	Bachelor's degree
Computer support specialists	507	660	153	30.3%	\$39,100	Bachelor's degree

Faculty in Ohlone's NTSA program are prepared to offer a transfer degree program in Networking as soon as Cal State University Monterey Bay finalizes their four year program.

CSUMB is in the process of establishing a new degree, Computer Science and Information Technology (CSIT). This will be an undergraduate program with emphasis on the human/user side of the computing and networking. Its purpose will be to help the student acquire a strong grounding in a core field of interest, then have the opportunity to pursue any of a number of current interests. There will be three areas of concentration for the student: computer networks and security, software engineering, and information systems.

As this degree program was being developed, the respective faculties of CSUMB and Ohlone established a correlation of Ohlone NTSA courses to CSIT courses, designed to facilitate student transfer from here to there. Below is a table showing the planned articulation:

Ohlone Course	CSUMB Course
CS 186A LAN Design (CCNA 1)	CST 281 Introduction to Communication Networks (CCNA 1)
CS 186B Router Config and Routing (CCNA 2)	CST 282 LAN Routing (CCNA 2)
CS 186C/DRouting and Switching and WAN Design (CCNA 3 & 4)	CST 284 LAN and WAN Internetworking (CCNA 3 & 4)
CS146 Introduction to UNIX/Linux	CST 234 Introduction to Operating Systems
CS 180 Introduction to Network Operating Systems	
CS 181 PC Hardware and Software	CST 237 Introduction to Computer Architecture
CS 124 Advanced Programming with Data Structures	CST 238 Introduction to Data Structures

College Goal 4

Provide continuous learning for all personnel associated with the District and promote an organizational structure that is adaptable, collegial, and supportive of the Learning College Model.

Recent efforts to match classified staff training needs with academic course offerings have resulted in two separate training sessions for IT staff. System administrators and desktop and lab support staff enrolled and completed training in the NTSA Microsoft program. Additional training sessions are planned for the upcoming semester.

College Goal 7

Increase public and private funds for educational programs, equipment, and facilities through entrepreneurial activities, grants, and the college foundation.

Ohlone College's NTSA program has long-standing relationships with Cisco Systems, Microsoft, Hewlett Packard, Oracle, and Sun Microsystems. At varying levels, each of these companies offers curriculum development, deep discounts on equipment and software, and training.

Internship opportunities for NTSA students have been provided over the years by Lawrence Berkeley Labs. This internship opportunity is unique in that it targets Community College students instead of the traditional four-year college student.

Program Student Learning Outcomes

Network Technology and System Administration is a dynamic program. Program review for such a program is continuous. Learning outcomes change as technologies change. Individual program outcomes for each of the specific areas of concentration taught within the NTSA program will be submitted individually.

General learning outcomes for students seeking the NTSA AS Degree are subject to greater breadth than those seeking merely a Certificate of Achievement or Completion. Students attaining the AS degree must also fulfill general education requirements. Program student learning outcomes for the NTSA AS degree are:

- Students will develop an appreciation of the IT career field and their need to be lifelong learners. They will increase their ability to identify new learning requirements and to learn independently.
- Students will develop oral and written communication skills and increase their ability to be effective team members.
- Students will learn to develop attitudes that are beneficial to maintaining the security of a computer/network system and assisting people to use that system or network.
- Students will develop confidence in their ability to work independently to setup and maintain computer and/or networking systems.
- Students will learn techniques to anticipate and prepare for a variety of unknown situations which might impact the operation of a computer system or network.
- Students will learn how computers communicate with each other and the methods employed to assure that the communication is reliable.
- Students earning the AS degree in NTSA will participate in a structured internship based in the workplace and receive real world, hands on experience.

Assessment of Student Success in Reaching Program Outcomes

Throughout all of the NTSA program areas, including the AS degree, Certificates of Achievement, Certificates of Completion, and individual courses of study, the assessment of outcomes is primarily made through the use of performance and objective-based assessments.

The awarding of the NTSA AS degree is a measure of student success at the degree granting program level. Eight to ten AS degrees per year have been awarded to students since the inception of the program in 2001.

Within the other program areas, student success is measured in several ways. Certificates of Achievement and Certificates of Completion are awarded through Admissions and Records and through the division office respectively.

Successful completion of industry certification exams by students, while not required by the College for credit, may also indicate mastery of the material and attainment of the prescribed outcomes. Complementary industry certification exams for the degree, certificates, and individual courses are identified in the course catalog. Our only method of determining the number of students who successfully complete the industry certification exams is to rely on informal communications from former students.

Student retention and completion rates are also an indicator of student success. Nine week courses have been the norm for most of the courses in the NTSA program since 1998. The nine week format has been a key factor in higher student retention, completion, and success rates.

Overall, the average student retention rate in Computer Studies courses has been 75-80% during the past three years. The student success rate over the same period has been 65-70%. Each of these rates is at least 10% higher, across the board, than other College disciplines. Since the CS rates include all of the NTSA nine-week courses, the major contributing factor to these high rates is the success rates in those nine-week courses: records from grade reports indicate that the success rates in nine-week courses have been 80-90%.

There have been inadvertent constraints placed upon the success of the nine-week programs over the years that continue until today. Support services continue to think in an “eighteen week semester” mode. The advertisement of scheduled courses, student counseling, the bookstore, and even campus security seems to have forgotten about the nine week schedules. As we move to a 16-week academic calendar, the faculty of the NTSA program is concerned that the distraction of this move will continue to leave the NTSA’s nine week program, and the newly instituted open entry-exit program, off the radar screen. Recommendations on how to prevent this from happening are encouraged and welcomed.


Assessment of Program through Review of the Teaching Learning Process.

In the Fall 2005 semester, selected courses within the NTSA program were changed to a more self-paced format because enrollment constraints have made it difficult to continue to offer more advanced course work. In an effort to continue to offer training in these specialized program areas, NTSA faculty moved from an instructor-directed format to an instructor-facilitated format.

Spring 2006 courses that will follow this new format are listed below:


Self-Paced Cisco and Microsoft Certification Sections

Self-Paced MCSA/MCSE Certification Training

Note: The following sections of MCSA/MCSE training are self-paced. One or more of the  courses could be completed in a single semester. Students work on instructor directed computer-base training, web-based assessments, and hands-on labs as they prepare for the corresponding Microsoft certification exam. **Mandatory attendance is required for the initial class meeting on Tuesday, January 17 or Thursday, January 19.** Weekly class and lab times will be discussed at this meeting.

CS 182A-01	028017	Windows Network Infrastructure Administration	HH114	R.Grotegut
CS 182B-01	028019	Microsoft Active Directory Administration	HH114	R. Grotegut
CS 183A-01	028020	Planning a Microsoft Network Infrastructure	HH114	R. Grotegut
CS 183B-01	028022	Designing Microsoft Active Directory Services	HH114	R. Grotegut
CS 183C-01	028024	Designing a Secure Microsoft Network	HH114	C. Huang
CS 184-01	028025	Microsoft Internet Security Accelerator Server (ISA)	HH114	C. Huang
CS 184A-01	028026	Microsoft Exchange 2000/2003	HH114	C. Huang
CS 184B-01	028027	Microsoft SQL Server 2000/2003 Administration	HH114	C. Huang
CS 212AM-01	028162	Supporting Users and Troubleshooting XP	HH114	M.Segraves
CS 212AN-01	028163	Troubleshooting Desktop Applications on XP	HH114	M.Segraves

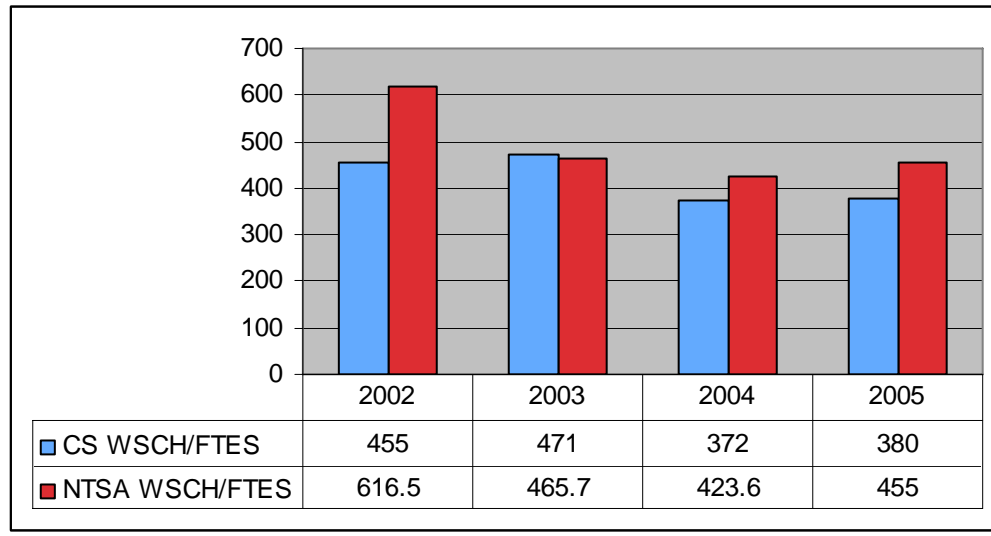
Self-Paced CCNA/CCNP Certification Training

Note: The following sections of CCNA/CCNP training are self-paced. One or more of the courses could be completed in a single semester. Students work on instructor directed web-based assessments and hands-on labs as they prepare for Cisco CCNA/CCNP certification. **Mandatory attendance is required for the initial class meeting on Wednesday January 18.** Weekly class and lab times will be discussed at this meeting. 

CS 186C-01	028030	Routing and Switching (CCNA3)	HH118	W.Wong
CS 186D-01	028031	WAN Design (CCNA4)	HH118	W.Wong
CS 186E-01	026943	Wireless Networks (642-577 WLANSE)	HH118	G.Wong
CS 188A-01	028032	Advanced Routing (642-801 BSCI)	HH118	G.Wong
CS 188B-01	028033	Remote Access Networks (642-811 BCMSN)	HH118	G.Wong
CS 188C-01	028034	Advanced Switching (642-821 BCRSN)	HH118	G.Wong
CS 188D-01	028035	Internetwork Troubleshooting (642-831 CIT)	HH118	G.Wong
CS 212AI	028037	Cisco Network Security – Routers	HH118	W.Wong
CS 212AJ	028165	Cisco Network Security – PIX	HH118	W.Wong
CS212AK	028160	VOIP and IP Telephony	HH118	R.Grotegut

Making this new format work, both for teaching and learning, was a initially a struggle. Students have faced significant difficulties in registering for the courses offered in this new format. It appeared both in Web Advisor and in the printed schedule that students would have to attend three or four days per week. Enrollments did not stabilize until the third week of instruction, which, since these were nine-week courses, made both teaching and learning extremely difficult. There has been limited opportunity for students to make use of open lab time, as there is no separate open lab for the NTSA program, and scheduled open lab periods must work around other class schedules in three different classrooms. Issues with the bookstore and book orders have also affected a smooth start to instruction.

On the positive side, no classes were cancelled and enrollments were up from the previous year. See chart below:



These numbers should improve even more next semester. The way courses appear in the Spring 2006 schedule has been improved and two of the NTSA programs, Microsoft and Cisco, will be moved to Hyman Hall where students can take advantage of the open lab in HH119.

Assessment of Program Improvement since Previous Program Review

As was stated earlier, the NTSA program is dynamic. Program review for such a program is continuous. A six-year cycle would be disastrous. Learning outcomes change as technologies change. New programs with new outcomes emerge as the industry changes.

The improvements in instructional technology have provided an effective opportunity to keep up with the fast-changing needs of industry. The remote labs, web-assessment, and eLearning simulations all provide alternatives for a time-conscious and increasingly busy IT worker.

Appendix A

MICROSOFT SYSTEMS ENGINEER (NETWORK+, MCP, MCSE)
NETWORK TECHNOLOGY AND SYSTEMS ADMINISTRATION
AS Degree and Certificate of Achievement Program

Program Description and Scope

This program prepares students to be product support professionals, responsible for designing and implementing an entire computing environment for a medium to large entity. This involves not only the design and installation of the operating systems, but also managing and supporting the Microsoft operating systems, both client and server; a Microsoft network infrastructure; and a Microsoft Active Directory, the directory service that is an integral part of the Microsoft Windows operating systems, as well as implementing Group Policy.

For network professionals, Microsoft offers the Microsoft Certified Systems Engineer (MCSE) credential. MCSE's are qualified to effectively plan, implement, maintain, and support information systems in a wide range of computing environments using the Microsoft Windows Server Products and the Microsoft BackOffice®. Candidates for this degree option must have strong PC skills prior to enrolling in the program.

Upon completion of this program, students will be prepared for Microsoft certification as an MCSE (Microsoft Certified Systems Engineer).

The MCSE credential is the premier certification for professionals who analyze the business requirements and design and implement the infrastructure for business solutions based on the Microsoft Windows® 2000-2003 platform and Microsoft Windows Server System™.

Implementation responsibilities include installing, configuring, and troubleshooting network systems. More information about MCSE job functions can be found in the MCSE Job Task Analysis in the appendices.

The MCSE certification is appropriate for:

- Systems engineers
- Technical support engineers
- Systems analysts
- Network analysts
- Technical consultants

The MCSE credential is one of the most widely recognized technical certifications in the industry. CertCities rated the MCSE as #2 in its ranking of the top ten certifications for 2005. By earning the premier MCSE credential, individuals are demonstrating that they have the skills necessary to lead organizations in the successful design, implementation, and administration of the most advanced Windows operating system and Microsoft Windows Server System.

The Typical Computing Environment of an MCSE

The Windows 2000 track of the MCSE credential is designed for information technology (IT) professionals working in the typically complex computing environment of medium to large organizations.

An MCSE candidate should have at least one year of experience implementing and administering a network operating system in environments with the following characteristics:

- 200 to 26,000 supported users
- Five to 150 physical locations

- Typical network services and applications including file and print, database, messaging, proxy server or firewall, dial-in server, desktop management, and Web hosting
- Connectivity needs including connecting individual offices and users at remote locations to the corporate network and connecting corporate networks to the Internet

In addition, an MCSE candidate should have at least one year of experience in the following areas:

- Implementing and administering a desktop operating system
- Designing a network infrastructure

Program Student Learning Outcomes

- Install, configure, and maintain the current Microsoft operating systems, both client and server; both locally and remotely.
- Design and implement a Microsoft network infrastructure.
- Create, configure, and maintain a Microsoft Windows Domain, including user and group accounts, shared resources, delegation of administrative control, group policy, and replication.
- Configure a Microsoft Windows Server to provide the services that a network requires: DHCP, DNS, WINS, Web, a Remote Installation Server (RIS), each on either a stand-alone computer or as part of Active Directory.
- Configure the networking services required for computer interoperability: network security protocols, Windows Routing and Remote Access, RADIUS, connectivity between network segments and to the Internet, data communication with NetWare, Macintosh, and UNIX.
- Identify and resolve network connectivity problems using Windows troubleshooting tools and utilities.
- Manage and restore an Active Directory database.

This program, in its entirety, is designed to provide the student with the knowledge and skills to earn the Microsoft Certification of MCSE – Microsoft Certified System Engineer. While the Program does not consider successful completion of the Microsoft Exams in measuring learning outcomes, it does use similar methods to measure said outcomes. The courses in the program are designed to be taken consecutively, enabling the student to learn skills incrementally. At each level, the student must demonstrate knowledge and skills before moving on. This is done through exams of multiple-choice and short-answer questions, and performance exams, demonstrating ability to successfully complete tasks specific to that particular course.

NETWORK ADMINISTRATOR - (NETWORK+, MCSA OR LINUX+, CCNA)
NETWORK TECHNOLOGY AND SYSTEMS ADMINISTRATION
AS Degree and Certificate of Achievement Program

Program Description and Scope

Organizations that rely on computing and networking resources to carry out their mission have always depended on network administration and network administrators. The dramatic increase in the number and size of distributed networks of workstations in recent years has created a tremendous demand for more, and better trained, network administrators.

Network administration is a widely varied task. The best network administrators are generalists: they can wire and repair cables, install new software, repair bugs, train users, offer tips for increased productivity across areas from word processing to web-based tools, evaluate new hardware and software, automate mundane tasks, and increase work flow at their site. In general, network administrators enable people to exploit computers and network devices at a level which gains leverage for the entire organization.

Network Administrators manage all of the day-to-day aspects of a computer network by maintaining the hardware and software that comprises the network. This normally includes the deployment, maintenance and monitoring of active network gear: switches, routers, and firewalls. It sometimes also includes maintenance of certain network servers: file servers, VPN gateways, intrusion detection systems, and authentication servers. Network administration commonly includes activities such as network address assignment, assignment of routing protocols and routing table configuration as well as configuration of authentication and authorization – directory services.

In addition to configuring networks, they take responsibility for making the network operational 24 hours a day. They perform such tasks as adding/deleting users, backing up the server, loading new software applications, and maintaining security. When something is not working, like e-mail or printer access, users will expect the Network Administrator to fix the problem.

Candidates for this degree option and/or Certificate of Achievement can concentrate on either the Microsoft or Linux operating systems. Strongest candidates would get experience with both OSs. Candidates must also have strong PC skills prior to enrolling in the program.

Students completing this NTSA track receive preparatory training for the following certification exams: Network+, MCSA or Linux+, and CCNA. These certifications have broad industry recognition and appeal.

Program Student Learning Outcomes

- Install, configure, and maintain an organization's LAN servers and workstations.
- Maintain the network's authentication infrastructure and network backup systems.
- Manage network performance and maintain security of LANS.
- Directs and supervises cabling, configuring and installing computer hardware, computers and computer networks and software for network and stand alone computers.
- Make recommendations regarding policies and standards for the computer and computer networks.
- Work with multiple hardware and software platforms at an intermediate level.
- Plan and implement required configuration changes to local area networks;
- Troubleshoots hardware and software conflicts and problems;