



# **MS** Computer Science

**Norfolk State University  
Department of Computer Science**

**Graduate Program  
Student Handbook**

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Graduate Program Director: Thorna Humphries  
Graduate Program Administrative Assistant: Linda Winkfield

Approved by Computer Science Graduate Program Committee  
January 24, 2018

## **Graduate Program Mission:**

The Computer Science graduate program provides a quality computer science graduate education to students, especially those from the underrepresented sector of the population, by strengthening analytic skills, offering valuable research experiences, and promoting professional development in computer science.

## **Graduate Program Objective**

A graduate of the Computer Science graduate program will be employed in a computer science or related position and / or enrolled in a doctoral program in a computing-related field.

## **Graduate Program Learning Outcomes**

Students graduating from the Master of Science in Computer Science program will be able to demonstrate:

1. Proficiency in applying computing fundamentals in several application areas.
2. Mastery of a significant body of advanced topics in computing, computational science, communication networks, or information assurance.
3. The ability to conduct independent research and understand the body of literature in one or more advanced topics.

## **The Graduate Program**

The Graduate Program Committee consists of the members of the faculty in the Computer Science Department designated to advise graduate students and teach graduate courses.

The Committee is responsible for

- admitting new graduate students,
- awarding and renewing assistantship awards,
- scheduling classes in conjunction with the Undergraduate Program Director,
- approving thesis and project proposals,
- maintaining and enforcing the standards of disciplinary conduct,
- overseeing the graduate students' academic performance/progress
- evaluating the graduate assistants' work performance
- conducting graduation audits and approvals,
- maintaining standards and procedures.

## Honor Code and Standards of Conduct

All graduate students are expected to agree to and practice the ACM Code of Ethics and Professional Conduct, located at URL: <https://www.acm.org/about-acm/acm-code-of-ethics-and-professional-conduct>, and the University's and Department's standards of conduct.

### Plagiarism

All written work, whether in preliminary or final form, submitted by a student in the course of study toward the Masters Degree in Computer Science is assumed to be the student's own work. Anything copied or paraphrased from another author or source must be appropriately identified, acknowledged, and attributed. The use of the exact language of another without identification as a direct quotation by quotation marks or otherwise is plagiarism even though the source is cited in the student's work. Violation of the rules stated in this paragraph may be subject to disciplinary action.<sup>1</sup> If plagiarism occurs in thesis or project drafts, proposals, or final documents, the student will receive an "F" grade for the course and be terminated from the program.

## Admissions

Please visit (<https://nsu.elluciancrmrecruit.com/Admissions/Pages/welcome.aspx>) to submit an online application.

Official transcripts must be mailed to the following address:

*The Graduate School  
700 Park Avenue, Norfolk VA 23504  
Telephone: (757) 823-8015; Fax: (757) 823-2849*

The Office will review your file and forward information to the Computer Science Graduate Program. The Graduate Admissions Committee makes the final selection for admission and assistantship and fellowship awards.

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<sup>1</sup> Derived from **Boston University School of Law Disciplinary Regulations Regarding Plagiarism**

## Admission Standards

*Academic Preparation:* Undergraduate degree from a regionally accredited 4-year college or university. Generally, the overall major GPA should be at least 3.0.

*English Proficiency:* The TOEFL will be waived if a student has completed at least one year of full-time study at a college or university in an English speaking country. The TOEFL score should total to at least an 80.

*GRE:* GRE scores are required of all applications for assistantships and fellowships. GRE scores should be sent to the Graduate School. Generally, the minimum GRE score required is 530 (155) on Verbal and 700 (155) on Quantitative. The Graduate Admissions Committee may waive GRE requirements if an applicant majored in computer science or computer engineering and has a GPA of 3.2 or higher in computer courses.

## Core Courses and Curriculum Requirements

### The Core Curriculum

All students must take the following four courses except for a waiver (see below):

**CSC 530 Data Communications**  
**CSC 564 Operating Systems**  
**CSC 625 Analysis of Algorithms**  
**CSC 668 Advanced Computer Architecture**

### Waiver

If a student has already taken one of the above courses at the undergraduate level and earned a B+ or above, he or she may ask the Graduate Program Director for a **waiver** of that core course requirement. Credit will not be awarded for any course waived. The student will be required to take the requisite number of credits for the degree.

### Limit on 500-Level Courses

A maximum of **five** 500-level courses will be credited for the MS degree in computer science including the two core courses. Note that students in catalog years before 2010 have a restriction of **three** 500-level courses.

### **Limit on Transfer Credits**

A maximum of *six credits* may be transferred into the graduate program from another accredited institution if they have not been previously applied to a degree at another institution. Those grades must be B or above. The courses must be comparable to those offered in the Computer Science MS Program. The credits must be earned within five years prior to registration.

### **Minimum Passing Grade**

The minimum passing grade for all courses applied to MS in Computer Science is "B." A grade of "B-" or lower is a failure.

### **Academic Probation**

Any student failing to maintain a 3.0 cumulative average (GPA) will be on academic probation for one semester. If the student's cumulative average does not return to 3.0 or above at the end of the probation semester, the student will be required to leave the program.

## **Graduation Options**

There are two options for completing the MS in Computer Science:

- 1) ***The Thesis Option***: twenty-four credits of course work plus six credits of thesis work.
- 2) ***The Project Option***: thirty credits of course work plus three credits of project.

**The Master's Thesis** will be an expository writing giving evidence of the student's ability to understand and present a solution to one or more problems in computer science. Every thesis must include the following:

- a background and rationale of the research; the problem statement;
- a complete, contemporary review of the state of the problem;
- a systematic analysis of the problem,
- an evaluation of new solutions or attempts at solutions,
- a conclusion,
- and a complete bibliography and set of references.

The Thesis I course should be taken in the second semester before expected graduation.

The student must identify a Thesis Director who has agreed to oversee his/her research *before* starting the Thesis I course. The student should choose a director based on the faculty member's availability to take thesis students and his/her research interests.

During the progress of the Thesis I course, the director and candidate will form a thesis committee comprised of the thesis director and two graduate faculty members, one normally chosen by the director and one by the candidate. In some circumstances, one of the members of the team may be outside the list of computer science graduate faculty members. This should be approved by the Graduate Program Committee. The thesis director may be a member of the graduate faculty of another graduate program. In this case the Graduate Program Committee must approve and appoint one of its own to chair the candidate's Thesis Committee.

Before the end of the Thesis I course, the candidate must have a thesis proposal approved by his or her Thesis Committee. Otherwise, the candidate cannot register for the Thesis II course. Any exception must be approved by the Graduate Program Committee.

At the end of the thesis process the candidate must present the candidate must present his thesis (results of the thesis work) in a public colloquium followed by a private defense of the thesis with the Thesis Committee.

The candidate is also required to produce three bound copies of the thesis for the University use: the original for the department, one for the Graduate Studies office, and one for the Library Archives.

**The Master's Project** will be expository writing giving a complete state-of-the-art status of a computer science problem including a thorough annotated understanding of the literature addressing the problem. Although the objectives of a project are similar to a thesis, it will be the intent of the project to replicate known solutions, understand and propose additional possible solutions, and to demonstrate these solutions in some form. It is expected that the student will demonstrate good computer science research methodology and with projects involving the building of software products, the student will practice good software engineering methodologies. The Masters Project course should be taken the second semester before expected graduation.

The student must identify a project director who has agreed to advise him/her on the project and a project reviewer before enrolling in the Masters Project course. Both must be members of the Graduate Faculty. The project director and project reviewer will jointly approve the project topic and review the progress of the student.

After the student completes the project research and the final report, the project director and project reviewer must jointly approve the research results and final report. The project student must present his or her work in a public colloquium.

Other Thesis and Project Requirements are included later in this document.

## **Program Emphases**

### **Information Assurance:**

- CSC 535 Computer Security I
- CSC 555 Management of Information Security
- CSC 635 Computer Security II
- CSC 650 Cryptography
- CSC 745 Network Defense
- CSC 760 Secure Software Development
- CSC 765 Advanced Topics in Information Assurance

### **Communications Networks:**

- CSC 530 Data Communications (Core-Required)
- CSC 630 Computer Networks
- CSC 720 Wireless Sensor Networks
- CSC 730 Advanced Topics in Networking
- CSC 781 Advanced Graduate Computer Topics II – Wireless Data Networking

### **Computational Science:**

- CSC 611 Computational Science I
- CSC 612 Computational Science II
- CSC 660 Parallel Computing
- CSC 678 Scientific Visualization

## **Courses and Their Descriptions**

**(Each course is 3 credit hours except as noted)**

### **CSC 521 Database Principles and Design**

An introductory course emphasizing the basic concepts and principles of database systems. Topics include relational, hierarchical, and network approaches to data organization.

### **CSC-526 Structured Programming, 3 credit hours (Does not count towards MS.CSC degree credits)**

This is a one semester course that extensively covers programming concepts and techniques at an accelerated pace. Students learn how to develop, test, and debug programs on both Unix and Microsoft platforms. Topics covered include control structures, files, arrays, strings, classes and data abstractions, pointers, virtual functions, object-oriented concepts, linked lists, stacks, and queues.

### **CSC 530 Data Communications**

Focuses on the basic principles of computer communication as well as hardware and software designs. Topics include transmission media, data encoding, transmission techniques, protocols, switching networks, broadcast networks, and local area networks.

### **CSC 535 Computer Security I**

Security for computer systems. Includes an introduction to Information Assurance concepts in addition to logging, encryption and decryption, effects on operating systems and machine architecture, countermeasures, risk analysis, security administration, legality and ethics, and computer forensics.

### **CSC 555 Management of Information Security**

Prerequisite: CSC 535 Computer Security I

This course is designed for Security System Administrators and Managers who are responsible for the design, planning and management of security installations in Business and Government Institutions. Topics include Management of Information Security, security planning, security protection (technical and procedural), best practices, risk management, Operations Security, legal issues and certification and accreditation. The course assumes some familiarity with various topics taught in an Introduction o Information Assurance course.

### **CSC 564 Operating Systems**

Topics include the history and evolution of operating systems, the concepts behind and structure of various operating systems, process scheduling, interprocess communication, input and output, multiprogramming, memory management, and file systems. Concepts of distributed operating systems are also introduced.



**CSC 566 Advanced Computer Topics I**

Advanced computer topics not generally covered in the curriculum. Designed as a computer science elective -- not as a replacement for any specific required course.

**CSC 567 Advanced Computer Topics II**

Advanced computer topics not generally covered in the curriculum. Designed as a computer science elective -- not as a replacement for any specific required course.

**CSC 570 Artificial Intelligence**

In depth study of concepts and problem solving techniques of artificial intelligence. Topics include knowledge representation, functional and logic programming, machine learning, natural language understanding, computer vision, robotics, and societal impact.

**CSC 576 Advanced Computer Topics III**

Advanced computer topics not generally covered in the curriculum. Designed as a computer science elective -- not as a replacement for any specific required course.

**CSC 577 Advanced Computer Topics IV**

Advanced computer topics not generally covered in the curriculum. Designed as a computer science elective -- not as a replacement for any specific required course.

**CSC 580 Computer Graphics**

Designed to focus on interactive computer graphics hardware and software: display devices, 2D and 3D geometric transformations, raster algorithms, representation of curves and surfaces, hidden line removal and surfaces, shading algorithms, and color graphics.

**CSC 593 System Programming**

Fundamentals of system and network programming methodology, techniques, system calls and library calls.

**CSC 596 Compiler Construction**

An introduction to the fundamentals of compiler construction and language translation. Topics include lexical analysis, specifications of syntax, algorithms for syntactic analysis, code generation, and optimization techniques.

**CSC 611 Computational Science I**

Computational Science is an emerging field of study focusing on collaborative research conversing a wide variety of science disciplines. This is a one-semester course to provide students with an overview of applications of computational skills to solve scientific research problems. The computational skills in review include: Programming Languages, Algorithms, Database Implementation, Internet technologies, data visualization, statistics, Modeling and Simulation, and Operations Research.

**CSC 612 Computational Science II**

Computational Science is a rapidly emerging field to foster collaborative research by teams of mathematicians, computer scientists, and scientists, to cover a wide variety of science disciplines. This is a one-semester course to provide students with an overview of applications of computational skills to solve scientific research problems. The computational skills in review include: programming languages, algorithms, database implementation, Internet technologies, data visualization, statistics, modeling and simulation, and operations research.

**CSC 625 Analysis of Algorithms**

Design and analysis of algorithms. Topics include Turing machines, NP-Complete theory, best, average, and worst case analysis; divide-and-conquer, greedy method, dynamic programming, graph traversal, backtracking, and branch-and bound techniques, sorting, searching, graph algorithms, and optimization.

**CSC 630 Communications Networks**

A one-semester, advanced graduate-level course focusing on the concept of internetworking in general and the TCP/IP Internet technology in particular. The course reviews both the architecture of network interconnections and the principles underlying protocols that make interconnected networks function as a single, unified communication system. It also covers how an Internet communication system can be used for distributed computation and communication

**CSC 635 Computer Security II**

Intrusion Detection Systems, Malicious software (viruses, worms, and other rogue programs), Advanced risk analysis methodologies, International standards and computer security models (Bell and LaPadula, Biba, Clark and Wilson), Network and Distributed Security, Database Security.

**CSC 650 Cryptography**

Study of historical and modern cryptographic techniques and algorithms. Topics include symmetric and asymmetric key cryptography, one-way functions, secure hash functions, digital signatures, key exchange, authentication, key management, PKI, DES, AES (Rijndael), current topics.

**CSC 660 Parallel Computing**

Study of high performance computing techniques. Includes the study of parallel computer architecture, memory, and I/O. Also, parallel computer algorithms to include shared and distributed memory, parallel computation models, graph algorithms, numerical algorithms, divide-and-conquer.

**CSC 668 Advanced Computer Architecture**

Principles and advanced topics of the instruction set architecture for uni-processors, embedded system processors, and multi-processors.

**CSC 678 Scientific Visualization**

Fundamental concepts of the algorithms and design principles underlying modern 3D computer graphics, data and scientific visualization.

**CSC 691 Graduate Independent Study I**

Supervised independent project designed to give computer science graduate students the opportunity to explore a single topic in a one-on-one learning relationship with a faculty member.

**CSC 701 Continuing Registration, Varying Credit Hours (Does not count towards MS.CSC degree credits)**

A course with varying credit hours that allows students to maintain continuous registration status.

**CSC 702 Practicum, One Credit Hour (Does not count towards MS.CSC degree credits)**

A one credit-hour course that allows students to apply their skills in a work setting. The credit earned through this course will not be counted towards MS.CSC degree credit. A student can take this course, and repeat it for up to three times, when he/she is away from campus on outside employment for internship or practical training in a related technical field. This is a Pass/Fail course.

**CSC 720 Wireless Sensor Networks**

An advanced, graduate-level course focusing on study of wireless sensor networks from communications, security, and computing platform viewpoints. Wireless sensor networks are a sensing, computing and communication infrastructure enabling the monitoring and manipulating of the environment.

**CSC 730 Advanced Topics in Networking**

This course includes the major fields in optical networks, dynamic spectrum access in wireless networks, cognitive radio networks, network coding, and other newly emerged networking technologies. For optical networks, the topics include WDM network elements, routing and wavelength assignment algorithms, blocking probability analysis, virtual/physical topology design, survivability, and IP over WDM. For dynamic spectrum access or cognitive radio networks, the topics include enabling technologies for cognitive radio, channel assignment/selection, routing, security, and spectrum management. This course will also cover network coding and other new ideas.

**CSC 745 Network Defense**

Prerequisite: CSC 530 Data Communications

This course focuses on network defense and countermeasures. It is designed to provide students a solid foundation in advanced network security. The course covers both the conceptual and practical aspects of network security. It first reviews the threats to network security, and defense-in-depth strategy and technologies. The course then explores in depth the three key network defense technologies: firewalls, intrusion detection and prevention systems, and virtual private network. An emphasis on labs and projects will provide students hands-on learning experiences in using popular open-source and industry-standard tools and solutions to design and implement a wide spectrum of security measures to protect the networks and communications, and to detect, respond to, and recover from intrusion and attacks.

**CSC 750 Evolutionary Computing**

The fundamentals of applying biological evolutionary characteristics to optimization of very complex problems.

**CSC 760 Secure Software Development**

Secure computing APIs, Java security, sandboxing, vulnerability assessment and code analysis techniques, secure middleware.

**CSC 765 Advanced Topics in Information Assurance**

Survey of current topics in Information Assurance

**CSC 781 Advanced Graduate Computer Topics I**

Advanced computer topics not generally covered in the graduate 600/700 level curriculum. Designed as a computer science graduate elective -- not as a replacement for any core course.

**CSC 782 Advanced Graduate Computer Topics II**

Advanced computer topics not generally covered in the graduate 600/700 level curriculum. Designed as a computer science graduate elective -- not as a replacement for any core course.

**CSC 791 Graduate Independent Study II**

Supervised independent project designed to give computer science graduate students the opportunity to explore a single topic in a one-on-one learning relationship with a faculty member.

**CSC 795 Master's Project**

Guided master's degree project under the supervision of the course instructor; requires extensive expository and other tasks and a formal 45 minute public presentation of the project's work. Projects must be approved by the Computer Science Graduate Committee.

**CSC 798 Master's Thesis I**

First semester of the Master's Thesis sequence. Under the supervision of the thesis director, students prepare a thesis proposal and work toward the goal of completing all background material needed for their research. Minimally, a satisfactory thesis draft will be used to satisfy completion of the course. The Graduate Committee must approve the thesis topic.

**CSC 799 Master's Thesis II**

The culmination of the two semester master's thesis sequence. Students must complete the thesis and defend it to a committee.

## Assistantships and Other Awards

There are different types of assistantship awards from many sources: department personnel budget, special grants, and research grants and contracts.

**A Graduate Assistantship Award is a contract** between the student and the Computer Science Graduate Program. Some awards may be for an academic year (8/16 through 5/15) with an expected workload of 20 hours per week on average. Some may be for a calendar year with work expected to continue throughout the summer during which the expected workload is 40 hours a week on average. If the student receives a calendar year award and does not wish to work in the summer, the graduate student should inform the Graduate Program Director by April 15.

The Department assigns students to specific assistantship duties based on the current needs of the Department, the experiences and talents of the student, and the requests of the faculty.

A Graduate Assistant must maintain full-time status and a GPA of at least 3.0.

A Graduate Assistant generally receives a full tuition award and a stipend of \$6,500 for an academic semester. If summer work is expected, the same stipend amount, \$6,500, applies for the summer semester as well.

The graduate program will not make tuition awards for more than 30 credits for a thesis student and 33 for a project student. The department will not provide awards for retaking failed courses or taking courses that would substitute for a failed course. Any exception must be approved by the Graduate Program Committee.

The graduate program will not make awards beyond expected time for graduation except in circumstances that benefit the University. Generally, this means that awards are limited to four academic semesters plus possibly any intervening summers.

Vacation time includes all University holidays and two contiguous weeks during the summer; the student's supervisor must approve all vacation times.

Students must seek permission of the Graduate Committee to do other work beyond their assistantship duties. Otherwise, students working beyond their assistantship duties and not receiving permission will lose their assistantships immediately.

If the student's supervisor assigns more work than the student can complete in the hours allocated for, the student should first try to work out a compromise with the supervisor. If there can be no compromise, the student may appeal to the Graduate Program Director in conjunction with the Graduate Program Committee. If a supervisor is not satisfied that his

or her graduate assistant is working as agreed to in the contract, the supervisor should try to work with the graduate assistant towards achieving satisfactory work. In any case, the Graduate Program Committee has the right to terminate all contractual obligations of the graduate assistantship at any time as long as it can justify that a student has not met the contractual obligations, or due to budget constraints.

Advisors who fund graduate students from their grants or contracts may terminate an assistant at any time with the consultation of the Graduate Program Committee.

If there are difficulties with the advisor, the assistant should speak to the Graduate Program Director. The procedure for making complaints begins with the Director, then the Department Chair, and the Dean of the College of Science, Engineering and Technology.

There may be other types of awards including tuition grants, grader-ships, and scholarships. Graduate students should understand any agreements entered into when receiving these awards.

#### **A Research Assistant:**

The Research Assistant shall:

- a) Assist the faculty in research activities.
- b) Attend workshops sponsored by various University offices as required by the Computer Science Graduate Director.
- c) Attend graduate seminars and departmental colloquia.
- d) Present research progress and results at the graduate seminar annually.
- e) Submit a year-end final research report.
- f) Hold weekly meetings with the research advisor.
- g) Assist the research advisor in mentoring undergraduate senior seminar student projects.
- h) Assist the advisor in data collection, data analysis, maintaining records, writing papers, presenting papers, preparing papers for publication, and other tasks specified by the advisor.
- i) Be evaluated by the research advisor at the end of each semester.
- j) Work on assigned system administration duties in a laboratory.

This is generally a yearlong award. The Research Assistant may be assigned a different advisor during the summer sessions if the advisor is not available. Vacation times during the academic year generally correspond to the advisor's vacation as a member of the faculty. If the assistant is supported by a research grant, the vacation policy may be adjusted per agreement with the faculty member at the time of assigning duties.

### **A Teaching Assistant**

The teaching assistant shall:

- a) Teach or work with an instructor on an undergraduate computer science course. Depending on the workload determined by the Department Chair and the Undergraduate Program Director this may include several different types of responsibilities.
- b) Hold eight fixed office and tutoring hours each week.
- c) Attend workshops sponsored by various University offices as required by the Computer Science Graduate Director.
- d) Attend graduate seminars and departmental colloquia.
- e) Be closely supervised by the course coordinator working in conjunction with the Department Chair.
- f) Work to gain skills to become a competent teacher.
- g) Not be assigned as an assistant for a course while enrolled in that course.
- h) Be assigned space, equipment and support needed to perform duties.
- i) Be professionally attired when teaching and working in the department.
- j) Be evaluated by the course coordinator in consultation with Department Chair and Undergraduate Program Director at the end of each semester.

A Teaching Assistant will be assigned duties by the Undergraduate and Graduate Program Directors. This is generally an academic-year award. Vacation times during the academic year correspond to the instructor's break time as a member of the faculty.

### **A Laboratory Assistant**

The Laboratory Assistant shall:

- a) Do a variety of duties including assisting with tutoring in the laboratories, work with the fulltime laboratory staff in support of the College of Science, Engineering and Technology, manage and set up specialized laboratories and computer configurations.
- b) Attend workshops sponsored by various University offices as required by the Computer Science Graduate Director.
- c) Attend graduate seminars and departmental colloquia.
- d) Be supervised by the IT Manager or designee.
- e) Submit a report of all work completed to the IT Manager or designee once each month.
- f) Be assigned space, equipment and support needed to perform duties.
- g) Be evaluated by the IT Manager or designee in consultation with the Graduate Program Committee at the end of each semester.



Vacations times during the academic year generally correspond to holidays when the University is closed. Laboratory Assistants may be required to work during Spring Break and during and after finals week. However, the Department Chair in consultation with the IT Manager may adjust this requirement. In any case, the Laboratory Assistant may take two contiguous weeks as vacation time during the summer after consultation with the IT Manager.

There may also be **combined duties** of TAs, RAs, and LAs depending on the needs of the department.

### **Office Responsibilities**

Most graduate assistants will be allowed to use designated workstations in the graduate student offices or labs. They must log out of these computers after their use. After-hours access is permitted, but the graduate student must keep all doors locked after entering and leaving. Any intentional or unintentional destruction of office equipment will be the student's responsibility. Replication of documents on the photocopier is permitted within the legal bounds of U.S. copyright laws. Telephone use is permitted, but no long distance calls may be charged to the University.

### **Other Policies and Procedures**

Other policies dealing with standards of content, graduation requirements, minimum and maximum loads, make up of incomplete grades, and so forth are outlined in the Graduate Studies Office web site and the University's academic catalogue.

Students should become familiar with the policies and procedures established by the Office of Graduate Studies (<https://www.nsu.edu/Academics/Faculty-and-Academic-Divisions/Schools-and-Colleges/School-of-Graduate-Studies-and-Research/Office-of-Graduate-Studies/Policies>). Students are required to follow these policies and procedures.

## Thesis and Project Requirements

### Copyright

A thesis is legally classified as a publication. Thus, authors should take care to avoid violating the United States copyright laws. Standard styles and reference credit should be given for quoted or paraphrased text within the narrative. Authors should receive permissions from the copyright holder for figure and tables taken from copyrighted sources. Evidence of written permission must be included in the thesis.

### Binding and Distribution

The Computer Science Department requires thesis authors to arrange and pay for three hard copies of the thesis: one for the Department, one for the Graduate Studies Office, and one for the Library. The thesis must be bound at Longs-Roulet Bindery in Norfolk (757-623-4244 [www.longs-roulet.com](http://www.longs-roulet.com)) in Norfolk, Virginia. The current price is \$22.50 per volume. Since binding takes two to three weeks to complete, the author must present the original receipt from Longs-Roulet for proof of binding to the Graduate Program Director before the Department can approve graduation. The Graduate Program Director is responsible for distributing copies of the thesis to the Graduate Studies Office and the Library. The original bound thesis (with original signatures on the title page) will be kept in the Department.

### Thesis/Project and Supplemental Materials on CD

**Required** along with the bound thesis or project is a CD containing all electronic materials that deal directly with the documentation (word processor files, graphics, source code, models, program binaries, and so forth). Thesis students should give the completed CD to the Graduate Director at the same time as the receipt for binding. Project students should hand in the CD at the same time as the bound project document.

### Thesis Format

1. The entire thesis must be written in **Times New Roman** font size 12.
2. The manuscript may be double-spaced or one and a half spaced. Mixing of spacing in the text is not appropriate. Single spacing is used only for long, blocked, and inserted quotations; footnotes; endnotes; and itemized or tabular material.
3. Any quotations of six or fewer typed lines should use the same spacing as the narrative text.
4. Font size reduction may be made in footnotes, tables, superscripts, subscripts, figures and appendix material only.
5. Mathematical and other symbols must be large enough to be readable and logical.

6. All thesis materials must be one-sided on white paper - #20 or greater. This must be used for all pages except for special photographic paper or fold-out pages. However, all figures or tables on those pages must conform to the margins.
7. The left-hand margin must be 1.5"; the other three margins are 1". All typing must be within the 9" x 6" area except for the page number.
8. All page numbers must be placed in the upper right corner.
9. Every page in the thesis except the Title and Approval Page (TAP) must be numbered. The preliminary pages are numbered with lower-case Roman numerals. The TAP is numbered (i) but should not be shown. The second numbered page is the Abstract, which is numbered (ii).
10. Digitized photographs are acceptable if they are good reproductions. Do not include color within the thesis at all unless color reproduction is necessary to the content of the thesis. In any case permission should be sought from the Graduate Director.
11. Separate tables and figures from the text body by using the equivalent of a triple-space. Tables and figures should also have titles appearing immediately under or above the table. It is preferable to place figures on the top or bottom of the page, not in the middle between the text.
12. Bold type should be used for new chapters and sections only. New chapters should be bold, capitalized and centered. New chapters should begin on a new page and separated by at least a double-space from the text below. The font size of a chapter heading may be
13. Use only single columns.
14. Do not use footnotes if they fall below the margins.
15. Use only complete sentences except in tables and figures.
16. Right-justification is not necessary; it can force a separation of words on lines with long sequences of letters.

**NEW CHAPTER**

Second headings should be bold, left-justified and separated from the paragraph above and below it. Example

**New Section**

## Thesis Content Order

### **Preliminary Pages**

- \*Title and Approval page (page (i), page number doesn't appear)
- Copyright Page (optional)
- \*Abstract
- Dedication and Acknowledgments
- \*Table of Contents
- List of Tables (if two or more tables in text)
- List of Figures (if two or more figures in text)

### **Text** (with Arabic numeral page numbers)

- \*Introduction (as first chapter or section)
- \*Main body of text divided into various chapters or sections
- \*Summary of Conclusion (as last chapter or section)

### **References and Supplemental Sections**

- \*Reference section
- \*Bibliography
- Appendix material

Sections marked with an asterisk (\*) must be included in the thesis.

### **Title and Approval Page**

Spacing must match the sample page that is included with this document. No bold font except in the title. No page number should be on the Title and Approval page.

The title must be centered in capital letters. Do not place a period at the end of the title. The thesis statement should be as it is in the sample page using single spacing. The student's name should be the same as in the official records at Norfolk State University and typed in all capital letters.

The submittal statement must use single spacing with Norfolk State University on a line by itself. Double-space between the submittal statement and the degree. Put the degree in capital letters.

Type out the month and year without a comma.  
Type COMPUTER SCIENCE in all capital letters.

The approval statement must include the director and the other members of the student's thesis committee. Do not include titles (Dr., Ph.D., Prof.). Signature lines and names must be placed on the right side as in the sample page.

**AN EVOLUTIONARY SECURE ROUTING ALGORITHM FOR  
WIRELESS SENSORY NETWORKS**

by

David Emmet Davis  
B.S., June 2008, Wyoming State University

A Thesis submitted to the Faculty of  
Norfolk State University in Partial Fulfillment of the  
Requirements for the Degree of

MASTER OF SCIENCE

COMPUTER SCIENCE

NORFOLK  
May 2010

Approved by:

\_\_\_\_\_  
Morris D. Kettleman (director)

\_\_\_\_\_  
Sharon Lewis-Smythe (member)

\_\_\_\_\_  
George W. Wiggins (member)

## Copyright Page

If the student chooses to reserve the copyright of his/her thesis, a copyright page needs to be added following the Title and Approval page. The format is to put

Copyright by  
Author name  
Year

centered at the bottom of the page. In addition, the student must pay some fees to the US Copyright Office. Check <http://www.loc.gov/copyright/> for further information. If the Copyright Page appears, this should be the second page and numbered (ii). All the following pages should increase in numbering correspondingly.

## Abstract

This is page (ii). Bold type should not be used on this page except for the word (ABSTRACT). The Abstract contains a statement of the problem, procedure or methods, results, and conclusions. All explanatory matter and opinion should be omitted. The title of the abstract appears in upper case letters with a period at the end of the title. Place Dr. before the thesis director's name (if the director does not have an earned doctorate, use the title Prof.) Begin the text one triple space below the preliminary lines, with a paragraph indentation. Text may be no more than 350 words.

See the sample below for further formatting information.

### ABSTRACT

#### AN EVOLUTIONARY SECURE ROUTING ALGORITHM FOR WIRELESS SENSORY NETWORKS.

David Emmet Davis  
Norfolk State University, 2010  
Director: Dr. Morris D. Kettleman

The text of the Abstract starts one triple-space below the heading, with a paragraph indentation. The text of the Abstract should be double-spaced or one space and a-half according to the spacing style followed in the narrative; it must not exceed 350 words in length. Any term (or numeral) with a space on either side of it will be counted as a word.

### **Dedication and Acknowledgement Page**

A dedication and acknowledgement page may be used if desired. This should be no longer than one page in the same format as the text. It will be numbered (iii).

### **Lists of Tables and Figures**

Such listings may be included if there is more than one table or one figure and should be in the same format as the text.

### **The Text**

Most of the information is explained above. Some items to note: use only single columns. Do not use footnotes if they fall below the margins. Use only complete sentences except in tables and figures. Right-justification is not necessary; it can force a separation of words on lines with long sequences of letters. Do not place URLs in text that are “active.” The thesis / project manuscript is to be considered a written document.

### **References**

The title of the required page for references should be capitalized and in bold as **REFERENCES**. Reference standards should be used in all cases including Internet references where the exact data read should be noted. All references must be cited in the text. This is not a bibliography. References may be cited in the text using numbers like [24] or by author, year, or chronological ordering as in [Williams], [Williams98], and [Williams98a].

### **Bibliography**

The bibliography normally includes all the references and an extensive compilation of the literature related to the area of study. Normally, but not always, a bibliography includes annotations about the content of the works.

### **Appendices**

Appendices normally include supporting materials (proofs, program code, and so forth) that are of significance. The font type and size restrictions are relaxed here to make an adequate presentation of the materials.

## **Masters Project Document Requirements**

The project document requirements are the same as the thesis requirements except for the following:

1. There is no binding requirement except that the student and his/her project director should bind the project document within the department with the cover page similar to the Title and Approval Page but with no signatures.
2. All source code used in the project must be included in the appendix.
3. The binding of the project must be complete before graduation is certified.

## **Exceptions to Requirements**

All exceptions to the requirements in this document must be approved by the Computer Science Graduate Program Committee and placed in its minutes.

*The Graduate Program Committee assumes this Handbook is consistent with University, Graduate School, and College requirements. The procedures included here, if incorrect or inconsistent, revert to University guidelines.*