LINK TO PROPOSED BUDGET

THE UNIVERSITY OF NORTH CAROLINA
APPENDIX C: REQUEST FOR AUTHORIZATION TO ESTABLISH A NEW DEGREE PROGRAM

Date: October 19, 2011

Constituent Institution: East Carolina University
School/College: College of Technology and Computer Science Department: Technology Systems

Program Identification:
CIP Discipline Specialty Title: Computer/ Information Technology Services Administration and Management
CIP Discipline Specialty Code: 11.1099.123.000 Level (B, M, I, Prof, D): M
Exact Title of the Proposed Degree: Network Technology
Exact Degree Abbreviation (e.g., BA, BS, MA, MS, EdD, PhD): MS

Does the proposed program constitute a substantive change as defined by SACS?	Yes	No X
a) Is it at a more advanced level than those previously authorized?	Yes	No X
b) Is the proposed program in a new discipline division?	Yes	No X

Proposed date to establish degree program (allow at least 3-6 months for proposal review): *Month:* Aug *Year:* 2012

Do you plan to offer the proposed program away from campus *during the first year of operation?* Yes *X* No
If yes, complete the form to be used to request establishment of a distance education program and submit it along with this request.

I. DESCRIPTION OF THE PROGRAM

A. Describe the proposed degree program (i.e., its nature, scope, and intended audience).

The Department of Technology Systems requests authorization to establish the Master of Science degree program in Network Technology (MSNT) as the next step in development of professional master's programs in the areas of information technology and networked computer systems. This program is currently offered as a component of the MS in Technology Systems (MSTS) and comprises three of the seven total concentrations including: digital communications technology, computer networking management, and information security. The program also features a new concentration area in web technologies, which will include the existing courses that are in the Website Developer graduate certificate program. This proposal recognizes the growth and development, over the last five years, of this strong and vibrant set of network and information system concentrations and the graduate level certificate programs within the MSTS. The focus of the MSNT will continue to be graduate education for professionals in the fields of information assurance, network planning, network design, network management, and related areas and will continue to be delivered both on-campus and online.

Timing with this request is essential and now is the appropriate time to transition the information and computer technology components of the MSTS program to independent degree status for several strategic reasons. First and foremost, this new degree program will enable increased focus on the course content while moving to steadily improve accomplishment of the educational objectives. The three network technology related concentration areas have evolved dramatically since the inception of MSTS program. They have matured and became more specialized in terms of the level of in-depth analysis and treatment of the network technology related concepts, subject matter, and applications. The graduates of those three concentrations have the skill set that is not effectively communicated with the MSTS degree. In addition, the new programmatic structure of the MSNT allows more compendious education in the field of network technology, which is found to be infeasible under the umbrella of MSTS since the program emphasis of MSTS is centered around the technology management. The inception of MSNT will allow faculty to explore the new possibilities in the fast

growing field of network technology much more effectively with the elevated focus on technical design, system development, technological innovation and state-of-the-art systems research. Secondly, this program establishment will allow for a more integrated and cohesive educational experience for students and will more closely align the program with the needs of the workforce, the growth and strength of this area of the economy, and the job market growth forecasts of the Bureau of Labor Statistics [2, 3, 6, 7]. The result will be an improved degree credential and a more focused learning experience for professionals in the growing and developing areas of information and computer networking. Furthermore, this program offering will continue to fill an important position in meeting the needs of information and network technology professionals who desire a program that bridges and integrates between computer science (typically software based), information systems (database-oriented), and engineering (hardware component design oriented). We propose that this program be named "Master of Science in Network Technology" (MS NT) for three primary reasons:

- It focuses on a graduate level specialty area that will serve the educational needs of the graduates of our undergraduate degree, the BS in Information and Computer Technology (BS ICT) program
- It clearly identifies the focus of the degree for potential students and employers, as well as accreditation entities
- It is consistent with other similar IT programs and related degrees' names. Note: Due to the nature of evolving technology and engineering fields in the area of network and computer systems, there is a range of program names closely related to the recommended degree designation, including
  - MS in Computer Networking (North Carolina State University)
  - Master of Science in Telecommunications and Network Management (Syracuse University)
  - Master of Network Engineering (Illinois Institute of Technology)
  - Information and Computer Technology (East Carolina University)
  - Master of Network Computing (Monash University)
  - Master's Degree in Networking and Systems Administration (Rochester Institute of Technology)

  Other related program descriptors include Information Engineering Technology, Information and Communications Technology, Information Systems, Computer Information Systems, and the like. While there are many more related program names, the primary reason for selecting the MSNT title is to identify the field of network technology as the focus of the degree program.

B. List the educational objectives of the program.

This program will

- Provide graduate education in network technology-- an area that has been identified as "high need" both in North Carolina and the nation
- Interface education with business and industry, government, and defense organizations to create mutually beneficial opportunities for research, technology transfer, and employment
- Prepare students to compete in a global economy, as well as internationalize programs through active global outreach and partnerships
- Contribute to North Carolina's workforce by preparing graduate professionals in high need occupations
- Improve and increase access to higher education for North Carolinians, especially in underserved areas
- Strengthen the relationship between UNC institutions and the NC Community College System through curricular development, improvement, and support for community college instructors
- Support the State Department of Public Instruction in its efforts to improve public education in North Carolina

Graduates from this program should be able to

- Demonstrate applied strategies for solving problems related to networked systems analysis, design, implementation, evaluation, and maintenance.
- Develop the technology management skills required for career progression in the area of network technology.
- Apply modern network technology modeling, analysis, and simulation tools to create, test, deploy, and manage solutions, as well as meet customer requirements.
- Analyze hardware, software, and organizational environments in which networked system implementation and operation occur.
- Employ critical-thinking skills and problem-solving strategies and techniques to solve network technology problems in organizations.
- Convey information effectively to colleagues, customers, staff, senior management, and other professional stakeholders using oral, graphic, web, and written tools.
- Analyze trends in technology and demonstrate skills to adapt to changing networked environments.
- Demonstrate a commitment to continuous professional development and professional growth.
- Analyze technological alternatives and demonstrate the ability to develop and manage projects including budget development, cost analysis, evaluation of risk factors, scheduling, and identification of functional requirements.
- Integrate people, equipment, and systems to achieve a cost-effective operations and maintenance plan for delivery of needed information and network services.

C. Describe the relationship of the program to other programs currently offered at the proposing institution, including the common use of: 1) courses, 2) faculty, 3) facilities, and 4) other resources.

The MS in Technology Systems currently is comprised of 7 concentration areas serving roughly 161 graduate degree seeking students. About 60 percent of these students are in the computer and networking concentration areas that will be segmented into the proposed MSNT degree program. The establishment of this stand-alone program recognizes the strength of the information and computer related concentrations, the importance of this professional field of study, and the necessity to continue to develop this program area to meet both regional and statewide graduate level educational needs. Conversely, this change will allow the MS in technology systems to concentrate on the important areas of operational systems improvement and develop state-of-the-art concentrations in other areas such as quality systems, performance improvement, and distribution and logistics.

The strategic fit of this proposal into the long-range plan of the College of Technology and Computer Science is an important factor. This plan included the establishment of an engineering department, the development of a master's degree program in software engineering, and the development of the MSNT. The MSNT program is a necessary step in the development of specialized degree offerings and expertise in the areas of network and computer systems that parallels the operational systems focus of the MS in Technology Systems. This program step will promote growth in both the distance education and on-campus graduate student populations for the MSNT and the MS in technology systems areas.

The following four sections address the common use of courses, faculty, facilities, and resources:

<u>Courses</u>

Attachment A contains the proposed copy for the ECU graduate catalog for this degree. This proposal recognizes the growth and development, over the last five years, of a strong and vibrant set of network and information system concentrations within the MS in Technology Systems. Currently, the Department of Technology Systems offers seven concentrations under the MS in Technology Systems. There will be four concentrations in this new MSNT program. Three concentrations (digital communications technology, information security, and computer networking management) will be split from the current MS in technology systems program and become a part of this new MSNT degree offering. There is currently a website developer graduate certificate program and this will be modified and added to the MSNT degree as a fourth concentration: web technologies. These concentrations are described in the tables 1 and 2, below, along with the proposed curriculum.

The current MS in Technology Systems consists of a common core of 12 semester hours and 18 semester hours of concentration content. The MSNT will maintain a similar structure but will focus the courses on the needs of information technology and network professionals. The four concentrations, digital communications, information security, computer networking management, and web technologies will also build on a 15 semester hour common core courses and include 15 to 18 semester hours of technical concentration content courses depending on the particular track (thesis, practicum, or non-thesis) that is followed. As illustrated in Tables 1 and 2, the major, planned curricular changes involve the modification of the core courses and the related changes that occur in the concentration areas. The revised core will provide a more focused network technology foundation for all of the concentration areas.

Table 1: Program Core Change Summary

Current MSTS Program Core (12 hours)	**Proposed MSNT Core (15 hours)**
ITEC 6000 Statistical Applications in Industry ITEC 6406 Capital Project and Cost Analysis for Technology ITEC 6200 Technology Project Management ITEC 6050 Strategies for Technical Management and Communications	ITEC 6060 Research Methods in Technology ITEC 6000 Statistical Applications in Industry ITEC 6200 Technology Project Management ICTN 6823 Information Security Management ICTN 6878 Legal and Ethical Issues in Information Technology

The concentration areas have been modified based on the ability to shift ICTN 6823 and 6878 into the core. To provide an additional degree of student flexibility in developing professional expertise, two elective courses will be introduced into each of the concentrations for those who do not pursue the thesis options. This will enhance flexibility for students to choose a course of professional interest and will also assure program productivity.

Table 2: Planned MSNT Concentration Courses

Digital Communications Technology	**Information Security**	**Computer Networking Management**	**Web Technologies**
1. ICTN 6810 Communication Technology 2. ICTN 6820 Networking Technology for Industry 3. ICTN 6830 Advanced Networking Technology 4. ICTN 6840 Communication Strategies for Industry 5. Options: <u>Thesis Option:</u>	1. ICTN 6865 Fundamentals of Network Security 2. ICTN 6870 Advanced Network Security 3. ICTN 6873 Network Intrusion, Detection and Incidence Response 4. ICTN 6883 System Integrity for Information Technology 5. Options:	1. ICTN 6865 Fundamentals of Network Security 2. ICTN 6875 Emerging Technology 3. ICTN 6880 Advanced Topics Information Infrastructure Design 4. ICTN 6885 Network Management Technology 5. Options:	1. ICTN 6815 Network Media Services 3. ICTN 6825 Dynamic Web Services 4. ICTN 6835 Enterprise Web Services 5. ICTN 6845 Web Site Development 6. Options: <u>Thesis Option:</u> ICTN 7000 Thesis <u>Practicum Option:</u>

ICTN 7000 Thesis Practicum Option: ICTN 6900 Practicum Non-thesis Option: Two elective courses. Comprehensive Exam.	Thesis Option: ICTN 7000 Thesis Practicum Option: ICTN 6900 Practicum Non-thesis Option: Two elective courses. Comprehensive Exam.	Thesis Option: ICTN 7000 Thesis Practicum Option: ICTN 6900 Practicum Non-thesis Option: Two elective courses Comprehensive Exam.	ICTN 6900 Practicum Non-thesis Option: Two elective courses Comprehensive Exam.

MSNT will require students to complete a minimum of 30 s.h for thesis and practicum options. Those who elect not to pursue a thesis or practicum option will be required to take an additional course (for a minimum of 33 s.h.) and successfully pass a comprehensive examination. The common core will include ICTN 6823, 6878; ITEC 6000, 6060, and 6200 will total 15 s. h. Concentration area will feature four courses (12 s.h.). The proposed MSNT options are further explained below.

Thesis Track: The students who are interested in advancing their research skills will be encouraged to pursue the thesis option. Thesis track students will be required to take ICTN 7000 Thesis course to conduct their research project, which will yield the completion of their theses. The thesis proposal and the subsequent thesis must be approved by the student's advisor and the committee composed of three technology systems faculty members. Thesis track coursework is comprised of a minimum of 30 credit hours.

Practicum Track: The second option is identified as the practicum option and designed for students who wish to pursue industry-based projects. Practicum track students will be required to take ICTN 6900 where they will conduct a real life complex technology project, which will yield the completion of a high quality practicum project report. The practicum project proposal and the subsequent report must be approved by the student's advisor and the committee composed of three technology systems faculty members. Practicum track coursework is comprised of a minimum of 30 credit hours.

Non-thesis Track: The third option is non-thesis option, which will require students to take two elective courses in addition to the five core and four concentration courses (for a minimum of 33 s.h.). Unlike thesis or practicum tracks, non-thesis track students will not undertake a thesis or an industry project. However, non-thesis students will be required to complete a total 33 s.h. minimum instead of 30 s.h., which is the required coursework for thesis and practicum tracks. In addition to the 33 s.h. coursework, non-thesis students must also pass a comprehensive exam, which is designed to evaluate the student's mastery in the field of network technology.

The tracks that are explained above are developed to address the needs of different student market segments. By providing a variety of options, the program will satisfy the needs of larger prospective student segments who have different career objectives.
The description of the four concentration areas that are featured in the MSNT program is as follows.

Computer Networking Management: Courses in this concentration emphasize advanced technologies used in the design, implementation, administration, monitoring, optimization, and maintenance of data communication and computer networking systems in industry.

Digital Communications Technology: Courses in this concentration emphasize a broad understanding of communication theory and practice in the transmission of digital data, including signal generation, conditioning, transmission, error detection and correction, and the underlying technologies used to retrieve, process, store, and analyze data in organizations.

Information Security: Courses in this concentration prepare students to design, deploy, manage, and apply techniques of securing and protecting the integrity and availability of information systems and communication networks in governmental, private, and non-profit organizations.

Web Technologies: Courses in this concentration prepare students to design, analyze, configure, implement, and operate web services, computer networks, multimedia objects, data storage systems, and interactive web components for governmental, private, and non-profit organizations.

Faculty

As with the current program, faculty from the Department of Technology Systems will support the new degree program's continued development. From a human resource perspective, there are eight technology systems faculty members, with doctoral qualifications in the degree related areas. The strength of this faculty team was recently highlighted when their collaborative efforts resulted in ECU's designation by the National Security Agency and the Department of Homeland Security as a National Center for Academic Excellence in Information Assurance Education (CAEIAE). Faculty vitae are included in Attachment B.

Facilities and Other Resources

As in the current program, existing college facilities and resources in both the distance education and campus areas will continue to be utilized to support the MSNT program. From a distance education perspective, the Department of Technology Systems faculty members have been leaders in the state and the nation in distance education employing remotely controlled computer networking laboratories, both at the undergraduate and graduate levels. This knowledge and experience will continue to be applied to this new MSNT program to assure continued program quality.

Since the courses will be delivered using the full capabilities of distance education technologies including the ECU global classroom, streamed content, remote access labs, and interactive online sessions, online students will enjoy the same advantages and opportunities that are available to face-to-face students. Distance education students will have access to streamed video and streaming recorded media lectures that provide the same learning opportunity as traditional, on-campus offerings.

From an on-campus perspective, current facilities and laboratories will continue to support the program with little or no change.

II. JUSTIFICATION FOR THE PROGRAM (Narrative Statement)

A. Describe the proposed program as it relates to the following:

1. Institutional Mission and Strategic Planning.

This MSNT program serves the need for professional development and advanced technology studies in an evolving and growing technological field that is necessary for both regional, statewide, and national, and global economic development. As a result, it integrates with key components of the ECU mission statement:

- Preparing our students to compete and succeed in the global economy and multicultural society
- Distinguishing ourselves by the ability to train and prepare leaders
- Creating a strong, sustainable future for eastern North Carolina through education, research, innovation, investment, and outreach [15]

The proposed MSNT also supports the UNC Tomorrow (UNCT) [9] initiative in that it:

- Offers a unique graduate education option that has been identified as an area of need in North Carolina and the nation [1]
- Opens opportunities for partnership with regional and statewide industry, government, and defense system organizations in the areas of information and computer technologies
- Enhances new and emerging research opportunities for the faculty in the information and computer technology programs in an emerging field
- Focuses on development of technology professionals in a key professional field and promotes growth of strong linkages and interactions with the industrial, business, and public sector organizations of eastern North Carolina

In addition, the proposed MS program specifically addresses the following current ECU Strategic Planning Goals as outlined in *ECU Tomorrow: A Vision for Leadership and Service* [8] and related sub elements, as well as the UNC Tomorrow [10] initiative:

- **Student preparation to compete in the global economy (UNCT 4.1.1, 4.1.2):** The MSNT program will be globally competitive as evidenced by integration of current industry standards and partnerships with Cisco, Red Hat, HP, EMC, VMware, Microsoft, SAP, NetLabs, etc. The program has already received recognition by our designation as a National Center of Excellence in Information Assurance Education by the National Security Agency.
- **Internationalization of programs, students, and faculty (UNCT 4.1.2, 4.1.3):** Members of the ICT faculty are developing partnerships with international universities that will allow faculty and students to collaborate on projects, encourage international exchanges of faculty and students, and strengthen research opportunities.
- **Commitment to student learning and success (UNCT 4.1.1):** ICT faculty continues to employ different tools and techniques that maximize interaction and student learning.
- **Commitment to increasing access to higher education for all students (UNCT 4.2.1, 4.2.3, 4.2.5):** Increasing access to higher education for the poorer regions of the state and for underrepresented minorities and underserved areas is our top priority. The proposed degree will be 100 percent accessible online and all students, regardless of location, will have complete access to state-of-the art laboratories from anywhere and at any time. All students (including those with disabilities) will receive equitable instruction, have access to faculty and resources, collaborate on projects with faculty and other students, and receive instructional support remotely, without any burden of having to travel to campus.
- **Support of innovative partnerships that foster economic development both within the university and between the university and the community (UNCT 4.1.3, 4.4.1, 4.4.2):** The economic prosperity and development of North Carolina is forefront in the mission of the College of Technology and Computer Science. Our faculty and students continue to engage in community-based outreach and service projects that help strengthen relationships throughout the eastern region and the state. Additionally, our faculty continue to develop partnerships and interdisciplinary collaborations in areas of mutual interests across the ECU campus.
- **Commitment to provide ongoing educational and learning opportunities to support the continued development of a competitive workforce for North Carolina (UNCT 4.2.6):** Due to its very dynamic nature, the information and computer technology field requires retraining and continuous improvement in order to stay in step with technological advances. The MSNT degree and certificate programs will provide opportunities for professionals and academic faculty to obtain needed credentials (like SACS) and training needed to become more successful in their

jobs. These programs will also provide training and retraining opportunities for the current and future workforce.

Other UNCT initiatives supported by the proposed program:

UNCT 4.2.2, 4.3.3: Ongoing efforts to strengthen the relationship between UNC and Community College System.

Currently, our undergraduate program in information and computer technology is fully articulated with the community college system. The proposed graduate program strengthens that articulation by providing access to faculty resources to the community colleges. This program provides an avenue for community college instructors to receive ongoing training and instructional support to help them obtain needed credentials that meet accreditation requirements (such as SACS), stay current, and help produce higher quality graduates.

UNCT 4.2.6: Commitment to academic success for all students

Our faculty members are fully committed to the academic and lifelong success of all students. To that end, ICT faculty strives to develop, offer, and upgrade programs in step with technological advances and labor market needs. ICT faculty work with students individually or in groups to insure maximum achievement, understanding and retention of subject matter. Our commitment to student success spans both baccalaureate and master's degree levels. For those who wish to pursue terminal degrees, the MSNT provides the necessary preparation and foundation for success at that level as well.

UNCT 4.3.1, 4.3.3: Improving Quantity and Quality of Teachers

The MSNT provides an opportunity for current faculty and industry professionals wishing to pursue academic careers to obtain necessary education and credentials to teach at community colleges, technical institutes, and even four year institutions around the state. This will help alleviate some of the problems surrounding teacher shortages, training, retraining, recruitment, and retention of qualified teachers.

UNCT 4.3.4, 4.3.5:

ICT Faculty collaborate with both the community college system and the Department of Public Instruction to enhance education in North Carolina. We recently signed a memorandum of understanding (MOU) with the NC Department of Public Instruction (DPI) to accept IT credits from North Carolina high school students wishing to pursue undergraduate ICT degrees at ECU.

2. Student Demand.

The fact that the proposed program currently exists as a part of another degree and has a healthy enrollment demonstrates that the program is in demand. As stated earlier, there are 100 degree-seeking and 41certificate-seeking graduate students enrolled in the MSNT related areas at the time of writing this document. From a broad perspective, employment in computer related occupations is expected to increase during the 2006–2016 period between two and three times faster than most occupations [2, 3, 7]. Table 3 summarizes the Bureau of Labor Statistics (BLS) forecasts for ten career fields with standard occupational classifications (SOC) related to the MS in information and computer technology that are among the fastest growing in the 2006-2016 period. The growth percentages range from 13 percent for computer specialists to over 53 percent for network system and data analysts [3, 7]. A significant element of Table 3 is the total job openings noted in the last column on the right. This substantiates not only high growth percentages but also large numbers of real openings in absolute numbers. Please note that these projections do not account for academic employment in community colleges and other institutions served by this program.

Table 3: BLS Growth Projections (in thousands) for ICT Related Positions for 2006-2016

Occupational title	SOC Code	Employment, 2006	Projected employment, 2016	Change, 2006-16	
				Number	Percent
Network systems and data communications analysts	15-1081	262,000	402,000	140,000	53
Network and computer systems administrators	15-1071	309,000	393,000	83,000	27
Database administrators	15-1061	119,000	154,000	34,000	29
Computer systems analysts	15-1051	504,000	650,000	146,000	29
Computer and information scientists, research	15-1011	25,000	31,000	5,400	22
Computer and information systems managers	11-3021	264,000	307,000	43,000	16
Computer support specialists	15-1041	552,000	624,000	71,000	13
Computer specialists, all other	15-1099	136,000	157,000	21,000	15

3. Societal Need. (Note: For graduate, first-professional, and baccalaureate-professional programs, cite manpower needs in North Carolina and elsewhere.)

From a general perspective, several studies have recently highlighted the need for continuing professional development in sciences, engineering, and technology based fields. For example, a recent report [1] analyzed the need for various engineering professions in North Carolina and identified a general shortage of master's-level continuing professional education in the workplace. The American Society for Engineering Education (ASEE) noted that "the country has not made a parallel investment in professionally oriented graduate education to support the development of an advanced engineering workforce in industry" [12]. In its landmark report titled " *Graduate Education: The Backbone of American Competitiveness and Innovation,"* the Council on Graduate Schools called on business leaders, educational institutions, and policy makers to "unite together in making the investments necessary to enhance U.S. innovation and national security through stronger support for and attention to graduate education [13]. In another landmark report, the National Academies of Sciences, Engineering, and the Institute of Medicine called for a significant increase in the number of U.S. citizens pursuing graduate study in "areas of national need" in order for this country to remain competitive [14]. To that end, organizations such as the Sloan Foundation [4] and the National Science Foundation [5] have targeted resources on this issue by supporting the Professional Practice Masters programs. The most compelling case supporting societal need is made by the BLS job growth data detailed in Table 3. The bullets below summarize briefly that information

- Network systems and data communications analysts: 53%
- Database administrators: 29%
- Computer systems analysts: 29%
- Network and computer system administrators: 27%

4. **Impact on existing undergraduate and/or graduate academic programs at ECU.** (e.g., Will the proposed program strengthen other programs? Will it stretch existing resources? How many of your programs at this level currently fail to meet Board of Governors' productivity criteria? Is there a danger of proliferation of low-productivity degree programs at the institution?)

Will the program strengthen other programs?

This implementation proposal converts existing concentrations within a graduate program to standalone status. The result of this change will have no negative impact and significant positive impact on related programs. Primarily the change will strengthen the information and computer technology options by allowing improved degree identity and a more focused curriculum. Similarly, the remaining areas of the MS in technology systems will be able to focus on the key areas and curricular content related to operational system improvement.

From a broader perspective, this change will advance the efforts of program faculty to open up new areas of research and collaboration with industry. In addition, it will help to grow enrollments in both on-campus and distance graduate programs. Finally, this revised master's degree program will provide improved career and graduate education opportunities for our current undergraduate students pursuing the BS in Information and Computer Technology and related areas.

Will it stretch existing resources?

Since the MSNT is currently a viable program within the MS in Technology Systems (MSTS), it will not reduce total enrollments in current programs and resources will not be impacted. As previously described, the faculty planning team developed a tightly integrated and focused curriculum. In addition, students now have the flexibility of selecting one of three tracks: thesis, practicum, or additional course work which will result in added flexibility for faculty and students, and will not result in any additional loads for the faculty.

The primary impact of this proposal on current program productivity involves the revised core for the MSNT. Previously the existing core courses were shared by all the concentrations in the MS in Technology Systems program. The basic question is whether there will be adequate enrollment if some of the MSTS students become MSNT students and take a different set of core courses. With an average enrollment of 55-60 students per course, even with a reduction due to different core courses for the MSNT students, there will remain a strong and sufficient enrollment to justify offering the original core courses along with the new courses for the MSNT. It is expected that the increased focus on the remaining MSTS concentrations will lead to an increase in enrollment in those areas.

As enumerated above, the impact of the MSNT on the MSTS related to the change of the core courses will be minimal since the current size of the overall graduate program supports independent sections of the core courses. It is also important to note that segmenting the MSNT will allow the MSTS to develop additional areas of focus which will bolster its core numbers and total growth. From an MSNT viewpoint, the reduction of a course in each concentration in lieu of an elective will produce a significant improvement in productivity that will more than compensate for the one new core course.

In summary, this change is not anticipated to impact existing resources. If both degree programs expand as anticipated, consistent with the projections in this document, formula funding will sustain additional growth and development. Program students in both degrees are primarily working professionals who pay the costs of their graduate education. Thus significant stipend and assistantship support will not be required beyond current levels.

How many programs fail to meet Board of Governors Productivity criteria?

The 2008 UNC-GA productivity study identified three master's degree programs for low productivity review. Enrollment in this proposed MSNT degree program should far exceed productivity standards.

B. Discuss potential program duplication and program competitiveness.

1. Identify similar programs offered elsewhere in North Carolina. Indicate the location and distance from the proposing institution. Include a) public and b) private institutions of higher education.

   The proposed program is not new since it currently exists as a series of concentrations under the MSTS. As was previously stated, the program has more than 100 degree-seeking graduate students already enrolled. Consequently, this proposal for a standalone degree does not present any issues related to duplication of similar degree programs anywhere in the state.

   From a statewide perspective, a review of the inventory of related degree programs at the UNC website indicates the following degree titles in areas related to the proposed degree that are offered via distance education (as of 01/31/2011) (http://www.northcarolina.edu/content.php/apps/disted2/searchresults.php?inv_type=D&browse=cis).

   a. UNC CH (109 miles). Disaster Management, 11.0802, Actual Title: *Community Preparedness and Disaster Management (CPDM)*. This program does not emphasize content from the networking area and has a different CIP Code from the proposed program according to: http://www.sph.unc.edu/hpaa/cpdm_curriculum_789_1353.html

   b. NCSU (90 miles). Computer Networking; 11.0901, and Computer & Information Sciences (11.0101). Content is a blend of Electrical & Computer Engineering and Computer Science and has no conflict with the proposed program. (http://www.csc.ncsu.edu/academics/graduate/degrees/mcsdl.php). The programs at NCSU are engineering-based, and provide theoretical depth with emphasis on design and programming of new devices, systems, and services. The proposed MSNT is lab-based, providing hands-on practical learning experiences in an applied learning environment.

   c. NCCU (103 miles). Computer and Information Science, 11.0701. The actual degree is a joint program-- Joint Master of Business Administration/ Master of Information Science (M.B.A./M.I.S.) (http://web.nccu.edu/graduatestudies/programs.php), is non-technical, has a limited number of networking courses (http://web.nccu.edu/business/graduate/cis_grd.htm), and does not conflict with the proposed program.

   d. UNCG (166 miles). Information Technology and Management, 11.0901. http://www.uncg.edu/bae/isom/masters/. The program emphasizes managerial and business aspects of information technology, is non-technical, and has no conflict with the proposed program.

   e. NCAT (166 miles). Information Technology, 11.1001, (http://www.ncat.edu/academics/). This program was approved recently and has a different emphasis and CIP code than the proposed degree program.

   In addition, all SACS-accredited institutions in North Carolina were reviewed for related master's degree programs (see http://www.sacscoc.org) and none were found to be relevant to the proposed degree program. An additional listing of private universities in North Carolina (http://ncpedia.org/education/privatehigher) was reviewed with similar results.

The proposed MSNT degree program that is being proposed by ECU is unique in the sense that it has been operating as concentrations under another degree program for several years. With more than 100 students already in the various degree concentrations in the networking areas, the issue of competition does not even arise. This program is being repackaged into a standalone status to better serve our clients and constituents. The proposed program is unique in itself due to its heavy application orientation, and is offered on campus and online.

It is important to point out that the proposed program already has faculty and resources (including laboratory facilities) in place and does not require any additional startup or implementation funds. Furthermore, the proposed program has earned a national recognition due to its designation as one of the National Centers of Academic Excellence in Information Assurance Education (CAEIAE) by the National Security Agency. As a result of the CAEIAE designation, ECU now has an NSA-funded Information Assurance Research laboratory that supports both research and instruction in the proposed program and provides NSA scholarship opportunities for our students. To that end, both the university and the NSA have significant investments in both teaching and research infrastructure that support current programs.

2. **Indicate how the proposed program differs from other programs like it in the University**. If the program duplicates other UNC programs, explain a) why it is necessary or justified and b) why demand (if limited) might not be met through a collaborative arrangement (perhaps using distance education) with another UNC institution. If the program is a first professional or doctoral degree, compare it with other similar programs in public and private universities in North Carolina, in the region, and in the nation.

   The proposed program is not new since it currently exists as a series of concentrations under the MS in Technology Systems. The program has approximately 100 degree-seeking students and 54 graduate certificate students already enrolled. Consequently, this proposal for a standalone degree does not present any issues related to duplication of similar degree programs anywhere in the state.

   We are simply repackaging the program to a standalone status so we can better serve our clients and constituents. The proposed program is unique in itself due its heavy application orientation. Furthermore, the proposed program already has faculty and resources (including laboratory facilities) in place; hence requires no additional implementation costs. Additionally, the proposed program has earned a national recognition due to its designation as one of the National Centers of Academic Excellence in Information Assurance Education (CAEIAE) by the National Security Agency. As a result of the CAEIAE designation, ECU now has NSA-funded Information Assurance Research laboratory that supports both research and instruction in the proposed program, as well as provides NSA scholarship opportunities for our students. To that end, both the university and the NSA have significant investments in both teaching and research infrastructure that support current programs.

C. Enrollment (baccalaureate programs should include only upper division program majors, juniors, and seniors):

Headcount Enrollment

Show a five-year history of enrollments and degrees awarded in similar programs offered at other UNC institutions (using the format below for each institution with a similar program); indicate which of these institutions you consulted regarding their experience with student demand and (in the case of professional programs) job placement. Indicate how their experiences influenced your enrollment projections.

This proposed program currently exists as concentrations under the MS in Technology Systems, formerly called MS in Industrial Technology. At the time of writing this proposal (spring semester

2011) there are about 100 degree-seeking students and 54 graduate certificate students enrolled in the ICT-related areas. The program has enjoyed a healthy enrolment over the years. Additionally, the curriculum has received national recognition and endorsement by earning the designation as one of the National Centers of Academic Excellence in Information Assurance Education (CAEIAE). We are basically repackaging an existing successful program and moving it under the umbrella of a standalone degree. To that end, there is no impact on any existing degree program around the state.

Enrollment patterns for the MS in Technology Systems master's degree programs (excluding graduate certificate programs) are summarized in Table 4 below and demonstrate strong and sustained student interest in this program. This should continue based on the job and employment patterns previously noted.

Table 4: MS in Technology Systems Performance Information

	2005-06*	2006-07	2007-08	2008-09	2009-10	2010-11
Declared majors - MS in technology systems	141	149	154	162	172	187
Degrees-Awarded	45	45	47	52	51	64

* Program was called "Master of Science in Industrial Technology (MSIT); after a name change, it became MS in Technology Systems beginning Fall 2006.

Use the format in the chart below to project your enrollment in the proposed program for four years and explain the basis for the projections:

Table 5 provides a conservative estimate of continued program operation similar to the current status. Although the new degree name presents the potential for additional growth, this will only occur if state funding supports this. Consequently, Table 6 presents a conservative enrollment model for degree seeking students (excluding graduate certificates).

Table 5: Anticipated Enrollment in MS in Network Technology

	2012-13	2013-14	2014-15	2015-16
Full time	25	27	30	32
Part time	85	88	90	93
Totals	110	115	120	125

Please indicate the anticipated steady-state headcount enrollment after four years:

Table 6: Headcount after Four Years

Full-time	40	Part-time	100	Total	140

SCH production (upper-division program majors, juniors, and seniors only for baccalaureate programs)
Use the format in the chart below to project the SCH production for four years. Explain how SCH projections were derived from enrollment projections. (See UNC website for a list of the disciplines comprising each of the four categories.)

Student credit hour production projected over a four-year period. These calculations, summarized in Table 7, were derived based on the following estimates:

- Full time students enroll in 9 SH
- Part time students enroll in 6 SH
- Students enroll in two terms (Fall & Spring)

Table 7: Graduate SCH Production

Year 1	**Student Credit Hours**		
Program Category	UG	Masters	Doctoral
Category I			
Category II			
Category III		2205	
Category IV			
Year 2	**Student Credit Hours**		
Program Category	UG	Masters	Doctoral
Category I			
Category II			

Category III		2313	
Category IV			
Year 3	**Student Credit Hours**		
Program Category	UG	Masters	Doctoral
Category I			
Category II			
Category III		2430	
Category IV			
Year 4	**Student Credit Hours**		
Program Category	UG	Masters	Doctoral
Category I			
Category II			
Category III		2538	
Category IV			

To sustain and elevate the enrollment numbers, a number of recruitment activities will be pursued:

- The program faculty will visit military bases to promote the program in military community
- The MSNT program will be promoted in National Defense University's annual open house event which features an education fair segment that is geared towards the needs of government employees
- The MSNT faculty members have extensive international connections. Those connections will be used to promote the program in international markets.
- Community college instructors have been identified as a potential market for MSNT. That market segment will be addressed by program presentations that will be conducted at North Carolina Community College Faculty Association conferences.

III. PROGRAM REQUIREMENTS AND CURRICULUM

A. Program Planning.

1. List the names of institutions with similar offerings regarded as high quality programs by the developers of the proposed programs.

The following universities offer master's degree programs in areas related to the information computer technology discipline and are also offered through their distance education system:

Purdue University
College of Technology
Master of Science in Computer and Information Technology
http://www.tech.purdue.edu/Cit/academics/graduate/index.cfm

Drexel University
College of Information Science and Technology
Master of Science in Information Systems
http://www.cis.drexel.edu/PS/GraduatePrograms/MSIS/

University of Nebraska at Omaha
College of Information Science and Technology
MS in Information Systems

http://www.isqa.unomaha.edu/

George Mason University
School of Information Technology and Engineering
MS in Information Systems
http://ite.gmu.edu/

Syracuse University
School of Information Studies
MS in Information Management
http://istweb.syr.edu/academics/graduate/msirm/index.asp

2. **List other institutions visited or consulted in developing this proposal.** Also discuss or append any consultants' reports, committee findings, and simulations (cost, enrollment shift, induced course load matrix, etc.) generated in planning the proposed program. Include outside reviewer comments.

   Drs. Resit Unal of Old Dominion University and Dr. Joe Ashby of Indiana State University served as external reviewers for the proposed program. Both reviews were very positive and in support of the proposed MSNT.

   Dr. Unal recommended that the department consider pursuing external accreditation for the MSNT. We would like to note that the department is currently conducting a self-study on the MSTS that will be used to pursue an accreditation from ATMAE during the 2012-2013 academic year. We may pursue this accreditation for the MSNT, as well, or alternately pursue a different path with ABET after their current draft standards for IT programs have been implemented.

   Dr. Joe Ashby made an observation in regards to the concentration name "Digital Communications" and stated that "it appears to be an industrial data systems and networking" program and indicated that "it might be worth a look to consider a name change there." We acknowledge this recommendation and clarify that the choice of the name is intentional and is intended to allow students from a broader background, including control systems, to enter the program (with appropriate guidance). We would also like to add that we have graduated hundreds of students under this concentration since its inception 15 or so years ago; therefore, recruitment into the concentration will not be an issue.

   The complete reviewer comments are included in Attachment C.

B. Admission. List the following:

1. **Admissions requirements for proposed program** (indicate minimum requirements and general requirements).

   Applicants must meet the admission requirements of the ECU Graduate School. Acceptance to the Master of Science in network technology is based on satisfactory undergraduate grades, scores on either the Miller Analogy Test or the Graduate Record Examinations, and letters of reference. Applicants whose native language is not English must additionally submit a satisfactory score on the Test of English as a Foreign Language. Completion of an undergraduate degree in computer science, computer engineering or technology, electrical engineering or technology, information systems or technology, telecommunications or a related discipline is recommended for admission. Students from other disciplines and applicants with limited technical expertise are evaluated on a case-by-case basis by the program admissions director. In some cases, remedial undergraduate

courses, professional certifications, or additional graduate courses will be required as a precondition for admission. Students in the program are required to have fully functional computer hardware and full, high-speed Internet connectivity.

2. **Documents to be submitted for admission** (listing or sample).

   Per ECU Graduate School procedures, applicants are required to complete a Graduate School application package and submit a number of supporting documents, including official transcripts, scores from standardized tests, three letters of recommendation, and a statement of professional goals and interest.

C. Degree Requirements. List the following:

1. **Total hours required**. Minimum of 30 credits.

   Attachment A contains the proposed ECU graduate catalog copy for the MS in Network Technology. The program will require a minimum of thirty semester hours of course work.

2. **Proportion of courses open only to graduate students to be required in program** (graduate programs only).

   All courses are 6000 level and higher and will be open only to graduate students.

3. **Grades required**.

   The MSNT will follow Academic Eligibility Standards established by the ECU Graduate School. Students are required to have a cumulative GPA of 3.0 (B average) in graduate degree or certificate programs, and to maintain such GPA after the first 9 attempted hours of coursework in order to remain in good standing.

4. **Amount of transfer credit accepted**.

   Per the ECU Graduate School policies, up to 20 percent of the program may be completed using transfer credits. These credits will be matched to the MSNT program requirements before they will be accepted.

5. **Other requirements** (e.g. residence, comprehensive exams, thesis, dissertation, clinical or field experience, second major, etc.).

   To demonstrate achievement of program goals, non-thesis track students will be required to take a comprehensive exam prior to graduation. Thesis-track students will create theses and present them to the thesis committees. Practicum track students will develop a comprehensive practicum report and present it to their practicum committees.

6. **Language and/or research requirements**.

   The program has no foreign language requirements. The diversity of technical topics in professional graduate programs requires research that is integrated into individual courses. As a result, research requirements are integrated into the subject matter in each of the graduate courses.

7. **Any time limits for completion**.

   Per ECU Graduate School policy, course credits for completion of a master's degree cannot be older than six years.

D. List existing courses by prefix, number, and title (include s.h.) and indicate (*) those that are required. Include an explanation of numbering system. List (under a heading marked "new") and describe new courses proposed.

Attachment A contains a complete summary of the proposed graduate catalog page related to the new MS in network technology.

IV. FACULTY

A. List the names of persons now on the faculty who will be directly involved in the proposed program. Provide complete information on each faculty member's education, teaching experience, research experience, publications, and experience in directing student research, including the number of thesis and dissertations directed for graduate programs. The official roster forms approved by SACS can be submitted rather than actual faculty vita.

The following faculty will be involved in the initial introduction of the MSNT. Complete faculty vita are included in Attachment B.

- Phil Lunsford, PhD, Associate Professor, Department of Technology Systems, 252-328-9670, lunsfordp@ecu.edu
- Tijjani Mohammed, PhD Associate Professor, Department of Technology Systems, 252-328-9668, mohammedt@ecu.edu
- Erol Ozan, PhD, Associate Professor, Department of Technology Systems, 252-328-9667, ozang@ecu.edu
- ChengCheng Li, PhD, Assistant Professor, Department of Technology Systems, 252-328-9671, liche@ecu.edu
- Peng Li, PhD, Assistant Professor, Department of Technology Systems, 252-328-9669, lipeng@ecu.edu
- Charles Lesko, PhD, Assistant Professor, Department of Technology Systems, 252-737-1907, leskoc@ecu.edu
- Te-Shun Chou, PhD, Assistant Professor, Department of Technology Systems, 252-737-1037, chout@ecu.edu
- Christine Russell, JD and ABD, Visiting Assistant Professor, Department of Technology Systems, 252-737-1470, russellc@ecu.edu

B. Estimate the need for new faculty for the proposed program for the first four years. If the teaching responsibilities for the proposed program will be absorbed in part or in whole by the present faculty, explain how this will be done without weakening existing programs.

The financial plan for this degree stipulates ongoing support per current operations and state funding. A primary goal of the curricular modifications to the current curriculum was to minimize the need for any additional resources over current operations. The faculty members who developed the curricular changes for the MSNT have accomplished this. Any additional faculty will be based on program growth and related funding model support which may occur after the third year of implementation. It is important to note that the great majority of students in the MSNT are working professionals who pay for their tuition and do not require assistantships or tuition remissions.

C. If the employment of new faculty requires additional funds, please explain the source of funding.

Hiring of new faculty will only occur if the program grows. Expenses will be covered based on the UNC system funding model and SCH growth. These in turn will be allocated to the college and

program through ECU budgeting processes. The students in the proposed MSNT will generally be employed while pursuing the degree and will pay the costs of their education.

D. Explain how the program will affect faculty activity, including course load, public service activity, and scholarly research.

The new degree will have no detrimental effects on course loads or public service activity. In scholarly research, the new MSNT will have a very positive effect based on growth of graduate student research via theses and industry based projects which are both included as options in the MSNT. Since the program is currently in existence under the MSTS, no issues are anticipated related to faculty course loads, service, and research. In fact, it is estimated that MSNT will stimulate additional research and publications for faculty and the graduate students.

V. LIBRARY

A. Provide a statement as to the adequacy of present library holdings for the proposed program.

Joyner Library, one of North Carolina's comprehensive information resources, is the largest library on the ECU campus. It serves all the schools and colleges within the Division of Academic Affairs. Joyner Library currently holds more than 1,051,000 volumes and 6,000 serial titles, and provides access to hundreds of electronic resources covering many disciplines, including information and computer technology.

The library's online catalog is available via terminals in the library, or remotely from the library web page: http://www.lib.ecu.edu. A listing of the extensive (and growing) array of electronic resources may also be found by visiting the Joyner Library web site.

For the MSNT program, the related databases include but are not limited to:

- **ACM Digital Library:** The ACM Digital Library contains a wealth of resources in Network Technology. This extensive resource covers a wide variety of journals, transactions, conference proceedings, news letter articles, etc. It also contains a vast collection of bibliographic citations and abstracts related to the field.
- **IEEE Explore**: Full-text access to IEEE and IEE publications since 1988, plus select content back to 1950. This resource is one of the largest sources of information in Network Technology and covers a wide variety of standards, journals, transactions, conference proceedings, newsletter articles, etc. It also contains a vast collection of bibliographic citations and abstracts related to the field.
- **Applied Science and Technology Abstracts**: Indexes and abstracts articles of at least one column in length in more than 410 periodicals. English-language periodicals published in the United States and elsewhere are covered; non-English language articles are included if English abstracts are provided. Periodical coverage includes trade and industrial publications, journals issued by professional and technical societies, and specialized subject periodicals such as conference proceedings.
- **Emerald**: This database contains the full text of over 130 full text journals published by MCB University Press. All of the database content can be searched at one time, or journals can be searched by title. Emerald's coverage is particularly strong in the following areas: engineering; general management; human resources; information management; library and information services; marketing; operations and production management; public sector management; quality management; and training and education.
- **Academic Search Elite**: Provides information on a wide range of academic areas, including business, social sciences, humanities, general academic, general science, education, and multi-cultural topics. It features full text for over 1,200 journals with many dating back to 1990,

abstracts and indexing for over 3,000 scholarly journals. It also includes coverage of over 1,700 peer-reviewed journals.

- **ABI/INFORM Complete**: Provides in-depth coverage of business and management publications through ABI/Inform Global and ABI/Inform Archive; local and regional business coverage through ABI/Inform Dateline, and trade journals through ABI/Inform Trade & Industry. Covers business conditions, trends, corporate strategies and tactics, management techniques, competitive and product information, and a wide variety of other topics. Subject coverage includes accounting, economics, information science, telecommunications, etc.
- **InfoTrac Expanded Academic ASAP:** Contains articles from more than 1,500 full-text scholarly, trade and general interest publications, plus indexing and abstracts from an additional 1,200+ titles. Includes core titles in every major academic concentration; area- and issue-specific journals; academic journals with application in the professions; and publications with national news coverage and commentary. More than 1,400 of the journals are refereed; twenty years of back file coverage are included.

B. State how the library will be improved to meet new program requirements for the next five years. The explanation should discuss the needs for books, periodicals, reference material, primary source material, etc. What additional library support must be added to areas supporting the proposed program?

Since the proposed program is already operating, the support structure for library resources is already in place. Additionally, Joyner Library is committed to continued support of the proposed MSNT program under consideration. The library recognizes that appropriate resources must be available for the students in the program as well as for the research needs of the faculty instructing them.

Provision for Distance Learning: The library has in place policies and procedures for distance learning to ensure that library materials not available electronically are available to students working remotely. See the web page for distance students: http://media.lib.ecu.edu/DE/DE_Home.html.

Books:
The Joyner Library catalog lists several thousand volumes in the general Library of Congress Classifications areas related to ICT including information technology, computer networks, engineering technology, engineering generally, etc. In order to strengthen the printed collection, Joyner Library will continue to adjust its book approval plan profile to include all appropriate titles in the MSNT related areas. This adjustment will ensure a healthy flow of recently-published texts and reference materials at the graduate level.

Journals:
The library subscribes to several electronic journal packages that will effectively support the proposed MSNT program, including:

- *The ACM (Association for Computing Machinery) Digital Library Core* package consists of subscriptions to all ACM journals, magazines, and conference proceedings, both in print and online, including an online archive from 1985 to the present.
- *The Society of Industrial and Applied Mathematics (SIAM)* package provides online access to the full text of eleven journals from the Society of Industrial and Applied Mathematics from 1997 to the present.
- *IEEE Explore* provides full-text electronic access to IEEE (Institute of Electrical and Electronics Engineers) and IEE (Institution of Electrical Engineers) transactions, journals, magazines, and conference proceedings published since 1988, plus selected content back to 1950, and all current IEEE Standards.

- *Science Direct* provides desktop access to the full text of more than 800 journals published or distributed by Elsevier Science, including a strong representation of titles in IT, engineering and computer science.
- *SpringerLink* provides us with electronic access to journals published by Springer-Verlag, a major publisher of scientific and technical literature internationally.

Index Services:
In addition to the full-text packages described above, the library subscribes to several indexing services of considerable value to MSNT students:

- Applied Science and Technology Abstracts provides web-accessible coverage of trade and industrial publications, journals issued by professional and technical societies, as well as special issues such as buyers' guides, directories, and conference proceedings.
- The Web of Science provides web access to the *Science Citation Index*, produced by the Institute of Scientific Information (ISI), with strong coverage in IT, computing, and related areas.
- ABI-Inform draws upon the business, science, and technical literature to provide coverage of the IT industry.

Joyner Library is actively considering a future consortia subscription to **Ei Compendex®**, produced by Engineering Information, Inc. *Compendex* is a comprehensive interdisciplinary engineering information database, including IT, with several million summaries of journal articles and conference proceedings, and 220,000 new additions every year. A complete listing of the library's electronic databases, e-journal portals, digital collections, citation linker, and the virtual reference desk may be found at: http://www.ecu.edu/lib/.

The following items are included since they also positively impact the MSNT:

- **Government Documents:** Joyner Library is a depository for U.S. Government Documents. This includes publications from relevant agencies such as the Department of Defense, Department of Energy, Department of Transportation, and NASA.
- **Institutional Membership:** In spring 2005, Joyner Library became an institutional member of the *American Society for Engineering Education*.
- **Human Resources:** Joyner Library has assigned a permanent reference librarian to oversee the collection development and bibliographic instruction needs of the faculty and students in the programs within the College of Technology and Computer Science. This will ensure that appropriate materials are purchased over time, and that the students and faculty in the program are aware of the relevant resources available to them.

C. Discuss any contemplated use of other institutional libraries.

The Joyner Library provides the following participation in access to other institutional libraries:

- **Interlibrary Loan Services:** When the ECU libraries don't have required materials, ILS permits access to copies of journal articles and books from other libraries. Interlibrary Services are available to all faculty, staff, and students.
- **WorldCat:** WorldCat provides catalog records for millions of books, dissertations, journals, manuscripts, maps, sound recordings, musical scores, films, archives, and computer files. It lists the academic, public, special, and national libraries that have a copy of the item. WorldCat locates materials outside of ECU, in almost any area of study, or locates items in specific libraries and research collections.
- **Access to other University of North Carolina system libraries:** These are available to the ECU community on the web.
  Appalachian State University
  East Carolina University

Elizabeth City State University
Fayetteville State University
NC Agricultural and Technical University
NC Central University
NC School of the Arts
NC State University
UNC Asheville
UNC Chapel Hill
UNC Charlotte
UNC Greensboro
UNC Pembroke
UNC Wilmington
Western Carolina University
Winston-Salem State University

- **Center for Research Libraries:** The Center for Research Libraries (CRL) is a consortium of North American universities, colleges, and independent research libraries. The consortium acquires and preserves newspapers, journals, documents, archives, and other traditional and digital resources for research and teaching and makes them available to member institutions through interlibrary loan and electronic delivery. ECU is an associate member of CRL and member libraries have free and unlimited use of the CRL collections through their libraries' interlibrary loan services departments.
- **Kudzu:** Kudzu is a system of linked online catalogs at sixteen research libraries, including ECU, across the Southeast. The system allows users to browse the participating catalogs using a single search interface and to submit interlibrary loan requests directly to the source library. Most documents can be delivered to the user within two days.

VI. FACILITIES AND EQUIPMENT

A. Describe the facilities available for the proposed program.

Similar to the current MSTS degree program, the proposed MSNT will utilize and benefit from the college's distance education and computer/network laboratories. From a distance education perspective, the advanced global classroom supports real time audio and video communication with students over the world for online education. In addition, the faculty members in the information and computer technology program are leaders in the state in distance education using networked laboratories. For example, rooms 140 and 142 in the Science and Technology Building are remote-access teaching labs dedicated to distance education in networking and computer systems. Additionally, Room 140 doubles as an Information Assurance Research Laboratory that is supported in part by the Department of Defense under ECU's designation as a national Center for Academic Excellence in Information Assurance Education (CAEIAE). These labs are well equipped with advanced internetworking infrastructure, high performance computing equipment, server farms, and network security appliances. This facility offers on/off campus students lab exercises over the Internet for information and computer technology related courses, including network environment, network security, web services management, and intrusion detection systems.

Recently, ECU joined other UNC institutions to take full advantage of the Virtual Computing Laboratory (VCL) that is located at North Carolina State University in Raleigh. ICT faculty are among the first at ECU to take full advantage of these shared resources that allow students to gain valuable hands-on experiences using the high-end VCL facilities at NC State University. In addition to the support from NSA/DoD, our faculty have secured additional funding from the National Science Foundation (NSF), Hewlett-Packard (HP), and EMC^2 that boost our capabilities in VCL, virtualization, and collaboration capabilities with other institutions.

B. Describe the effect of this new program on existing facilities and indicate whether they will be adequate, both at the commencement of the program and during the next decade.

Since the current program operates with the existing facilities, it is anticipated that they will be adequate for the new program which is substantially identical in facility needs. During the next decade, the university will need to continue to support equipment updates as it does now with the current program. Additionally, continued use of shared resources around the state, like the VCL at NC State, as well as network of resources via projects funded by NSF, HP, and EMC^2 will minimize resource needs for all programs around the state.

C. Indicate any computer services needed and/or available

Standard university support services such as network access will be needed. This will also include our continued participation and use of the VCL as noted above. Other required support is noted in the budget and is based on current operations.

D. Indicate sources of financial support for any new facilities and equipment.

Since this program will continue to attract students to the UNC system and ECU, it is self-supporting based on incremental student credit hours and the funding model revenues it generates. Consequently, there will be no incremental support necessary to operate the program beyond funding model revenues.

The program faculty members will continue to pursue research grants and outside sources of revenue, such as industry consulting and delivery of professional development short courses through our Center for Innovation and Technology (CITE) to attract additional sources of revenue. As funded and active members of HP's Global Collaboratory Consortium, we expect to secure additional funds to increase our capacity for research and instruction to maintain ECU's leadership in network technology education.

VII. ADMINISTRATION

Describe how the proposed program will be administered, giving the responsibilities of each department, division, school, or college. Explain any inter-departmental or inter-unit administrative plans. Include an organizational chart showing the "location" of the proposed new program.

The MSNT will be administered by a graduate faculty member of the Department of Technology Systems under the direction of the department chair. The Graduate Director, along with individual program coordinators (for MS in technology systems, MS occupational safety, and MSNT) will provide needed support and oversight for the program. Other graduate program directors in the college are shown in the organization chart in Figure 1 below.

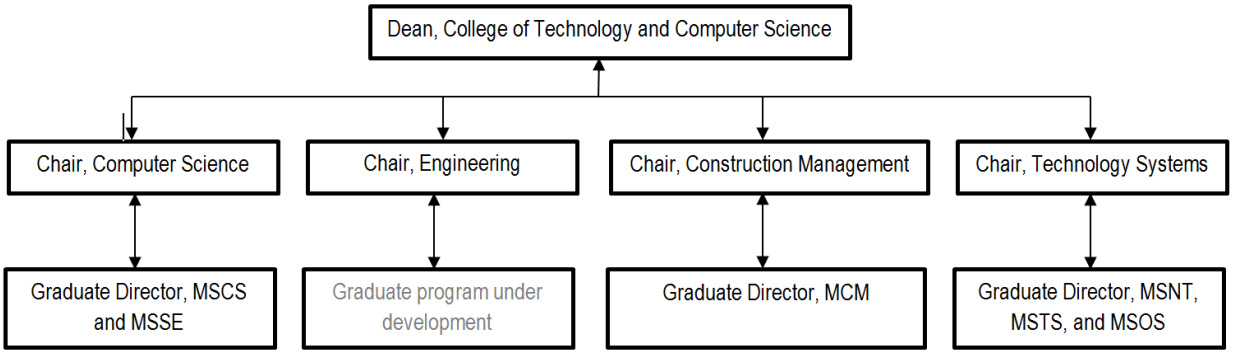

Figure 1: TECS Organizational Structure

The responsibilities of the MSNT program coordinator will include:

- Development and maintenance of short and long range plans for course offerings based on collaboration and coordination with the faculty and chair
- Coordination of faculty load planning with the chair
- Development and implementation of a marketing plan for the program
- Review applicants and make recommendations on acceptance and rejection of candidates to be reviewed by the program graduate committee
- Develop and implement a continuous improvement plan for degree assessment
- Hold periodic meetings to review program performance with the chair and graduate faculty.

VIII. ACCREDITATION

Indicate the names of all accrediting agencies normally concerned with programs similar to the one proposed. Describe plans to request professional accreditation. If the proposed new degree program is at a more advanced level than those previously authorized or if it is a new discipline division, was SACS notified of a potential "substantive change" during the planning process? If so, describe the response from SACS and the steps that have been taken to date with reference to the applicable procedure.

Our undergraduate programs are currently accredited by the Association of Technology, Management, and Applied Engineering (ATMAE), formerly known as National Association for Industrial Technology (NAIT). We are also exploring new graduate program accreditation standards that were recently developed by ATMAE. National accreditation standards and guidelines will be utilized in continuous improvement and assessment activities. As a result, these same models will be applied to assess and evaluate graduate programs including the MSNT.

IX. SUPPORTING FIELDS

Are there other subject matter fields at the proposing institution necessary or valuable in support of the proposed program? Is there needed improvement or expansion of these fields? To what extent will such improvement or expansion be necessary for the proposed program?

The Department of Technology Systems contains the current resources and subject matter expertise to offer the MSNT. As this program grows and new faculty members are hired, strategic addition of individuals with specific research and teaching expertise areas will be pursued.

In addition, the department will continue to explore avenues and collaborative opportunities that are inclusive of related fields such as computer science, management information systems, and engineering. As the diversity of faculty grows with the College of Technology and Computer Science,

it is anticipated that a number of areas and individuals will have experience and collaborative and research interests in information technology and network related areas.

X. ADDITIONAL INFORMATION

Include any additional information deemed pertinent to the review of this new program proposal.

XI. BUDGET

Provide estimates (using the attached form) of the additional costs required to implement the program and identify the proposed sources of the additional funds required. Use SCH projections (section II.C) to estimate new state appropriations through enrollment increase funds. Prepare a budget schedule for each of the first three years of the program, indicating the account number and name for all additional amounts required. Identify EPA and SPA positions immediately below the account listing. New SPA positions should be listed at the first step in the salary range using the SPA classification rates currently in effect. Identify any larger or specialized equipment and any unusual supplies requirements.

For the purposes of the second and third year estimates, project faculty and SPA position rates and fringe benefits rates at first-year levels. Include the continuation of previous year(s) costs in second and third-year estimates.

Additional state-appropriated funds for new programs may be limited. Except in exceptional circumstances, institutions should request such funds for no more than three years (e.g., for start-up equipment, new faculty positions, etc.), at which time enrollment increase funds should be adequate to support the new program. Therefore, it will be assumed that requests (in the "new Allocations" column of the following worksheet) are for one, two, or three years unless the institution indicates a continuing need and attaches a compelling justification. However, funds for new programs are more likely to be allocated for limited periods of time.

As indicated earlier, the proposed program already exists as concentrations within the Master of Science in Technology Systems. To that end, program needs will be met by current resources and MSTS faculty who are currently teaching the courses proposed in the MSNT. Nonetheless, a projected budget based purely on enrollment increase is appended to this document. Due to continued strong student interest in the current program, the revenues generated by the MSNT will continue to exceed the costs as it currently does now.

XII. EVALUATION PLANS

All new degree program proposals must include an evaluation plan which includes (a) the criteria to be used to evaluate the quality and effectiveness of the program, (b) measures to be used to evaluate the program, (c) expected levels of productivity of the proposed program for the first four years of the program (numbers of graduates), (d) the names, addresses, e-mail addresses, and telephone numbers of at least three persons (six reviewers are needed for graduate programs) qualified to review this proposal and to evaluate the program once operational, and (e) the plan and schedule to evaluate the proposed new degree program prior to the completion of its fifth year of operation once fully established.

A. Criteria to be used to evaluate the proposed program.

The success of the program will be evaluated using a combination of tools to assure a "triangulation" of results from several perspectives: current students, program graduates, industry advisory board, and employers.

- Student opinion of instruction surveys (SOIS) will be monitored every semester to assure student satisfaction.
- Review of content by degree advisory board to assure content is at the advanced level required.
- Alumni survey of program graduates.

B. Measures to be used to evaluate the program.

The following quantitative measures will be tracked to evaluate the success of the program:

- SOIS rating above university norms for graduate courses.
- SCH generation in excess of faculty load investment.
- Increase in the number of completed theses and practicums
- Increase in Graduate student publications and attendance of professional meetings
- Positive response by graduates on quality of program and impact of program on career.
- Number of papers (refereed journal and conference papers) published by faculty and students in the field of Information and Computer Technology.

- Success in comprehensive exams, which are administered by, and reviewed by a faculty committee. The results of these exams will be used not only to assess student performance, but to help improve the program.

C. Projected productivity level (number of graduates):

Table 8: MSNT Productivity Level

Level	Year 1 (2011-2012)		Year 2 (2012-2013)		Year 3 (2013-2014)		Year 4 (2014-2015)		Totals
B									
M	50		52		54		56		212
I/P									
D									

(Key: B-Bachelor's, M-Master's, I/P-Intermediate or Professional, D-Doctoral)

D. Recommended consultants/reviewers: Names, titles, addresses, e-mail addresses, and telephone numbers. May not be employees of The University of North Carolina.

External reviewers will be submitted separately to the Graduate School and the reviews will be included in Appendix C.

E. Plan for evaluation prior to the fifth operational year.

Our undergraduate programs are currently accredited by the Association of Technology, Management, and Applied Engineering (ATMAE), formerly known as National Association for Industrial Technology (NAIT). We are also at the early stages of a self-study that will be used to purse ATMAE accreditation for the MSTS. National accreditation standards and guidelines will be utilized in continuous improvement and assessment activities. As a result, these same models will be applied to assess and evaluate graduate programs including the MSNT. As noted above, this will include gathering data on enrollment, student credit hour generation, course learning objectives, student satisfaction, and graduate/alumni satisfaction. In addition, an industry advisory committee will be actively involved in the program.

XIII. REPORTING REQUIREMENTS

Institutions will be expected to report on program productivity after one year and three years of operation. This information will be solicited as a part of the biennial long-range planning revision.

Proposed date of initiation of proposed degree program:

Fall 2012

This proposal to establish a new degree program has been reviewed and approved by the appropriate campus committees and authorities.

Chancellor: _____

Date: _____

References

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15. ECU Mission Statement (2011). Available from World Wide Web: http://www.ecu.edu/cs-ecu/mission.cfm.

Attachment A

Proposed ECU Graduate Catalog Information for the MSNT

MS IN NETWORK TECHNOLOGY

MS in Network Technology

The master of science in network technology is designed to serve the needs of students who possess baccalaureate degrees in networking technology-oriented disciplines. Students take a common set of courses and select one of four concentrations: computer networking management, digital communications technology, information security, and web technologies. The program emphasizes advanced applications in computer networking such as network infrastructure management, networked systems design, network security, and technical problem solving in technology-driven organizations. A minimum of **30 s.h.** are required as follows:

1. Common core: ICTN 6823, 6878; ITEC 6000, 6060, 6200.....15 s. h.
2. Concentration area (Choose one).....12 s.h.
   Computer Networking Management: ICTN 6865, 6875, 6880, 6885
   Digital Communication Technology: ICTN 6810, 6820, 6830, 6840
   Information Security: ICTN 6865, 6870, 6873, 6883
   Web Technologies: ICTN 6815, 6825, 6835, 6845
3. Options (Choose one of the following.) - 3-6 s.h.

   Thesis option: ICTN 7000 Thesis – 3 s.h.

   The student writes a thesis and presents a seminar based on the thesis research. The thesis proposal and the subsequent thesis must be approved by the student's advisor and the committee composed of three technology systems faculty members.

   Practicum option: ICTN 6900 Practicum – 3 s.h.

   The student writes a practicum report and presents a seminar based on the report. The practicum project proposal and the subsequent report must be approved by the student's advisor and the committee composed of three technology systems faculty members.

   Non-thesis option: Additional electives – 6 s.h.

   The student's advisor, the graduate program director, and the chairperson must approve the electives and student's course of study.

Computer Networking Management

Courses in this concentration emphasize advanced technologies used in the design, implementation, administration, monitoring, optimization, and maintenance of data communication and computer networking systems in industry.

Digital Communications Technology

Courses in this concentration emphasize a broad understanding of communication theory and practice in the transmission of digital data, including signal generation, conditioning, transmission, error detection and correction, and the underlying technologies used to retrieve, process, store, and analyze data in organizations.

Information Security

Courses in this concentration prepare students to design, deploy, manage, and apply techniques of securing and protecting the integrity and availability of information systems and communication networks in governmental, private, and non-profit organizations.

Web Technologies

Courses in this concentration prepare students to design, analyze, configure, implement, and operate web services, computer networks, multimedia objects, data storage systems, and interactive web components for governmental, private, and non-profit organizations.

Attachment B

Faculty CVs for the MSNT

Attachment C

External Reviews for the MSNT

Attachment D

Budget (Based on Enrollment Increase)

SUMMARY OF ESTIMATED CONTINUING COSTS FOR PROPOSED PROGRAM BASED ON ENROLLMENT INCREASES

INSTITUTION: East Carolina University *DATE:* September 23, 2011

Program (CIP#, Name, Level): 11.1099, Computer Information Technology Services Administration and Management, MS

Degree(s) to be Granted: Master of Science in Network Technology *Program Year:* Year 3

FY 2015/16	Reallocation of Present Institutional Resources	Enrollment Increase Funds	Federal or Other (Identify)	New Allocations	Total
101 Regular Term Instruction					
1210 SPA Regular Salaries					
Administrative support					
1310 EPA Academic Salaries					
Graduate faculty		$75,000			$75,000
Graduate stipend		$15,000			$15,000
1810 Social Security		$6,885			$6,885
1820 State Retirement		$9,090			$9,090
1830 Medical Insurance		$4,157			$4,157
2000 Supplies and Materials					
Copying, office supplies, printers, etc.		$1,000			$1,000
Laboratories supplies		$2,000			$2,000
Literature and materials		$1,500			$1,500
3000 Current Services					
Travel, phones, etc.		$2,500			$2,500
4000 Fixed Charges					
Professional obligations		$1,000			$1,000
5000 Capital Outlay (Equipment)					
TOTAL Reg. Term Instruction		$118,132			$118,132
151 Libraries		$12,480			$12,480
(Identify Accounts)					
TOTAL Libraries		$12,480			$12,480
TOTAL OPERATIONAL COSTS		$130,612			$130,612

FY 2016/17	Reallocation of Present Institutional Resources	Enrollment Increase Funds	Federal or Other (Identify)	New Allocations	Total
101 Regular Term Instruction					
1210 SPA Regular Salaries					
Administrative support					
1310 EPA Academic Salaries					
Graduate faculty		$77,000			$77,000
Graduate stipend		$15,000			$15,000
1810 Social Security		$7,038			$7,038
1820 State Retirement		$9,292			$9,292
1830 Medical Insurance		$4,157			$4,157
2000 Supplies and Materials					
Copying, office supplies, printers, etc.		$1,000			$1,000
Laboratories supplies		$2,000			$2,000
Literature and materials		$1,500			$1,500
3000 Current Services					
Travel, phones, etc.		$2,500			$2,500
4000 Fixed Charges					
Professional obligations		$1,000			$1,000
5000 Capital Outlay (Equipment)					
TOTAL Reg. Term Instruction		$120,487			$120,487
151 Libraries		$12,813			$12,813
(Identify Accounts)					
TOTAL Libraries		$12,813			$12,813
TOTAL OPERATIONAL COSTS		$133,300			$133,300

FY 20117/18	Reallocation of Present Institutional Resources	Enrollment Increase Funds	Federal or Other (Identify)	New Allocations	Total
101 Regular Term Instruction					
1210 SPA Regular Salaries					
Administrative support					
1310 EPA Academic Salaries					
Graduate faculty		$79,000			$79,000
Graduate stipend		$15,000			$15,000
1810 Social Security		$7,191			$7,191
					$0
1820 State Retirement		$9,494			$9,494
1830 Medical Insurance		$4,157			$4,157
2000 Supplies and Materials					
Copying, office supplies, printers, etc.		$1,000			$1,000
Laboratories supplies		$2,000			$2,000
Literature and materials		$1,500			$1,500
3000 Current Services					
Travel, phones, etc.		$2,500			$2,500
4000 Fixed Charges					
Professional obligations		$1,000			$1,000
5000 Capital Outlay (Equipment)					
TOTAL Reg. Term Instruction		$122,482			$122,482
151 Libraries		$13,146			$13,146
(Identify Accounts)					
TOTAL Libraries		$13,146			$13,146
TOTAL OPERATIONAL COSTS		$135,988			$135,988