

College of Computing  
and Engineering  
**NOVA SOUTHEASTERN UNIVERSITY**

**NSU**  
Florida

# Graduate Catalog 2023-2024

## NSU COVID-19 RETURN OF THE SHARKS PROTOCOL

Nova Southeastern University (NSU) considers the health, safety, and well-being of its students and community to be one of its top priorities. In the midst of these unprecedented pandemic conditions, NSU continues to follow federal, state, and local guidelines to put in place extensive provisions and protocols to mitigate the spread of COVID-19 in NSU facilities and locations.

NSU takes its responsibilities seriously, and the university counts on its students to take their responsibility to comply with safety practices and protocols seriously as well, understanding that some risks lie outside of anyone's control.

NSU cannot guarantee a completely COVID-19-free environment. However, to address the health and safety of the NSU community and reduce the risk of transmission of the COVID-19 virus, NSU has created policies and protocols for mitigating the spread of COVID-19. Taking steps to mitigate the risk of COVID-19 infections at NSU is a shared responsibility. It is critical that all students adhere to these policies and protocols, as well as national, state, and local guidelines, for their own well-being and the well-being of those around them. Students are expected to comply with the NSU safety policies and protocols related to COVID-19, including the protocols set forth in the *Return of the Sharks Student Guide*. Residential life students are also required to comply with the Addendum to the 2020–2021 Residential Life and Housing Contract and the *Residential Life COVID-19 Preparedness Guide*, which include additional health and safety protocols and policies specific to residential life. The NSU policies and protocols for responding to COVID-19 may be updated at any time, as additional information about COVID-19 is obtained, and/or as additional guidance is issued from federal, state, and local governmental bodies and agencies. As such, students are responsible for continuing to monitor their NSU email for any updates to this handbook, as well as [nova.edu/ehs/cv19-resources/index.html](http://nova.edu/ehs/cv19-resources/index.html) for additional updates. Failure to comply with the NSU safety policies and protocols related to COVID-19 may result in immediate removal from campus and a referral to the Office of the Vice President of Student Affairs, or the applicable college/academic program, for disciplinary action in accordance with the university's Code of Student Conduct and Academic Responsibility.

By returning to any NSU campus, as well as living in NSU housing or sponsored housing, students assume the risk of exposure to certain dangers, including, but not limited to, possible exposure to communicable diseases such as the COVID-19 virus. COVID-19 is a highly infectious, potentially life-threatening disease declared by the World Health Organization to be a global pandemic. There is no current vaccine available to the public for COVID-19. The disease's highly contagious nature means that contact with others or contact with surfaces that have been exposed to the virus, can lead to infection. Additionally, individuals who may have been infected with the COVID-19 virus may be asymptomatic for a period of time or may never become symptomatic at all. Because of its highly contagious and sometimes "hidden" nature, it is currently very difficult to control the spread of COVID-19 or to determine whether, where, or how a specific individual may have been exposed to the disease.

Again, you have NSU's commitment to continually enhance its efforts to maintain a safer environment. However, by making the decision to return to any NSU campus or housing or sponsored housing, each student is acknowledging that he or she fully understands the risks associated with COVID-19 and is doing so freely and voluntarily.

We are all in this together as we all commit to follow proper, known protocols to better contain COVID-19 here in our shared community.

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## **Governing Documents**

### **Reservation of Power**

The Nova Southeastern University (NSU) Student Handbook and the College of Computing and Engineering Graduate Catalog are not intended to be a contract or part of a contractual agreement between Nova Southeastern University and the student. The College of Computing and Engineering Graduate Catalog is available at <http://computing.nova.edu/graduate/catalogs.html>. Changes in the content of the College of Computing and Engineering Graduate Catalog may be made at any time, by the university, division, or college administration. Reasonable notice may be furnished to the university community of any substantive changes, but is not required. The College of Computing and Engineering Graduate Catalog supersedes all previous catalogs, handbooks, documents, and directives where they may be in conflict. The College of Computing and Engineering Graduate Catalog is the governing document for all graduate program-related information. Students are required to become familiar with and understand the policies and procedures listed within. Failure to read this catalog does not excuse students from the rules, policies, and procedures contained in it. Students are expected to be familiar and comply with all the policies and procedures contained within the College of Computing and Engineering Graduate Catalog, including any revisions or modifications.

Whenever specific titles are used in these procedures, they shall include the appropriate designee of the person bearing these titles. Whenever references to the singular appear in this catalog, the plural is also intended; whenever the plural is used, the singular is also intended. Wherever a reference is made to the masculine gender, the feminine gender is included.

Failure to read this catalog does not excuse students from the rules, policies, and procedures contained within the graduate catalog. The rights and responsibilities that follow take effect immediately upon publication of this document.

### **NSU Student Handbook**

The NSU Student Handbook is designed to provide all enrolled students, regardless of academic program, an overview of the universal rights and responsibilities provided and required as a member of our academic community. Through the Code of Conduct outlined in

the NSU Student Handbook, information regarding academic integrity requirements, as well as behavioral expectations, are provided to all students. In addition, information about grievance, including discrimination procedures, are provided for all students through the NSU Student Handbook. Academic programs/colleges may enforce additional policies for academic progress and/or professional standards and are outlined in the individual college's catalog/handbook.

For the purpose of promoting its educational mission, Nova Southeastern University has the inherent right to preserve order and maintain stability through the setting of standards of conduct and the prescribing of procedures for the enforcement of such standards. The foundation underlying such student standards relies on the tenet that the exercise of individual rights must be accompanied by an equal amount of responsibility. This assures that the same rights are not denied to others. By becoming a member of the university community, a student acquires rights in, as well as responsibilities to, the whole university community. These rights and responsibilities are defined within the NSU Student Handbook.

Students are required to comply with all university regulations as well as all local, city, county, state, and federal laws. All students, undergraduate, graduate, and professional, are subject to the policies and procedures as contained within the NSU Student Handbook. In addition, any student residing in university residence facilities is subject to these policies and procedures for violations occurring within those facilities. Any act that constitutes a violation or an attempt to violate any of the policies or procedures contained herein may establish cause for disciplinary and/or legal action by the university. In circumstances where this handbook defines a violation more stringently or differently than local/state law, the handbook's definition shall supersede.

Students who engage in conduct that endangers their personal health or safety or the personal health or safety of others, may be required to participate and make satisfactory progress in a program of medical evaluation and/or treatment if they are to remain at the university. The determination as to the students' participation and progress is to be made by the Student Behavioral Concerns Committee. The university reserves the right to require the withdrawal of a student from either enrollment and/or university housing, whose continuation in school, in the university's judgment, is detrimental to the health or safety of the student or others. Students who withdraw for reasons of health or safety must contact the Office of Student Conduct and Community Standards before seeking readmission to the university. Decisions made under this policy are final.

Changes in the content of the NSU Student Handbook may be made, at any time, by the university. Reasonable notice may be furnished to the university community of any substantive changes but is not required. **The NSU Student Handbook is the governing document for all enrolled students. You are expected to become familiar with the policies and procedures within the handbook. Failure to do so does not excuse students from the rules, policies, and procedures contained in it. Please refer to pages 15 and 16 of the student Handbook.**

**Accreditation**

Nova Southeastern University is accredited by the Southern Association of Colleges and Schools Commission on Colleges (SACSCOC) to award associate's, baccalaureate, master's educational specialist, doctoral, and professional degrees. Nova Southeastern University also may offer credentials such as certificates and diplomas at approved degree levels. Questions about the accreditation of Nova Southeastern University may be directed in writing to the Southern Association of Colleges and Schools Commission on Colleges at 1866 Southern Lane, Decatur, GA 30033-4097, by calling (404) 679-4500, or by using information available on SACSCOC's website ([www.sacscoc.org](http://www.sacscoc.org)).

## **University Equal Opportunity/Nondiscrimination Policy**

Consistent with all federal and state laws, rules, regulations, and/or local ordinances (e.g., Title VII, Title VI, Title III, Title II, Rehab Act, ADA, Title IX, and the Florida Civil Rights Act), it is the policy of Nova Southeastern University not to engage in any discrimination or harassment against any individuals because of race, color, religion or creed, sex, pregnancy status, national or ethnic origin, non-disqualifying disability, age, ancestry, marital status, sexual orientation, gender, gender identity, military service, veteran status, or political beliefs or affiliations, and to comply with all federal and state nondiscrimination, equal opportunity, and affirmative action laws, orders, and regulations. Any such acts are unacceptable and strictly prohibited by the university. In addition, the law prohibits retaliation against an individual for opposing any practices forbidden under this policy, for bringing a complaint of discrimination or harassment, for assisting someone with such a complaint, for attempting to stop such discrimination or harassment, or for participating in any manner in any investigation or resolution of a complaint of discrimination or harassment. This nondiscrimination policy applies to NSU's education activities and programs, including admissions; enrollment; scholarships; loan programs; athletic employment; and access to, participation in, and treatment in all university centers, programs, and activities. NSU admits students of any race, color, religion or creed, sex, pregnancy status, national or ethnic origin, non-disqualifying disability, age, ancestry, marital status, sexual orientation, gender, gender identity, military service, veteran status, or political beliefs or affiliations, to all the rights, privileges, programs, and activities generally accorded or made available to students at NSU, and does not discriminate in the administration of its educational policies, admission policies, scholarship and loan programs, and athletic and other school-administered programs. The following person has been designated to handle inquiries and complaints regarding perceived discrimination and NSU nondiscrimination policies:

For inquires or reports regarding perceived sexual misconduct violations please contact:

Laura Bennett  
Title IX Coordinator  
(954) 262-7858 [laura.bennett@nova.edu](mailto:laura.bennett@nova.edu)

Information about NSU's Title IX/Sexual Misconduct policy, confidential resources, rights of all parties, definitions and examples of prohibited behaviors, and the procedures for investigating and resolving reports of sexual misconduct is available on the Title IX website at [nova.edu/title-ix](http://nova.edu/title-ix). Individuals may report incidents through a secure online form on the Title IX website and/or may contact the Title IX Coordinator directly. The Title IX Coordinator also assists students in learning about their protections under Title IX, such as those for pregnant/parenting students as well as those who may have experienced sexual violence on- or off-campus that affects their ability to participate in an NSU educational program or activity. Note: The Department of Education issued new Title IX regulations to be effective August 14, 2020. NSU will be reviewing and updating relevant policies and procedures to ensure compliance and will post revisions online. Refer to the Title IX website at <http://www.nova.edu/title-ix> for more information.



All other reports or inquiries regarding perceived discrimination should be directed to:

Benjamin O. Johnson  
Ph.D. Assistant Dean for Student Development  
(954) 262-7281 [bj379@nova.edu](mailto:bj379@nova.edu)

# 2023 - 2024 Academic Calendar

<b>Fall 2023</b> <b>August 21, 2023 - December 10, 2023</b>	
Open Registration Period	<b>Term I</b> April 10, 2023 - August 20, 2023 / <b>Term II</b> April 10, 2022 - October 15, 2023
Late Registration Begins	August 11, 2023 ( <b>Late Registration Fees Applied</b> )
Drop/Add Period	August 21 - 27, 2023 / October 16 - 22, 2023
Last Day to Withdraw	September 24, 2023 / November 19, 2023
Last Day to Request Incomplete	October 1, 2023 / November 26, 2023
*Doctoral meeting dates are subject to change	

<b>Winter 2024</b> <b>January 3, 2024 - April 28, 2024</b>	
Open Registration Period	<b>Term I</b> October 23, 2023 - January 2, 2024 / <b>Term II</b> October 23, 2023 - March 3, 2024
Late Registration Begins	December 22, 2023 ( <b>Late Registration Fees Applied</b> )
Drop/Add Period	January 3-9, 2024 / March 6 - 10, 2024
Spring Break: February 26, 2024 - March 3, 2024	
Last Day to Withdraw	February 11, 2024 / April 14, 2024
Last Day to Request Incomplete	February 18, 2024 / April 14, 2024
*Doctoral meeting dates are subject to change	

<b>Summer 2024 May 6, 2024 - July 28, 2024</b>	
Open Registration Period	May 6, 2024 - May 12, 2024
Late Registration Begins	April 26, 2024 ( <b>Late Registration Fees Applied</b> )
Drop/Add Period	May 6 - 12, 2024
Last Day to Withdraw	July 7, 2024
Last Day to Request Incomplete	July 14, 2024

## **NSU Holiday Calendar**

NSU administrative and academic offices/departments are closed on NSU observed holidays.

<b>Holiday</b>	<b>NSU Observed Date</b>
Labor Day	Monday, September 4, 2023
Thanksgiving Day	Thursday, November 23, 2023
Day after Thanksgiving Day	Friday, November 24, 2023
*Winter Closure	Friday, December 11, 2023 - Tuesday, January 2, 2024*
Martin Luther King Day	Monday, January 15, 2024
Spring Break (No Classes)	Monday, February 26, 2024 - Sunday, March 3, 2024
Memorial Day	Monday, May 27, 2024
Independence Day	Thursday, July 4, 2024

\*Dates are subject to change

## 2023-2024 Tuition Refund Schedule

<b>Fall 2023</b> <b>August 21, 2023 - December 10, 2023</b>	
<b>Drop/Add Periods for Terms I and II</b>	August 21 - 27, 2023 / October 16 - 22, 2023
<b>75%</b>	Ends September 3, 2023 / October 29, 2023
<b>50%</b>	Ends September 10, 2023 / November 5, 2023
<b>25%</b>	Ends September 17, 2023 / November 12, 2023
<b>Last Day to Withdraw</b>	September 24, 2023 / November 19, 2023
<b>Term I</b> - No Refunds after September 17, 2023 / <b>Term II</b> - No Refunds after November 12, 2023	

<b>Winter 2024</b> <b>January 3, 2024 - April 28, 2024</b>	
<b>Drop/Add Period for Terms I and II</b>	January 3 - 9, 2024 / March 4 - 10, 2024
<b>75%</b>	Ends January 16, 2024 / March 17, 2024
<b>50%</b>	Ends January 23, 2024 / March 24, 2024
<b>25%</b>	Ends January 30, 2024 / March 31, 2024
<b>Last Day to Withdraw</b>	February 11, 2024 / April 14, 2024
<b>Term I</b> - No Refunds after January 30, 2024 / <b>Term II</b> - No Refunds after March 31, 2024	

<b>Summer 2024</b> <b>May 6, 2024 - July 28, 2024</b>	
<b>Drop/Add Period for Term I</b>	May 6 - 12, 2024
<b>75%</b>	Ends May 19, 2024
<b>50%</b>	Ends May 26, 2024
<b>25%</b>	Ends June 2, 2024
<b>Last Day to Withdraw</b>	July 7, 2024
Term I - No Refunds after June 2, 2024	

## **About Nova Southeastern University (NSU)**

Located in Fort Lauderdale, Florida, NSU is a private, not-for-profit institution research institution accredited by the Southern Association of Colleges and Schools Commission on Colleges. Classified as a research university with “high research activity” by the Carnegie Foundation for the Advancement of Teaching, NSU is 1 of only 54 universities nationwide to also be awarded Carnegie’s Community Engagement Classification, and is also the largest private, not-for-profit institution in the United States that meets the U.S. Department of Education’s criteria as a Hispanic-Serving Institution. For more than 50 years, NSU has been fostering groundbreaking research and a commitment to community. The university awards associate’s, bachelor’s, master’s, specialist, doctoral, and first-professional degrees in a wide range of fields, including the humanities, biological and environmental science, business, counseling, computing and engineering sciences, conflict resolution, education, family therapy, medicine, dentistry, various health professions, law, marine sciences, performing and visual arts, psychology, and other social sciences. NSU has campuses in Fort Lauderdale, Fort Myers, Jacksonville, Miami, Miramar, Orlando, Palm Beach, and Tampa, Florida, as well as San Juan, Puerto Rico, while maintaining a global presence online. The institution also has an excellent reputation for its programs for families offered through the Mailman Segal Center for Human Development and the NSU University School. These include innovative parenting, preschool, primary, and secondary education programs, and programs across the life span for people with autism.

The university’s library system is composed of the following four libraries: the Alvin Sherman Library, Research, and Information Technology Center; Panza Maurer Law Library; the Oceanographic Campus Library; and the Martin and Gail Press Health Professions Division Library. Through a unique agreement with Broward County, NSU’s Alvin Sherman Library, Research, and Information Technology Center serves the residents of Broward County as well as the university’s students, faculty, and staff members. This means the community at large can enjoy the resources and services this spectacular venue has to offer. NSU is also home to three additional libraries that serve students, faculty and staff in the areas of health professions, law and oceanography. Stunningly modern and towering a full five stories, the 325,000-square-foot Alvin Sherman Library is one of the largest library buildings in the state of Florida and offers full collections of research materials, specialized databases, popular fiction and nonfiction books, magazines and journals, CDs, and DVDs. Cozy reading niches, 22 study rooms, 1,000 user seats, wireless internet service, and a café. Special programs for children and teens, book discussion groups, author readings, and classes on using research tools and resources. Most importantly, you will find a professional library staff attuned and ready to serve your needs. The Alvin Sherman Library is also home to several permanent works of art, including a one-of-a-kind creation by famed glass artist Dale Chihuly, and a hand forged Buddhist Prayer Wheel blessed by His Holiness the Dalai Lama.

# The College of Computing and Engineering

## Dean's Message

Congratulations on your decision to join NSU's College of Computing and Engineering (CCE). As Dean of the College of Computing and Engineering, it brings me great pleasure to welcome you to NSU and to the exciting opportunities in computer science, information technology, cybersecurity, and information systems.

At CCE, we are committed to educating today's computer scientists and technology leaders to be tomorrow's problem solvers. Through innovative curricula and research activities, our outstanding faculty engage students in a unique, interactive learning environment that facilitates academic excellence and prepares our students for their future careers while they earn a B.S., M.S., or Ph.D. degree. Companies seeking new sources of talent are looking at our college because of our commitment to our students and our program for both discipline experts and strong communication, teamwork, and life-long learning skills. At CCE, we will take your dedication and ambition to the next level of your life.

We encourage you to engage with your peers, outstanding faculty members, and the activities that the university and college offer to strengthen your experience here at NSU.

The faculty and staff all look forward to providing strong support through your exciting journey towards personal fulfillment, career advancement, and global citizenship. We look forward to celebrating your accomplishments.

Meline Kevorkian, Ed.D.  
Dean, College of Computing and Engineering

## **Mission Statement**

Engaging in innovation across boundaries, the College of Computing and Engineering prepares leaders and problem solvers in engineering, computer science, information systems, and cybersecurity for application and integration of science and technology to research and design effective solutions that contribute to society and the public good.

## **Introduction to the College**

The College of Computing and Engineering (CCE) prepares students to meet the technological challenges of today. Drawing on 40 years of institutional experience in computing education and research, and 30 years of experience in innovative program delivery, CCE offers focused and flexible programs aligned to industry's most sought-after fields to help students reach their full potential. CCE has a distinguished faculty, evolving curricula, and an alumni network that integrates 40 years of graduates from computing disciplines at NSU. CCE has flexible online and campus-based formats for its three bachelor's, seven master's, and three Ph.D. programs.

The college welcomes part-time and full-time students, whether on-campus or online. Undergraduate on-campus students participate in day and evening programs and may have the opportunity to apply to the Dual Admission program that automatically reserves a seat in one of CCE's graduate programs. Online master's degree programs require no campus attendance and are available to students worldwide.

CCE has facilities to support hands-on instruction for students to learn and research computing and engineering including mobile application development in the Mobile Computing Laboratory (MCL); areas of distributed systems with an emphasis on designing, implementing, and evaluating systems in the Distributed Systems (CLOUDS) and Security Robust Distributed Systems (SARDIS) laboratory; and more.

The college's research advances knowledge, improves professional practice, and contributes to understanding in the engineering and computing fields. In addition to its regional accreditation by the Commission on Colleges of the Southern Association of Colleges and Schools, NSU has been designated a National Center of Academic Cybersecurity (NCAE-C) - Cyber Defense (CD) by the U.S. National Security Agency (NSA) and its federal partners include the Cybersecurity and Infrastructure Security Agency (CISA), the Federal Bureau of Investigation (FBI), the National Institute of Standards and Technology (NIST)/National Initiative on Cybersecurity Education (NICE), the National Science Foundation (NSF), the Department of Defense Office of the Chief Information Officer (DoD-CIO), and U.S. Cyber Command (USCYBERCOM) (<https://www.nsa.gov/Academics/Centers-of-Academic-Excellence/>). NSA its federal partners have certified that NSU's curriculum in Cybersecurity meets or exceeds the requirements and standards expected of a leader in cybersecurity education.

All M.S. graduate degree programs employ a three-term format: Fall (8-week term starting in August) and 8-week term II starting in October), Winter (8-week term starting in January and 8-week term II starting in March) and Summer (8-week term starting in May).



Once students are in the doctoral research and dissertation stage of the Ph.D. program, then they will have a longer semester format: Fall (16-week term starting in August), Winter (17-week term starting in January) and Summer (12-week term starting in May).

Online students use the web to access course materials, announcements, email, distance library services, subscription library databases, and other information and for interaction with faculty and fellow students. Online, interactive learning methods are used through the instructional sequence based on the use of a web-based course management system.

Online activities facilitate frequent student-to-faculty and student-to-student interaction. They are supported by threaded discussion boards, white boards, videoconferences, email, and other online tools.

## **Degrees and Programs of the College of Computing and Engineering**

### ***Bachelor of Science (B.S.)***

- ✓ Computer Science
- ✓ Engineering (Concentrations in Biomedical Engineering and Industrial Systems Engineering)
- ✓ Information Technology

### ***Master of Science (M.S.)***

- ✓ Computer Science (concentrations in artificial intelligence, software engineering, computer systems, data science, information assurance & cybersecurity, and real-world computing)
- ✓ Cybersecurity Management
- ✓ Data Analytics
- ✓ Information Assurance & Cybersecurity
- ✓ Information Systems (concentrations in business intelligence/data analytics, information assurance & cybersecurity management, and user experience (UX)/human-computer interaction,)
- ✓ Information Technology (concentrations in application development, data analytics, and information assurance & cybersecurity management)
- ✓ Information Technology and Organizational Leadership

### ***Doctor of Philosophy (Ph.D.)***

- ✓ Computer Science
- ✓ Cybersecurity Management
- ✓ Information Systems

### ***Collaborative Efforts with other NSU Programs***

- College of Humanities, Arts, and Social Sciences
  - M.S. in Criminal Justice
    - Track in Information Systems
    - Track in Information Assurance and Cybersecurity
  - M.S. in National Security Affairs

- Concentration in Cyber-terrorism and Security
- . College of Osteopathic Medicine
  - M.S. in Disaster and Emergency Preparedness
    - Track in Cyber Security
- . Halmos College of Natural Sciences and Oceanography
  - Graduate Certificate in Computational Molecular Biology  
Shepard Broad College of Law
  - Graduate Certificate in Computational Molecular Biology  
Shepard Broad College of Law
  - Joint JD/MS Program  
*The program allows J.D. students at NSU's College of Law who are also admitted to an M.S. program at the College of Computing and Engineering to count up to 9 credits of J.D. course work as electives toward their M.S. programs. Similarly, the College of Law will provide elective credit toward the J.D. from the M.S. curriculum (as per College of Law policy).*

### **Student Organizations**

Organizations with active CCE affiliations include:

- ✓ Association for Computing Machinery (ACM)
- ✓ Association for Information Systems (AIS)

The goal of these organizations is to help students advance in their professions through contact with working professionals, participation in conferences, or recognition of academic excellence. Student membership provides benefits such as technical publications, career development, and financial services.

Student government: The College of Computing and Engineering Student Government Association (CCE-SGA) provides exceptional students the opportunity to be elected to represent the college on all matters pertaining to students and is officially chartered to speak on behalf of the student body to the university administration. The mission of the CCE-SGA is to represent the students of the College of Computing and Engineering, promote advocacy and service to the institution and community at large. Elections for CCE-SGA occur at the beginning of summer term, and elected members are announced by the start of fall. The Executive Cabinet consists of the President, Vice President, Vice President of Online Affairs, Treasurer and Secretary. There are two Representatives: one Master's Representative and one Doctoral Representative.

### **Library Resources**

The university's library system ([www.nova.edu/library](http://www.nova.edu/library)) is composed of the following four libraries: the Alvin Sherman Library, Research, and Information Technology Center; the Health Professions Division Library; the Shepard Broad Law Library and Technology Center; and the William S. Richardson Oceanography Library. The NSU libraries' online

catalog, NovaCat, is accessible to students and faculty members wherever they may be located. NSU libraries provide access to more than 500 subscription databases and provide online access to a variety of full-text resources including 20,000 unduplicated full-text journals, over one million dissertations, 100,000's of ERIC ED documents, and over 100,000 e-books. Students are able to obtain books and periodicals quickly and efficiently and have access to more than 10 million books through NSU's libraries and agreements with other libraries.

Students may request delivery of books and other documents to their homes or offices. Requests can be made via online forms or fax through Alvin Sherman Library's Document Delivery Department. Delivery options include:

- **Shipped Delivery:** requested items are shipped to the address listed in the student's ILLiad account. Materials may not all arrive to you on the same day. Library staff ship the items as they are ready. Print materials sent to students in the United States are sent by first-class mail. Print materials sent to international students are sent via DHL when necessary.
- **Electronic Delivery:** the DD/ILL Department now provides desktop delivery of articles to distance patrons. Through ILLiad we are able to post articles to a web site while simultaneously sending an e-mail notification to the patron. Users can select this mode of delivery in their ILLiad user account.
- **Other Options:** some of the databases found online in the NSU's Electronic Resources include the full text of newspaper and journal articles. A growing number of these databases can also provide full images of articles (pictures and graphs, along with text). See the complete list of databases. To determine whether a particular journal is available full text online, use Journal Finder.

The Document Delivery Department can be reached toll-free phone, email, or via the web. Students can request up to 50 free documents per week while they are enrolled at NSU. The website provides more information about the department: <http://sherman.library.nova.edu/sites/services/docdel/>

Students may also call the Alvin Sherman Library's Reference Desk at 800-541-6682, ext. 24613 for reference information, advice on research strategies and resources, and suggestions on other library resources that may be of use. The desk is staffed 86 hours per week. Students may ask questions via phone, email, chat, text, and set up individual consultation appointments: <http://www.nova.edu/library/main/ask.html>

The college provides orientations for its new students before the start of their first term. Each orientation includes an introduction to library resources and pointers to where to get additional help. Librarians also provide course specific instruction and online library workshops. For a list of upcoming and recorded workshops visit: <http://sherman.library.nova.edu/sites/library-workshops/>

The university's library system supports the larger community. For example, the Alvin Sherman Library, Research, and Information Technology Center is a joint-use facility with the Broward County Board of County Commissioners. This five-story, 325,000 square-

foot has 1,000 user seats, 20 electronic classrooms, and the 500-seat Rose and Alfred Miniaci Performing Arts Center.

### **Office of Student Disability Services**

The office of Student Disability Services provides information and individualized accommodations to ensure equal and comprehensive access to university programs, services, and campus facilities. Information about requirements for requesting academic or facility accommodations by any student enrolled at the university, is available online through the office website: <http://www.nova.edu/disabilityservices>

### **Program Formats**

#### **M.S.**

The master's degree requires the successful completion of 30 credit hours. Master's students may not change majors without prior approval from their academic advisor. While multiple concentrations are permitted within a master's program, master's students are not permitted to seek double majors or enroll in multiple academic programs concurrently within the CCE. Full-time on-campus and online students may be able to complete the M.S. degree in 12 months. Part-time on-campus and online students may complete the degree in 16–24 months. On-campus programs are offered in the evening—each class meets one night a week. There are three master's terms each academic year: Fall (two 8-week sessions), Winter (two 8-week sessions) and Summer (one 8-week session). On-campus students are permitted to take online courses, and online students are permitted to take on-campus courses. Each student must have an active broadband account with an Internet Service Provider (ISP) and must have his or her own personal computer.

Admitted students are able to take courses in either format (online and/or on-campus). Students participate in online classes from anywhere in the world where Internet access is available. On-campus classes are held on the main campus in Fort Lauderdale, for - two 8-week sessions in the fall term, two 8-week sessions in the winter term and - one 8-week session in the summer term. Most degree programs include an optional six-credit thesis (the six credits for thesis are in lieu of course credit hours).

CCE students are provided NSU computer accounts but must obtain their own Internet service providers and use their own computer systems. Online students use the web to access course materials, announcements, email, distance library services, subscription library databases, and other information, and for interaction with the faculty and fellow students. Online, interactive learning methods are based on the use of a web-based course management system. Online activities facilitate frequent student-to-faculty and student-to-student interaction. They are supported by threaded discussion boards, white boards, web, chat rooms, email, and multimedia presentations.

#### **Ph.D.**

The college offers Ph.D. programs with a blend of on-campus and online activities. Doctoral students may not change majors without prior approval from their academic advisor. Doctoral students are not permitted to seek double majors or enroll in multiple academic programs concurrently within CCE. Students are required to attend all of their scheduled class sessions. Between sessions, students work on course assignments and research,

and participate in online activities that facilitate frequent interaction with the faculty and with other students.

Interactive learning methods, consistent communication between faculty and students, and accessible learning resources provide a powerful and supportive learning environment that can be accessed anywhere around the globe. Online activities may include forums using threaded discussion boards, chat rooms, white boards, email, and multimedia presentations. Each student must have an active broadband account with an Internet Service Provider (ISP) and must have his or her own personal computer.

### **Coursework**

Students must complete a minimum of 51 credits in the M.S. to Ph.D. pathway or a minimum of 66 credits in the B.S. to Ph.D. pathway.

### **Qualifier Stage for Admission to Candidacy**

Students must maintain a minimum of 3.2 GPA in core courses for the Ph.D. program and a B or higher in each core course. Additionally, students must successfully complete the core course requirement before taking doctoral research courses.

Each student must defend their research topic concept paper by the end of the second doctoral research course. The research topic concept review is conducted by a faculty committee prior to the official idea paper and dissertation committee formation. If the research concept is not successfully defended by the end of the third doctoral research course, the student will be dismissed.

Upon successful completion of the course and research topic defense requirements, the student is admitted to Ph.D. candidacy.

### **Comprehensive Stage Dissertation Proposal**

Students must successfully pass the qualifier stage, secure an advisor and dissertation committee, and have an approved Idea Paper before pursuing dissertation course registration. After the student has achieved sufficient depth in a field of study, they prepare a proposal for the Ph.D. dissertation. Upon approval of the written proposal, the student has to present the proposed work orally to the dissertation committee.

### **Doctoral Dissertation**

The student registers for one year (three terms) of dissertation, at eight credits per term. Students who have not completed the dissertation after one year of dissertation registrations must register for Continuing Dissertation, three terms per year, until they have satisfied the dissertation requirement. Students not on approved leave register for each term following the one in which they enter candidacy.

### **Dissertation Defense**

The dissertation defense consists of a presentation given by the candidate on the topic focus of the dissertation. This includes questions from the dissertation committee and others in attendance. The defense is chaired by the Ph.D. advisor.

### Time Limitation

Students must have an approved dissertation proposal within eight (8) years of the date of their first registration and have completed all requirements for the Ph.D. degree within ten (10) years from the initial term of registration. Students unable to complete the program within this ten-year timeline may be subject to dismissal.

### Financial Information

Academic, program, and online services are provided only to CCE students who are currently registered. Students who are not registered are not entitled to receive services. Textbooks are not included in tuition and fees and must be purchased by the student. Students are responsible for their own lodging and travel expenses. Students must be registered to gain access to NSU's computing services. Rates are subject to change.

### University Fees

NSU fees are annually approved by the Board of Trustees-in the spring-for the upcoming academic year. Rates are subject to change without notice. The below fees are assessed for all NSU students. Additional fees, such as acceptance, access, late registration, and lab fees, may be assessed by the student's college and/or program.

#### Tuition and Fees

Undergraduate (B.S.)	1,150 under 12 credits 34,500 flat rate 12-18 credit hours
Master of Science (M.S.)	\$969 per credit hour
Doctor of Philosophy (Ph.D.)	\$1,386 per credit hour
Admission Application Fee	\$50 (non-refundable)
Readmission Fee	\$50 (non-refundable)
Student Services Fees	\$300 (3 credit hours) \$600 (4 or more credit hours)
Registration Fee	\$0 (no fee as of July 1,2022)
Late Registration Fee	\$100 (non-refundable)
Degree Application Fee	\$0 (no fee as of July 1,2022)

### University Student Services Fee

NSU offers to all students—on campus, online, clinical or hybrid—the same quality education and many opportunities for student benefits depending on the student's choice of educational modality. Therefore, the University sets the overall student fees on an aggregate, student-centric basis for the entire student body. The overall costs exceed the amount collected from student fees charged to all students.

These student fees are blended together to create 1NSU with high-tech systems, student activities, and many other essential student services that make a complete, integrated university. This mission transcends the development and ultimate determination of the amount of student fees for all students, irrespective of their choice of learning modality.

### **NSU Student Health Insurance Fees**

NSU requires all students to carry adequate health insurance coverage. Therefore all NSU students will automatically be enrolled in the NSU Student Health Insurance Plan, and their student accounts will be charged when they register for classes. Students who reside and take classes outside the United States are exempt from this requirement. Students who already have health insurance must opt out of the NSU Student Health Insurance Plan each academic year by the given waiver deadline for their program. For detailed information, including waiver deadlines, access to the online waiver, NSU Student Health Insurance Plan features, costs, and more, students should visit the Bursar's website at [nova.edu/studentinsurance](http://nova.edu/studentinsurance).

### **Responsibility for Payment of Tuition and Fees**

Once registered, students are personally responsible for the payment of their tuition and fees. Returned checks, cancelled credit cards, employer or agency refusal to pay, ineligibility for financial aid, and other reasons for non-payment may result in a direct bill to the student, and/or referral to a collection agency.

Payments and refund policies are based on the view that a student registering for a class is reserving a place in that class and that tuition and fees cover the opportunity to secure that place in the class. Since no other person can purchase that place, the student is responsible for the tuition and fees associated with it. Simply not attending does not constitute a reason for non-payment.

### **Force Majeure**

NSU's duties and obligations to the student shall be suspended or modified immediately, without notice, during all periods that the University determines it is closed or ceases or modifies or curtails operations because of force majeure events including, but not limited to, any fire or any casualty, flood, earthquake, hurricane, lightning, explosion, strikes, lockouts, prolonged shortage of energy supplies, riots or civil commotion, Act(s) of God, war, governmental action, act(s) of terrorism, infectious diseases, epidemic, pandemic, physical or structural dangers, or any other event beyond the University's control. If such an event occurs, NSU's duties and obligations to the student (including its delivery and format of classes, student housing and dining, campus facilities, and related services, activities, and events) will be postponed, cancelled, or modified until such time as the school, in its sole discretion, may safely reopen or resume normal operations. Under no circumstances, except as otherwise required by Federal or State statute, will NSU be obligated to refund, reduce or credit any portion of tuition, housing, meal plans, fees, or any other cost or charge attributable to any location, delivery modality, or service affected by any such force majeure event necessitated by Acts of God, University or academic or health and safety decisions, and/or any situations outside of the University's control. This includes, but is not limited to, any suspensions to or changes from in-person, on-campus education, services and/or activities to remote services, activities, and/or remote learning. By choosing to enroll or study at NSU, students agree to these terms. Any decisions by the University to provide a refund or credit, in whole or in part, of any fee or other charge, in the event of a campus closure, suspension, or other change to the delivery format of education, activities, housing, dining, and/or services shall be in the University's discretion and shall not create an expectancy that any individual is legally entitled to such refund or credit or that it will be provided in any other instance.

## **Flexibility in Policies**

University policies are intended to describe some of the expectations of members of the University community, as well as outline the University's community policies and programs. It is intended to be used as a guideline and does not create an express or implied contract which cannot be changed or modified. Circumstances not specifically addressed in university policies will be handled on a case-by-case basis by the appropriate official selected by the University. As the need may arise, the University reserves the right to, in its sole discretion, modify, revise, supplement, rescind, suspend, terminate, or change its policies, procedures, programs, activities and services, in whole or in part, to the fullest extent permitted by law.

## **Financial Aid**

The Office of Student Financial Assistance administers the university's financial aid programs of grants, loans, scholarships, and student employment and provides professional financial advisors to help students plan for the most efficient use of their financial resources for education. In order to participate in financial aid programs, a student must be admitted into a university program and must be a citizen, a national, or a permanent resident of the United States, or be in the United States for other than a temporary purpose. A prospective student who requires financial assistance must apply for financial aid while he or she is a candidate for admission. Applicants and prospective students may apply for financial aid online at <http://www.nova.edu/financialaid/>. Students must work directly with the university's Office of Student Financial Assistance because the school's program office does not administer or manage the financial aid process. For additional information or application forms, (1) call 954-262-2000 or 800-806-3680; or (2) send email to [finaid@nova.edu](mailto:finaid@nova.edu). To continue financial aid, at a minimum, enrolled students must demonstrate satisfactory academic progress toward a stated educational objective in accordance with the university's policy on satisfactory progress for financial aid recipients. See <http://www.nova.edu/sap>.

## **Tuition Payment**

The Bursar's Office is responsible for collecting university tuition and fees, issuing student refunds from financial aid funds, sending invoices and receipts, and distributing student educational tax data.

NSU accepts payment via credit card using Visa, Master Card, or American Express. Other CCE acceptable forms of payment are personal checks, cashier's checks, money orders in US Dollars made payable to NSU, and wire transfers. Always be sure to include your full name and student ID number on your method of payment.

The tuition payment options are subject to change at any time at the discretion of the administration of Nova Southeastern University. The options available for the payment of tuition are:

1. Full payment by the student: Payment is due at the time of registration and considered past due 30 days after the start of the semester. An email will be sent to the student 20 after the first day of the semester reminding you of the approaching late fee date.
2. NSU Payment Plan: The Nova Southeastern University (NSU) Payment Plan is a payment option designed to provide budgetary assistance in meeting a



student's semester education expenses. NSU students, excluding international students, who wish to split their payments for the semester, may request to enroll in an NSU Payment Plan. While payment for tuition, fees, and other institutional charges is due in full at the time of registration, we recognize that sometimes students and families may need extra time to meet their financial obligations. Please see the Office of the University Bursar for more information [http://www.nova.edu/bursar/payment/payment\\_plans.html](http://www.nova.edu/bursar/payment/payment_plans.html). (international students are not eligible for this option)

3. Direct payment by the student's employer: If a letter of commitment or a voucher from the student's employer accompanies the registration form, then the student will not be required to make a payment at registration time. The letter of commitment or the voucher must indicate that the employer will remit full payment of tuition and fees to Nova Southeastern University on receipt of the invoice from the university's accounts receivable office.
4. Tuition reimbursement by the student's employer: If the student submits a letter from the employer at registration time that establishes eligibility for tuition reimbursement, the student may choose a two-payment plan. The first payment, due at registration, shall include all fees, 50 percent of the tuition, plus a \$75 deferment fee. The second payment, due five weeks after the end of the term, shall equal 50 percent of the tuition. To secure this plan, the student must provide, at registration, a postdated check or credit card authorization for the deferred portion.
5. Financial aid award: Students who have applied for financial aid and have submitted all the required paperwork to the Office of Student Financial Assistance may register without payment.

### **Admission**

Admission is competitive; consequently, applicants who meet the minimum requirements specified herein are not assured admission. There is no formula, yardstick or scoring, the college qualitatively and quantitatively evaluates applicants and makes selections based on performance, personal qualifications, and evidence of potential for success. Newly admitted students must begin the program in the term to which they were admitted. An appeal to defer matriculation may be requested one-time only as long as the request is made within the one year.

Students who are admitted and do not begin their program within one year from the term of their acceptance will be automatically withdrawn and an application would be required. Subsequent enrollment will require a new application. Applicants must meet the requirements specified below, as well as the program-specific admission requirements contained in the individual program sections of this catalog. For instructions on applying, visit the college's admissions page: <http://computing.nova.edu/admissions/>.

For additional information, contact:

College of Computing and Engineering

800-986-2247 or  
954-262-2031

Nova Southeastern University  
3301 College Avenue  
Carl DeSantis Building, 4<sup>th</sup> Floor.  
Fort Lauderdale, Florida 33314-9918

Email: [computing@nova.edu](mailto:computing@nova.edu)  
Website: [computing.nova.edu](http://computing.nova.edu)

### **Admissions Information and Requirements (M.S. & Certificates)**

Admission decisions are made on a rolling basis. Applications will be reviewed by the Admissions Committee after the following items have been received by the admissions office: application form, application fee, résumé, and all sealed official transcripts. To ensure evaluation for the desired starting term, applications and all required documents must be ready for review at least one month prior to the start of the term. Late applications that cannot be processed in time for the desired starting term will be considered for the next term.

Master's (M.S) and Certificate Program Minimum Admission Requirements are as follows:

1. An earned bachelor's degree with a GPA of at least 2.5 from a regionally accredited institution and with an appropriate major (see program-specific admission requirements under individual programs). Lower GPA scores must be accompanied with a supplemental letter explaining why the low GPA does not reflect inadequate potential for success in the program.
2. Online application form and application fee.
3. Sealed official transcripts from all institutions attended.
4. A résumé.

The college may, at its discretion, request additional documentation to support the application. In addition, applicants may submit standardized test scores or any additional documentation to strengthen their application. Admission is not guaranteed, even if an applicant meets all minimum requirements.

### **Admission Information and Minimum Requirements (Ph.D. Program)**

Applications will be reviewed by the Admissions Committee after the following items have been received by the admissions office: application form, application fee, essay, resume/curriculum vitae, three letters of recommendation, and all sealed official transcripts (unofficial copies are acceptable pending receipt of sealed official transcripts). To ensure evaluation for the desired starting term, applications and all required documents must be received at least two months prior to the start of the term. Late applications that cannot be processed in time for the desired starting term will be considered for the next term.

Ph.D. Minimum Requirements are as follows:

1. An earned master's degree with a GPA of at least 3.2 from a regionally accredited institution and with an appropriate major (see program-specific admission requirements under individual programs).
2. Online application form and application fee.
3. Essay.
4. Sealed official transcripts from all institutions attended.
5. Three letters of recommendation from three people who are familiar with your academic and/or professional capabilities and able to assess your intellectual abilities, maturity, and motivation. Recommendations from your professors are preferred. Recommendations are unacceptable if they are from family members, friends, those without experience in the research-based doctorate, or from those unable to evaluate

- your academic potential to succeed in the program to which you are applying.
6. A Résumé/Curriculum vitae (CV) that provides a short account of your academic background and professional experience.
  7. Proficiency in the English language. Ph.D. students are expected to write numerous papers and a dissertation. Grammatical errors, spelling errors, and writing that does not express ideas clearly will affect a student's grades and the completion of his or her degree. The faculty will not provide remedial help concerning grammatical errors or other writing problems. Applicants who are unable to write correctly and clearly are urged to seek remedial help before applying to any of the college's programs.

The college may request, at its discretion, documentation to support the application. In addition, the applicants may submit standardized test scores or any additional documentation to strengthen their application.

Admission is not guaranteed, even if an applicant meets all minimum requirements.

### **Additional Admission Requirements for International Students**

1. The applicant must have a university-level education equivalent to a regionally-accredited United States bachelor's or master's degree in a related field (see program-specific admission requirements in this catalog) with an equivalent GPA meeting the stated minimum. A course-by-course evaluation with a GPA calculation is required. To enable CCE to determine equivalencies, applicants must have their degrees evaluated by an agency that is a member of the National Association of Credential Evaluation Services (NACES). For current information on evaluation agencies visit <http://www.naces.org/members.html>.
2. Applicants whose native language is not English are required to demonstrate English proficiency. The following standardized tests satisfy the university's English requirement for nonnative English speakers: (1) Duolingo English Test (<https://englishtest.duolingo.com/>): minimum score 105; (2) International English Language Testing System (IELTS) ([www.ielts.org](http://www.ielts.org)): 6.0 on the Academic test module; and (3) Pearson Test of English – (PTE-Academic) (<https://pearsonpte.com/>): 54 on the computer-based test; and (4) Test of English as a Foreign Language (TOEFL) ([www.ets.org/toefl](http://www.ets.org/toefl)): 80 on the Internet-based test. Official test results must be sent directly from the testing agency to Nova Southeastern University. An applicant can qualify for an exemption from taking an English proficiency examination if one of the following criteria is met: (1) successful completion of at least a bachelor's degree at a regionally approved U.S. institution of higher education; (2) passing Level 9 at Talk International Language School; (3) completion of a degree at an institution in one of the following countries: Australia, English-speaking Canada, Ireland, New Zealand, United Kingdom or Ghana.
3. Applicants for the M.S. programs may complete their degrees entirely online and do not have to travel to the United States.
4. Pursuant to U.S. Citizenship and Immigration Services (USCIS) regulations, international students who are granted full admission to a M.S. program requires

an I-20 in order to obtain a student (F-1) visa for study in the U.S. for the length of their programs. Our Ph.D. programs do not qualify for an I-20.

An Enrollment Deposit Fee for F-1 visa students of \$500 will be required to process the accepted applicant's I-20. This deposit will go toward your tuition costs once you are officially enrolled in classes and is not refundable in the event of a withdrawal or non-registration. An I-20 cannot be issued to a conditionally or provisionally admitted student. All official documents and the \$500 deposit fee must be submitted.

Detailed instructions are provided on the website of the Office of International Students and Scholars: <http://www.nova.edu/internationalaffairs/students/>. Applicants may contact the university's Office of International Students and Scholars by email: [intl@nova.edu](mailto:intl@nova.edu); telephone: 954-262-7240 or 800-541-6682, ext. 27240; or fax: 954-262-3846. An I-20 cannot be issued to a provisionally admitted student. Interested international applicants should contact the university's Office of International Students and Scholars.

5. The application fee must be in U.S. dollars.

### **Transfer Credit Policy (M.S. only)**

A maximum of six credit hours of graduate-level work will be considered for transfer if (1) the graduate credit was earned within five calendar years of course completion, (2) the credit was earned from a regionally accredited university, (3) the content of the courses requested for transfer is equivalent to an NSU course in the program of study (4) the courses were not used toward a prior awarded degree, and (5) a grade equivalent to B or higher in each of the courses requested for transfer. A grade of P (Pass) or CR (Credit) or other such grade will not be accepted. Upon admission into one of the master's degree programs, the student may request approval of transfer of credits in writing to an academic advisor. Official transcripts are required to process requests for transfer credits. The acceptance of transfer credits is at the sole discretion of the College of Computing and Engineering.

### **Administrative Withdrawal (M.S. Only)**

Other than students on a college-approved leave of absence. Any student who fails to register or enroll in any courses at the College of Computing and Engineering for a period of one year (3 consecutive full terms/semesters) or more will be considered administratively withdrawn from the program/college. Any administratively withdrawn student wishing to reenroll in the college/program, must contact their academic advisor to petition for readmission. Any student who is granted readmission will be subject to the requirements established under the current catalog in effect at the time of their readmission. Petitions for readmission are evaluated on a case-by-case basis and approval is not guaranteed.

### **Provisional Admission**

Applicants are provisionally admitted based on a review of unofficial transcripts and/or unofficial test scores. This initial status of provisional admission allows students to register for one term only (the term of acceptance). All final and official documents and

requirements must be received within ninety (90) calendar days from the start of the term. If these final and official documents and/or requirements are not received by that time, the student will not be allowed to continue class attendance. Financial aid will not be disbursed to a provisional student until he or she has been fully admitted as a regular student (all admission requirements have been approved by the Office of Admissions).”

All students must have at least provisional admission status, be officially registered, and pay tuition and fees in order to attend class, receive a grade, and receive academic credit. Students should register via SharkLink for the fall, winter, and summer semester during the open registration period, and take advantage of the university’s online degree-evaluation system Degree Works for guidance (see “Degree Works” on page 69 for more details). Students should register for all courses they intend to complete within a semester and not wait until the semester has started to register for part of a term. Petitions for changes to course registrations will only be accepted up to 20 days after each semester ends. Registering early for the entire semester ensures availability of seats in required classes and allows the NSU Office of Student Financial Assistance to properly process and disburse the student’s financial aid. An official grade will not be recorded, and credit will not be given to anyone who attends class as an unregistered student. The following holds will prevent students from registering: NSU employee hold—NSU employees must submit a Student Transaction Form (STF) to register. An online STF is available on the registrar’s website; paper STF’s may be submitted at the One-Stop Shop or the Office of the University Registrar. Other holds, such as a bursar or academic hold, may prevent students from registering. Students must contact the respective hold originator to resolve the hold before registering in SharkLink. Please note that late registration will not be accepted if a financial hold was not cleared prior to the close of the registration period.

### **University-Wide Academic Inactivity Policy**

NSU requires all students to make consistent progress toward obtaining an eligible degree or certificate program at the university. Any student who does not complete a course and earn credit(s) for three consecutive semesters/four terms will be considered inactive and withdrawn from the University, excluding any semesters/terms where the student is on an approved leave of absence. Students withdrawn pursuant to this policy who wish to continue their academic program are required to follow the readmission process as detailed in their college or academic program’s student handbook/catalog. Readmission is solely at the discretion of the student’s college or academic program and may include specific conditions, including the repeat of courses or the entirety of the academic program, when deemed appropriate by the college/academic program. Additionally, students may be subject to the admissions standards and academic program requirements as outlined in the student handbook/catalog for the academic year in which the student is seeking readmission. While this policy is intended to set forth the maximum period of academic inactivity, colleges and academic programs are permitted to adopt more stringent standards, i.e., shorter time periods of inactivity that will lead to withdrawal. Students should consult with their college or academic program for additional information about the maximum period of academic inactivity applicable to their course of study.

### **Readmission**

Any student who has been withdrawn or dismissed and wishes to re-enter the program must apply for readmission. Students withdrawn from NSU due to academic inactivity and

seeking readmission to their academic program will be required to petition their specific college or academic program for readmission.

The application for readmission cannot be submitted until one (1) year has elapsed since withdrawal or dismissal. The application for readmission must be submitted to the Office of Admissions and must include the items listed in the minimum admission requirements. The applicant, in a separate letter, must present the reasons why the conditions that led to dismissal or withdrawal have been remediated and why the applicant now feels more confident about succeeding. The applicant need only send transcripts not previously submitted. If readmitted, the student must meet all program requirements in effect at the time of readmission and will be given a new time limit for completion of the program.

### **Degree Works**

Degree Works is the University's online degree evaluation system. Degree Works is designed to help students achieve their academic goals efficiently. The system is used to compare your completed and in progress coursework against degree requirements published in the college catalog. Degree Works is not meant to replace your academic advisor/program office or the college catalog but is a reference tool to help you track your progress toward degree completion.

Degree Works enables students and advisors to measure academic progress toward degree requirements at any time through WebSTAR.

Degree Works evaluations are not official and should not be solely relied upon in making academic decisions. You should consult your academic advisor/program office for detailed program requirements and course options. To obtain additional information regarding Degree Works, please visit the Registrar's website: <http://www.nova.edu/registrar/instructions.html>

### **Standards and the Code of Student Conduct**

The university is a community of scholars in which the ideals of freedom of inquiry, freedom of thought, freedom of expression, and freedom of the individual are sustained. However, the exercise and preservation of these freedoms and rights require a respect for the rights of all in the community to enjoy them to the same extent. It is clear that in a community of learning, willful disruption of the educational process, destruction of property, and interference with the orderly process of the university as defined by the university administration or with the rights of other members of the university cannot be tolerated. Students enrolling in the university assume an obligation to conduct themselves in a manner compatible with the university's function as an educational institution.

To fulfill its functions of imparting and gaining knowledge, the university retains the power to maintain order within the university and to exclude those who are disruptive to the educational process.

**In support of the Code of Student Conduct, any violations of the Code of Student Conduct and Academic Responsibility and/or university policies and procedures**

**may result in disciplinary action. Violations of academic and standards will be handled through the College of Computing and Engineering. Violations of conduct standards, university policies, and/or procedures will be handled by the Office of the Vice President of Student Affairs. Violations of sexual misconduct/discrimination will be handled in accordance with the policies and procedural detailed in the NSU Sexual Misconduct Policy.**

Students are required to be familiar with the rules, policies, and Code of Student Conduct and Academic Responsibility detailed in the NSU Student Handbook. The NSU Student Handbook is available on the Office of Student Conduct Website, <http://www.nova.edu/studentconduct/index.html>

### **Writing Skills and Form and Style Requirements**

Students must demonstrate proficiency in the use of the English language. Writing, including grammatical errors and spelling errors, that fails to express ideas clearly will affect their grades and the completion of their academic programs. The faculty will not provide remedial help concerning grammatical errors or other writing difficulties. It is the student's responsibility to proofread and edit his or her work, which, in both form and content, should be letter-perfect. Work that is not properly edited will be rejected.

For an individual course, the course professor will specify form and style requirements in the course syllabus. For the M.S. thesis, students must follow the guidance of their thesis advisors. Ph.D. students must follow the policies, procedures, and formatting requirements contained in the school's *Dissertation Guide* (2013) for the planning and preparation of the dissertation, as well as the guidance of their dissertation advisors. M.S. and Ph.D. students may find the *Dissertation Guide* helpful in the preparation of other work. Several books contain general guidelines for form, style, and writing. *On Writing Well* (Zinsser, 2006) is an excellent guide to clear, logical, and organized writing. *The Elements of Style* (Strunk & White, 2000) is a compact handbook on the basic principles of composition, grammar, word usage and writing style. The *Publication Manual of the American Psychological Association* (APA) (2010), a comprehensive handbook on writing for publication, addresses editorial style, grammar, and organization. Give particular attention to Chapter 2, Manuscript Structure and Content; Chapter 3, Writing Clearly and Concisely; and Chapter 4, The Mechanics of Style. Chapter 3 also has good advice on writing style and grammar. Another excellent handbook on writing for publication is *The Chicago Manual of Style* (2003). The APA manual and the Chicago manual contain guidance on punctuation, spelling, capitalization, abbreviations, quotations, numbers, statistical and mathematical material, tables, figures, footnotes, appendixes, and reference citations in text. Students should use a good dictionary such as *Merriam-Webster's Collegiate Dictionary* (11<sup>th</sup> ed.).

### **Academic Misconduct**

The university is an academic community and expects its students to manifest a commitment to academic integrity through rigid observance of standards for academic honesty. The university can function properly only when its members adhere to clearly established goals and values. Accordingly, the academic standards are designed to ensure that the principles of academic honesty are upheld. The NSU Code of Student Conduct and Academic Responsibility can be viewed in its entirety online in the NSU



student Handbook at <https://www.nova.edu/studentaffairs/past-studenthandbooks.html>.  
The following acts violate the academic honesty standards:

1. **Cheating in any form:** intentionally using or attempting to use unauthorized materials, information, or study aids in any academic exercise, or having others complete work or exams and representing it as one's own.
2. **Fabrication:** intentional and unauthorized falsification or invention of any information or citation in an academic exercise.
3. **Facilitating academic dishonesty:** intentionally or knowingly helping or attempting to help another to violate any provision of this code.
4. **Conspiracy to commit academic dishonesty:** assisting others to commit acts of academic misconduct.
5. **Misrepresentation:** intentionally making false statements or omissions of facts. Examples include, but are not limited to portfolios, cover sheets, and clinic, training station, and practicum agreements.
6. **Bribery:** offering of goods, services, property, or money in an attempt to gain an academic advantage.
7. **Forging or altering documents or credentials:** examples include, but are not limited to signatures, dates and other information on portfolios, cover sheets, and clinic, training station, and practicum agreements.
8. **Knowingly furnishing false information to the institution.**
9. **Plagiarism:** the adoption or reproduction of ideas, words, or statements of another person as one's own without proper acknowledgment.
  - a. Students are expected to submit tests and assignments that they have completed without aid or assistance from other sources. Using sources to provide information without giving credit to the original source is dishonest. Students should avoid any impropriety or the appearance thereof in taking examinations or completing work in pursuance of their educational goals. Students in violation will be subject to disciplinary action.

Penalties for academic misconduct can include but are not limited to reduced grades on assignments or in courses, and failing grades on assignments or in courses, as determined by the course professor. Academic misconduct may also result in dismissal from the College of Computing and Engineering without the possibility of re-enrolling at any time. Students may not withdraw from a course in progress to avoid a failing grade upon receiving notice that academic misconduct may have occurred.

**Note: If a charge of academic misconduct is determined in a course, any student-initiated withdrawal for that course may be administratively reversed and a grade of "F" may be entered on the student's transcript for that course.**

### **Standards of Academic Integrity**

For the university-wide policy on academic standards, see the section Code of Student Conduct in NSU's *Student Handbook*, <http://www.nova.edu/studentaffairs>. Each student is responsible for maintaining academic integrity and intellectual honesty in his or her academic work.

It is the policy of the college that each student must:

- ✓ Submit his or her own work, not that of another person.
- ✓ Not falsify data or records (including admission materials and academic work)
- ✓ Not engage in cheating (e.g., giving or receiving help during examinations; acquiring and/or transmitting test questions prior to an examination; or using unauthorized materials, such as notes, during an examination)
- ✓ Not receive or give aid on assigned work that requires independent effort.
- ✓ Properly credit the words or ideas of others according to accepted standards for professional publications (see the next section *Crediting Words or Ideas*)
- ✓ Not use or consult paper writing services, software coding services, or similar services for the purpose of obtaining assistance in the preparation of materials to be submitted for course assignments or for theses or dissertations.
- ✓ Not commit plagiarism (*Merriam-Webster's Collegiate Dictionary* (2003) defines plagiarism as “stealing or passing off ideas or words of another as one’s own” and “the use of a created production without crediting the source.”) (See *Plagiarism* below)

## **Plagiarism**

### *Crediting Words or Ideas*

When using exact words from another work, quotation marks must be used for short quotations (fewer than 40 words), and block quotation style must be used for longer quotations. In either case, a proper citation must also be provided. *Publication Manual of the American Psychological Association, Sixth Edition*, (2010, pp. 170–173) contains standards and examples on quotation methods.

When paraphrasing (summarizing, or rewriting) words or ideas from another work, a proper citation must be provided. (*Publication Manual of the American Psychological Association, Sixth Edition* (2010) contains standards and examples on citation methods (pp. 174–179) and reference lists (pp. 180–224).) The *New Shorter Oxford English Dictionary* (2007) defines paraphrase as “A rewording of something written or spoken by someone else, esp. with the aim of making the sense clearer...”. Changing word order, deleting words, or substituting synonyms is not acceptable paraphrasing—it is plagiarism, even when properly cited. Rather than make changes of this nature, the source should be quoted as written.

## **Original Work**

Assignments, exams, projects, papers, theses, dissertations, etc., must be the original work of the student. Original work may include the thoughts and words of others, but such thoughts or words must be identified using quotation marks or indentation and must properly identify the source (see the previous section *Crediting Words or Ideas*). At all times, students are expected to comply with the school’s accepted citation practice and policy. The college and its faculty are committed to maintaining high standards of academic integrity. Student work will be routinely submitted to plagiarism detection tools (such as those at [www.turnitin.com](http://www.turnitin.com)) for review.

Work is not original when it has been submitted previously by the author or by anyone else for academic credit. Work is not original when it has been copied or partially copied from any other source, including another student, unless such copying is acknowledged by the person submitting the work for credit at the time the work is being submitted, or unless copying, sharing, or joint authorship is an express part of the assignment. Exams and tests are original work when no unauthorized aid is given, received, or used before or during the course of the examination, reexamination, or remediation.

Penalties for plagiarism may include, but are not limited to, reduced grades on assignments or in courses, and or failing grades on assignments or in courses, as determined by the course professor, as well as dismissal from the College of Computing and Engineering without the possibility of re-enrolling to the college at any time.

Any determination of plagiarism on a practicum or an applied dissertation (concept paper, proposal, final report), also may result in dismissal from the College of Computing and Engineering without the possibility of re-enrolling at any time.

Any course assignments and dissertations submitted in partial fulfillment of degree requirements may be checked for plagiarism. Students may not withdraw from a course in progress to avoid a failing grade or other consequence upon receiving notice that plagiarism may have occurred. If a charge of plagiarism is determined in a course, any student-initiated course withdrawal for that course may be administratively reversed and a grade of F entered on the student's transcript for that course [see Academic Misconduct]. Student access to online courses, and attendance at site-based courses, will be discontinued following a determination of plagiarism that results in an "F" for the course. All students are entitled to process pursuant to the College of Computing and Engineering policies and procedures.

### **Student Misconduct**

Students are expected to conduct themselves as respectable and respectful members of the academic community. The school will not tolerate acts of academic dishonesty, or behavior that is unethical, unprofessional, flagrantly disruptive, or that violates the general understanding of the proper conduct of graduate students. Committing an act of misconduct may subject the student to disciplinary action, including, but not limited to, dismissal from the university.

### **Procedures for Resolving Allegations of Student Misconduct**

Allegations of student misconduct must be made in writing to an advisor, faculty member, Dean, or member of the Dean's executive staff, by a faculty member, staff member, or student. Pertinent factors, witnesses, events, and evidence related to the alleged misconduct should be included. Non-academic violations will be handled by the Office of the Dean of Student Affairs pursuant to the policies and procedures detailed in the NSU Handbook. Alleged violations of academic standards will be examined by the Department Chair of the student's program who will determine if an inquiry should be conducted into the allegations he or she will notify the accused of the inquiry, including sufficient details about the nature of the allegations for the basis of the inquiry to be understood, and the specific academic standards that were alleged to have been violated. The Department

Chair may appoint a faculty designee to conduct the investigatory phase of the inquiry. Students who believe that the Department Chair has a conflict of interest which prevents them from conducting the student conduct process in an impartial manner should notify the Dean of such allegation, along with any supporting information in writing, within two business days of receiving notice of the inquiry. In such circumstances, an independent party from outside of the College will be appointed by the Dean to review such claims and make a determination if a conflict of interest exists. If the determination is made that a conflict exists, the Dean will designate a replacement faculty member to complete the student conduct process. If a determination is made that no conflict exists, the student conduct process will continue with the original Department Chair.

As part of the inquiry, all pertinent documentary evidence and statements from witnesses will be assembled by the Department Chair or his/her designee. Students are permitted to review the report that initiated the conduct process against them, and any other documentation they would otherwise be permitted to inspect or review pursuant to the Family Educational Rights and Privacy Act.

The accused will be given an opportunity to provide the Department Chair with a written response to the allegations within seven days of receipt of the inquiry notice. After reviewing the findings of the inquiry, if the Department Chair determines that misconduct has been committed, the Department Chair will identify an appropriate sanction (see NSU's Student Handbook) and make a recommendation to the Dean. The Dean may accept, reject, or modify the recommendation of the Department Chair, and will notify the student of his or her findings and penalty. The student may acquiesce or appeal in writing to the Director of Academic Affairs, or his/her designee as indicated in the correspondence provided to the student from the Dean, setting forth the grounds for appeal. Grounds for appeal are limited to:

1. The student has new, relevant evidence that was not available during the investigation that would substantially alter the outcome of the case.
2. Information that that applicable University and/or College policies/procedures were not followed, and the deviance would substantially alter the outcome of the case.
3. The sanction(s) do not relate appropriately to the violation.

Failure of the accused to appeal to the Director of Academic Affairs, or his/her designee, in writing within 10 days from the date of receipt of the report shall be construed as acquiescence of the Dean's findings and prescribed penalty. Appeals that do not rely upon the specific grounds for appeal described above will be denied. If the Director of Academic Affairs, or his/her designee, timely receives an appeal from the accused student, an appeal of an academic violation will be conducted by the College's Academic Review Board, while appeals of non-academic violations will be conducted by the Office of the Dean of Student Affairs, in accordance with the procedures detailed in the NSU Student Handbook. The College's Academic Review Board will consider the grounds for appeal cited by the student and may uphold, overturn, or modify the Deans decision or remand the matter back to the Department Chair for further investigation. The decision of the College's Academic Review Board is final.

## **Registration**

Students must be officially registered prior to the start of courses in order to participate in and receive credit for those courses. Students can register and confirm their registration status by accessing NSU SharkLink ([sharklink.nova.edu](http://sharklink.nova.edu)). Prior to registration, students must complete the Nova Southeastern University Student Enrollment Agreement (SEA) each semester or risk being dropped from their courses. To avoid late fees, students should register during the open registration period before the registration deadline. Students should register for all courses they intend to complete within a semester and not wait until the semester has started to register for part of a term. Petitions for changes to course registrations will not be accepted beyond 20 days after each semester ends. Registering early for the entire semester ensures availability of seats in required classes and allows the NSU Office of Student Financial Assistance to properly process and disburse the student's financial aid. Students must be fully admitted in order for financial aid funds to disburse. An official grade will not be recorded, and credit will not be given for anyone who attends class as an unregistered student.

All holds must be cleared at the time of registration, and all registrations must be completed by the last date of the registration period. Late registration will not be accepted if due to a financial hold that was not cleared prior to the close of registration period. Registration after the close of the published registration period, when permitted, may incur a late registration fee. Registration materials are available on the school's website.

Auditing of courses is not allowed or permitted by the College of Computing and Engineering.

## **Unregistered Students**

Students who are not registered are not eligible to receive academic services from faculty and staff members and are not eligible to receive computing, library, and other university services. Doctoral students, see also section Leave of Absence.

## **Withdrawals**

(See the section Grade Policy Regarding Withdrawals.)

A student withdrawing from a course may be eligible for a refund (full or partial) of tuition paid (not including fees) depending on the date of withdrawal request. Course withdrawal requests must be submitted to the program office in writing via postal mail or NSU email by the student. Requests for withdrawal must be received by the program office by the withdrawal deadline date for that term. (See Academic Calendar on page ii). The amount of refund, if any, will be calculated as a percentage of the course tuition, as published on the school's website. If a student is using one of the payment plans (see section Tuition Payment Options) the tuition due or the amount refunded will be adjusted accordingly. International students must be aware that their immigration status can be affected by changes in their course schedule.

## **Attendance Policy**

Students are required to be present at each meeting of their classes on campus. Exceptions to this rule may be made in the case of illness or in other hardship situations when approved by the course professor. Students should advise their course professors

in advance of any anticipated absences. Additional work may be required by a course professor for any absence. Excessive absences will result in a failing grade. For online and hybrid courses, participation/attendance policies will be covered in the syllabus of each course. In particular, each course requires substantial participation in the first week of each term.

### **Student Research Involving Human Subjects**

All students must be aware of the university's policy regarding research involving human subjects. The instruments and protocols of surveys, interviews, tests, or any other types of assessments involving human subjects must be reviewed in advance by the university's Institutional Review Board (IRB). The purpose of the IRB is to protect the rights of human subjects involved in research and ensure appropriate practices are being carried out at NSU. CCE has a representative to the IRB who can help students with the review process. There are three levels of review: exempt, expedited, and full review. The CCE representative guides students regarding the level of review required and assists with any paperwork and procedures that might be required. Most research at CCE involving human subjects falls into the exempt category, which requires a rather simple process, but it must be logged appropriately. Doctoral students doing such research should contact the CCE IRB representative by the time they start working on their dissertation proposals. Additional information can be found at <http://www.computing.nova.edu> .

Courses also may involve human subject research. In most cases, faculty members secure approval in advance for all students in the course. Students planning to conduct human subject research in a course should raise the matter with their professor. Students may obtain additional information from the program office and from <http://www.nova.edu/irb/index.html>.

### **Student Participation in Extracurricular Research**

Research is a critical component in maintaining the quality of educational programs. Research may require the collection of data from human subjects. Students may be requested by faculty to participate as human subjects in research activities. The NSU Institutional Review Board (IRB) has established procedures to ensure that all research involving human subjects complies with applicable federal laws and regulations. An important consideration in obtaining IRB approval of research is the protection of the privacy of the human subjects participating in the study. While most research studies are designed to offer some level of privacy protection to the participants, the complete anonymity of the participants cannot be guaranteed in all research activities conducted at NSU. However, a primary protection provided by the IRB process is that no researcher may involve individuals as subjects in research without their informed consent. CCE students are advised that while their participation in these research activities is extremely valuable to the researchers conducting these investigations, their participation is strictly voluntary. No CCE student will be required to participate in any research activity that is conducted outside the scope of established course activities. Students are encouraged to discuss the scope and requirements of any research program with the principal investigator prior to volunteering to participate in the research activity. Any questions regarding the IRB can be directed to the CCE IRB representative.

## Thesis Option

(Applicable to programs that support a thesis.) For the thesis option, students must register twice for 699 for a total of six credit hours. These credit hours are in lieu of six credit hours of course work (usually electives). Students who have not completed the thesis by the end of the second thesis registration must register for continuing thesis. Students interested in the thesis option should contact the program office to make arrangements.

## The Dissertation

Students must successfully pass the qualifier stage, secure an advisor and dissertation committee, and have an approved Idea Paper before pursuing dissertation course registration. Students will have qualified for doctoral candidacy and be permitted to register for Doctoral Dissertation after they have completed their required course work with a minimum cumulative GPA of 3.20 completed at least two sections of Doctoral Research and submitted a dissertation idea approved by a faculty advisor and two readers. Three registrations of Doctoral Dissertation are required, to be taken over three consecutive terms. The dissertation is the most important requirement for the Ph.D. Each student is expected, with the approval of a faculty advisor, to select an appropriate topic of sufficient scope to satisfy the requirements for the dissertation. Although registration for Doctoral Dissertation cannot occur until doctoral candidacy is established, students are encouraged to learn about the dissertation process as early as possible and to begin talking with faculty members about potential research topics early in the program. The dissertation must be an original work and must represent a significant extrapolation from a base of solid experience or knowledge in the student's area of concentration. Dissertation results must, in a significant way, advance knowledge, improve professional practice, or contribute to understanding in the field of study. Results must be of sufficient strength to distill from the work a paper worthy of publication in a major journal. Although publication is not a requirement for completing the Ph.D., students are encouraged to submit their dissertation research for publication. Ph.D. students must follow the policies, procedures, and formatting requirements contained in the *Dissertation Guide* [https://computing.nova.edu/doctoral/documents/dissertation\\_guide.pdf](https://computing.nova.edu/doctoral/documents/dissertation_guide.pdf) (Students are required to present an oral defense of the dissertation).

## Grading System

Grade	Grade Points
A	4.0
A–	3.7
B+	3.3
B	3.0
B–	2.7
C+	2.3
C	2.0
C–	1.7
F	0.0
I	A temporary grade assigned for incomplete course work.
P	Pass. Indicates successful completion in a course. Carries credit hours but no grade points.

W	Withdrawn from course
PR	Progress. May be assigned to thesis or dissertation. Carries credit hours but no grade points. Indicates progress toward completion of a thesis or dissertation.
NPR	No Progress. May be assigned to thesis or dissertation. Carries no credit hours. Indicates insufficient progress toward completion of a thesis or dissertation. Repeated NPR grades will result in probation (see section Evaluation of Research Progress).

To determine the grade point average (GPA), divide the sum of all the grade points earned in graduate courses taken toward the graduate degree by the number of course credit hours taken toward that degree. Only those courses and projects taken toward the degree that carry grade points, except courses that have been repeated and transfer credits, are included in the computation of the GPA. The grades of I, W, PR, and NPR do not affect the GPA. With the exception of the grade of I, once a final grade in a course has been recorded by the Office of the University Registrar it can be changed only in cases of computational error or other justifiable cause approved by the dean (see Challenge of Course Grade). A student may not do additional work nor repeat an examination to raise a final grade.

### **The Temporary Grade of Incomplete (I)**

The temporary grade of Incomplete (I) will be granted only in cases of extreme hardship. Students do not have a right to an Incomplete, which may be granted only when there is evidence of just cause. A student desiring an Incomplete must submit a written appeal to the course professor at least two weeks prior to the end of the term. In the appeal, the student must: (1) provide a rationale; (2) demonstrate that he/she has been making a sincere effort to complete the assignments during the term; and (3) explain how all the possibilities to complete the assignments on time have been exhausted. Should the course professor agree, an *Incomplete contract* will be prepared by the student and signed by both student and professor. The Incomplete contract must contain a description of the work to be completed and a timetable. The completion period should be the shortest possible. The completion date will not typically extend beyond 30 days from the last day of the term for master's courses or 60 days from the last day of the term for doctoral courses. The Incomplete contract will accompany the submission of the professor's final grade roster to the program office. The program office will monitor each incomplete contract. When the incomplete contract ends. The course professor will assign a grade based upon the work completed. No student may graduate with an "I" on his or her record. The grade of an "I" does not apply to master's thesis or doctoral dissertation registrations.

### **Grade Policy Regarding Withdrawals**

Course withdrawal requests must be submitted to the program office in writing by the student. Requests for withdrawal must be received by the program office by the withdrawal deadline (see specific withdrawal deadline dates in the Academic Calendar on p. ii). Withdrawals sent by email must be sent from the student's assigned NSU email account. Requests for withdrawal received after 11:59 p.m. on the withdrawal deadline date will not be accepted. Failure to attend class or participate in course activities will not automatically drop or withdraw a student from the class or the university. Students who have not withdrawn by the withdrawal deadline will receive letter grades that reflect their



performance in the course. When a withdrawal request is approved, the transcript will show a grade of *W (Withdrawn)* for the course. Students with four withdrawals will be subject to dismissal from the program. Depending on the date of withdrawal, the student may be eligible for a partial refund (see the program sections Refund Policy Regarding Withdrawals).

### **Repeating a Course**

See the paragraphs Academic Progress, Grade Requirements, and Academic Standing.

### **Unregistered Students**

Students who are not registered are not eligible to receive academic services from faculty and staff members and are not eligible to receive computing, library, and other university services. Doctoral students, see also section Leave of Absence.

### **Student Records and Transcripts**

The university maintains a system of record keeping and provides students with official grade reports and transcripts reflecting their academic progress. This system documents all official information from the time of application for admission to graduation. Official hard copies of records are maintained by the registrar's office. Records are secured via the computerized student information system in addition to back-up hard copy files. Computer files are secure and kept up to date. The registrar's office follows the American Association of Collegiate Registrars and Admissions Officers (AACRAO) guidelines for the retention and disposal of records. After the appropriate time period, hard copy files are retired to storage. Computer files are moved to historical files and permanent records are microfilmed for later reference.

To obtain an official transcript, visit [www.nova.edu/registrar](http://www.nova.edu/registrar) and click on Transcript Requests. Official transcripts of a student's academic record cannot be released until after all of his or her accounts, academic or nonacademic, are paid. Upon completion of a degree program at the university, students receive one transcript without charge. Any other transcripts, before or after graduation, must be specifically requested. For these, there is a fee for each official transcript requested.

### **Challenge of Course Grade**

A student who wishes to challenge a grade assigned for an entire course must communicate with the course professor, in writing, within 15 calendar days of posting of the grade. In this communication, the student must state the reasons for requesting a change in the grade. A decision will be made by the course professor following his or her review of the appeal. If the student is not in agreement with the course professor's decision, the student can choose to appeal, in writing, to the department chair. The chair will review the appeal and return a decision in writing. The student will not be permitted further appeal. A student may neither do additional work nor repeat an examination to raise a final grade.

### **Student Grievance Procedure**

This section describes the procedure for student grievances regarding academic matters other than grades. If the issue concerns the fairness of a grade, the procedure described in the section Challenge of Course Grade must be followed. Grievance procedures for

nonacademic disputes are contained in NSU's *Student Handbook*. First, the student should attempt to resolve the matter at the level at which it occurred, e.g., the appropriate faculty member or staff member. This attempt must be in writing. The student may wish to use certified mail to verify receipt of correspondence. In the correspondence, the student must present a rationale for his or her position based on factual information. The student will receive a reply from the recipient, in writing, that addresses the complaint. If the reply is not acceptable, the student is encouraged to submit the complaint, in writing, to the next higher level, usually the department chair. If the department chair is unable to resolve the complaint, he or she will notify the student and the Dean of this in writing. The student may then appeal in writing to the Dean of the College of Computing and Engineering who will attempt resolution. If appropriate, the Dean may assign the matter to the Academic Review Board. The committee will meet, carefully review the case, hold a hearing if necessary, and make a written recommendation, including rationale, to the Dean to either accept or reject the appeal, or may propose an approach to resolve the complaint. The Dean will review the Academic Review Board's findings and recommendation and will notify the student in writing of his or her decision. The Dean's decision is final and cannot be appealed.

### **Image Use Statement**

As part of the Student Enrollment Agreement (SEA), which students must complete with their first registration each academic year, students are required to agree with the following Image Use Statement: I permit and authorize Nova Southeastern University (NSU) and its employees, agents, representatives, contractors, and personnel who are acting on behalf of NSU at any NSU-related events or at any public areas on NSU's property to take and/or obtain and use my photograph, name, alias, a video and/or audio recording, or other likeness of myself (hereinafter collectively referred to as "My Likeness"). I grant NSU permission to take and use My Likeness for purposes related to the educational mission of NSU, including instructional and/or educational purposes, as well as publicity, marketing, promotion, or other commercial ventures for NSU and its various programs without compensation to me. I understand my Likeness may be copied/reproduced and distributed in any media format. I further understand that My Likeness may be subject to reasonable modification and/or editing. I acknowledge that NSU has the right to make one or more reproductions of My Likeness in any media. I waive any right to inspect or approve the finished product or material in which NSU may eventually use My Likeness. I acknowledge that NSU owns all rights to My Likeness. I understand that, although NSU will endeavor to use My Likeness in accordance with standards of good judgment, NSU cannot warrant or guarantee that any further dissemination of My Likeness will be subject to NSU supervision or control. Accordingly, I release NSU from any and all liability related to the dissemination, reproduction, distribution, and/or display of My Likeness in any media format, and any alteration, distortion, or illusionary effect of My Likeness, whether intentional or otherwise, in connection with said use. I also understand that I may not withdraw my permission for use of My Likeness which was granted. Online Course Access and Shark.

### **Communication by Email**

Students must use their NSU email accounts when sending email to faculty and staff and must clearly identify their names and other appropriate information, e.g., course or program. When communicating with students via email, faculty and staff members will only send email to students' NSU email accounts. Students who forward their NSU-generated email to other email accounts do so at their own risk. CCE uses various course management tools that use private internal email systems. Students enrolled in courses

using these tools should check both the private internal email system and NSU's regular email system. NSU offers students web-based email access. Students are encouraged to check their NSU email accounts and their course management email accounts daily.

### **Academic Progress, Grade Requirements, and Academic Standing**

Students are expected to maintain satisfactory academic progress through their programs. Relevant academic policies are as follows (also see the section Time Limitations):

#### **The following requirements apply to M.S. students:**

- ✓ Each student must maintain a cumulative grade point average (GPA) of at least 3.0 for the duration of his or her program to remain in good academic standing. When the cumulative GPA falls below 3.0 the student is automatically placed on academic probation and will not be permitted to graduate. (Academic probation may adversely affect financial aid.) If the cumulative GPA is not raised to 3.0 within two terms the student may be dismissed from the program. Upon achieving a cumulative GPA of 3.0, the student will be removed from academic probation. If the cumulative GPA could not possibly be raised to 3.0 within the required period, the student will be dismissed.
- ✓ Students with four withdrawals will be subject to dismissal.
- ✓ Students who receive a grade of "F" have the right to repeat the course. Students who receive a second grade of F in any course will be subject to dismissal (independent of whether the first F was repeated with a passing grade).
- A student who has passed a course with a grade of B or higher is not permitted to repeat it for credit. A student receiving a grade of B– or lower has one opportunity to repeat the course and earn a higher grade. Students are recommended to consult with their academic advisor before registering for a repeated course. Students may not repeat more than two courses to earn passing grades. The transcript will show both the original and repeat grades; however, only the higher grade will be counted in the student's cumulative GPA. Students repeating a course must pay course tuition and fees.

#### **The following requirements apply to Ph.D. students:**

- Students must maintain a cumulative grade point average (GPA) of at least 3.20 for the duration of their programs to remain in good academic standing. If the cumulative GPA falls below 3.20 the student will automatically be placed on academic probation. (Academic probation may adversely affect financial aid.) If the cumulative GPA is not raised to 3.20 within two terms the student will be dismissed from the program. Upon achieving a cumulative GPA of 3.20, the student will be removed from academic probation. If the cumulative GPA could not be raised to 3.20 within the required period, the student will be subject to dismissal. Students who do not have a cumulative GPA of 3.20 at the end of their course work will not be eligible to enter doctoral candidacy or register for dissertation.
- Students with four withdrawals will be subject to dismissal.
- Students may repeat a doctoral course to replace the earned grade (whether it was passing or failing). At most two courses may be repeated. Students repeating a course must pay course tuition and fees.

- . Students may not repeat a master's course taken to fulfill requirements specified on admission to the doctoral program.
- . Students who receive two failing grades will be subject to dismissal (independent of whether the first F was repeated with a passing grade).
- . Doctoral courses taken to satisfy prerequisite requirements must be completed with a grade of B or better.
- . Registered but inactive dissertation students risk losing their advisors/committees, especially if their inactivity has not been coordinated with their advisors.
- . Students who make sustained unsatisfactory progress toward the completion of a dissertation will be placed on probation, and are subject to dismissal (see the section Evaluation of Research Progress).
- . Doctoral Research courses can be taken a maximum of four times (regardless of NPR or PR grade). Students who do not complete their Idea Paper within such timeframe will be subject to dismissal.

### **Evaluation of Research Progress (Doctoral Students Only)**

(See the section Academic Progress, Grade Requirements, and Academic Standing.)

Students are evaluated each term by their dissertation committee regarding their research progress. The purpose of such evaluations is to provide students with relevant and timely feedback concerning their overall performance in the dissertation process. Students that receive a total of three NPR grades may be subject to dismissal from the Ph.D. program. Students must demonstrate proficiency in the use of the English language in all work submitted during the dissertation process. Grammatical errors, spelling errors, and writing that fails to express ideas clearly and may result in a NPR grade. The faculty will not provide remedial help concerning grammatical errors or other writing problems that students might have. Students who are unable to write clearly and correctly are urged to obtain remedial help. (See the section Writing Skills and Form and Style Requirements.)

### **Administrative Withdrawal**

Doctoral students are expected to register for courses or dissertation credits continuously from acceptance in the program until graduation. In the event of circumstances that preclude registration for course or dissertation credit, the student must notify the Academic Advising department in the Office of Academic Affairs, in writing, of their intent to take a leave of absence. The leave should be coordinated with the student's dissertation chair, if such a relationship exists, before approval by the Office of Academic Affairs. Note that coordination with the dissertation chair does not guarantee that the dissertation committee will continue to work with the student upon the student's return. Any Doctoral student who fails to register for courses or dissertation credits continuously and is not on a leave of absence will automatically be administratively withdrawn from their academic program. Any administratively withdrawn doctoral student who wishes to resume their academic program must contact their academic advisor to petition for readmission.

Petitions for readmission are evaluated on a case-by-case basis and approval is not guaranteed.

Student who wishes for a leave of absence from his/her program of study must follow the procedure outlined below:

### **Leave of Absence Policy**

A leave of absence (LOA) is a university-approved temporary period of time during which the student is not in attendance but is not considered withdrawn from the university. Students who experience extenuating and unavoidable circumstances that prevent them from maintaining an active status through continuous enrollment must consult with their advisor/program office to determine whether their circumstances warrant an LOA request and to discuss the impacts of an approved LOA on their degree/program completion, academic standing, course grades, and conditions for return. Financial aid recipients who wish to request an LOA must also consult with a financial aid counselor to learn about impacts on their financial aid eligibility. An LOA request must be submitted at least 14 days prior to the beginning of the semester/term for the leave. Leaves requested after the semester/term has begun will be considered for approval only in a documented extreme circumstance. An approved LOA may be granted for up to 180 days within a 12-month period. For more details, including the Leave of Absence Request Form, visit the Office of the University Registrar's website at <https://www.nova.edu/registrar/policies/leave-of-absence-policy.html>.

### **Time Limit for Degree Completion Masters**

Students must complete requirements for the master's degree within five (5) years from the initial term of registration. Students unable to complete the program within this five-year timeline may be subject to dismissal.

Students who experience unexpected extenuating circumstances that inhibit their ability to complete all program/degree requirements within five years may request an extension of time of up to one (1) year (maximum). Requests must be received during the last term prior to the expiration of the five-year timeframe for program/degree completion, for consideration. Students must be in good academic and financial standing to be eligible for an extension.

### **Doctoral**

Students must have an approved dissertation proposal within eight (8) years of the date of their first registration and have completed all requirements for the Ph.D. degree within ten (10) years from the initial term of registration. Students unable to complete the program within this ten-year timeline may be subject to dismissal.

Students who experience unexpected extenuating circumstances that inhibit their ability to complete all program/degree requirements within the ten-year timeframe, may request an extension of time of up to one (1) year (maximum). Extension requests must be received prior to the expiration of the ten-year timeframe for program/degree completion, during students' last term of enrollment, for consideration. Students must be in good academic and financial standing to be eligible for an extension.

### **Independent-Study Basis and Taking a Course in Another Program**

Each of these requires the student to submit a request for approval to the relevant department chair prior to registration. *Independent-study basis* means taking a course that is published in the curriculum of the program under which the student is enrolled but is not currently offered (it would be taken under the supervision of a faculty member). The student would register for the course prefix and number listed in the curriculum. *Taking a course in another program* means taking a course in one of the school's programs in which

the student is not enrolled. For each of these cases, the department chair will review the student's record to determine the appropriateness of the request. If the request appears to be consistent with the student's program and school policies, the department chair will consult with the appropriate faculty member for possible approval and will notify the student of the decision and any requirements.

### **Student Services**

(For additional services see the NSU website and the NSU Student Handbook.)

### **NSU Cards**

The NSU Card is the official Nova Southeastern University identification card, and each registered student is issued one. Students are required to carry and display the NSU Card for identification purposes when at the university. Cards are required to check out books from the library and for many other purpose <https://www.nova.edu/nsucard/apply/index.html>

A number of businesses in the community will give students discounted rates on a variety of services ranging from movies to dinner if an NSU card is shown. If an NSU card is lost or destroyed, a new one may be requested at the NSU Card Office. There is a fee to replace the card.

### **Textbooks**

Book information is available online. Barnes & Noble College Bookstores, the university's official bookstore, offers comprehensive services to local and online students. While students have the option to purchase textbooks from other online and local sources, there may be benefits from purchasing from the university's bookstore (on-campus or online). The university's bookstore provides a wide range of shipping options. The university bookstore posts book titles on its website at least one month prior to the start of each term. Students should order their books early enough to ensure delivery prior to the start of the term in the event that e-texts are not available. There may be occasions when books are not available for the start of the term because they are out of stock or temporarily out of print. In such cases, faculty members will ensure that courses progress according to their schedules. It is recommended that students order each book by its ISBN number in order to be assured of obtaining the edition required for the course.

### **Student Housing**

The Office of Residential Life and Housing helps students find housing on- and off-campus. One- and two-bedroom furnished apartments are available for graduate students without children. For further information about on-campus and off-campus housing contact the university's Office of Residential Life and Housing at 954-262-7052 or 800-541-6682, ext. 27052.

### **Travel Services**

Nova Southeastern University has a full-service travel agency that can make reservations, issue airline tickets, and reserve rental cars. In addition, travel agents can assist with making arrangements for trips and vacations. NSU's travel agency accepts money orders and major credit cards. The travel agency can be reached at [www.nova.edu/travel/index.html](http://www.nova.edu/travel/index.html) or via email: [travel@nova.edu](mailto:travel@nova.edu)

## Alumni Association

For information, visit NSU's Alumni Association at <https://alumni.nova.edu>

## Graduation Requirements

Students must complete the minimum number of credit hours designated for the chosen program, and must meet the following requirements:

- ✓ Satisfaction of program and academic requirements including completion of courses, master's thesis where appropriate and, for the Ph.D., an approved dissertation as specified in program documentation.
- ✓ Ph.D. students: Attendance at all required class meetings.
  
- ✓ Attainment of a cumulative GPA of at least 3.0 (M.S. students) and 3.20 for students.
- ✓ Complete and submit the *Application for Degree* form and submit payment of the degree application fee: <http://www.nova.edu/registrar/instructions.html>
  - Master's students should complete the form at the time of registration for their final term.
- ✓ Doctoral students should complete the form upon written notification of acceptance of their dissertation report.

Note: Existing holds and outstanding balances will not prevent degree conferral, but failure to complete and submit a degree application in a timely manner will affect your degree conferral date. Understand, however, that no diploma, transcripts or degree verification will be released until all financial obligations have been satisfied.

## Degree Conferral

Nova Southeastern University will recommend the candidate to the Board of Trustees for the degree *only* upon completion of all program requirements for the degree. Degrees are typically awarded at the end of the official term of the candidate's last term of enrollment. All financial obligations with the university must be cleared at the time of degree conferral.

## Commencement

The graduate commencement ceremonies are held annually in June. All graduating students are encouraged to participate in this important ceremony; however, students are not required to attend the ceremony to have their degrees awarded.

Commencement participation eligibility requirements:

- ✓ **Master's students:** Scheduled to have all coursework completed by the end of the summer term of the same year.
- ✓ **Doctoral students:** completion of all coursework and degree requirements by the end of the winter term of the same year.
  
- ✓

## Department of Computing

Programs: B.S. Computer Science; B.S. Information Technology; M.S. Computer Science; M.S. Cybersecurity Management., M.S. Information Assurance and Cybersecurity M.S. Information Systems; M.S. Information Technology; M.S. Data Analytics; M.S. Technology

and Organizational Leadership; Ph.D. Computer Science; Ph.D. Cybersecurity Management; Ph.D. Information Systems.

### **Department of Engineering**

Programs: B.S. Engineering.

*\*Undergraduate curricula are detailed in the NSU Undergraduate Catalog.*

### **Master of Science in Computer Science**

The Master of Science in Computer Science is a 30 credit-hour degree program designed to give students a thorough knowledge of the field and to provide an enduring foundation for future professional growth. Offered online and on-campus in South Florida, the Master of Science in Computer Science degree program blends theory and practice into a learning experience that develops skills applicable to complex real-world problems.

Students take five core courses covering the theory of programming languages, the design and analysis of algorithms, operating systems, database management systems, and software engineering. Three or more courses are then taken in one of the following concentrations of the student's choosing: software engineering; artificial intelligence, computer systems; data science; information assurance and cybersecurity; and real-world computing. Students can elect a no concentration option. Remaining courses are electives drawn from computer science course offerings.

The security concentration in the M.S. in Computer Science is part of the Center for Information Protection, Education, and Research (CIPhER) that is recognized as a National Center of Academic Excellence in Cybersecurity (CAE-C) in Cyber Defense (CD) by the U.S.

National Security Agency (NSA) and its federal partners.

### **Learning Outcomes**

A graduate with a M.S. in Computer Science will have the ability to (1) communicate computer science concepts, designs, and solutions effectively and professionally; (2) apply knowledge of computing to produce effective designs and solutions for specific problems; (3) identify, analyze, and synthesize scholarly literature relating to the field of computer science; and (4) use software development tools, software systems, and modern computing platforms.

### **Program-Specific Admission Requirements**

(For general requirements, see the section Admission.)

This program is designed for students with undergraduate majors in computer science, engineering, mathematics, or physics, or a closely related field, and who have completed courses or have equivalent experience in data structures and algorithms, assembly language, computer architecture, programming in a modern high-level language, systems software (compilers or operating systems), calculus (differential and integral calculus), and discrete mathematics.



Applicants who do not have adequate backgrounds may be required to take one or more of the following 500-level graduate courses during the first two terms of the student's program (courses are 3 credits each):

CISC 501 Computer Organization and Architecture

CISC 502 Mathematics in Computing

CISC 503 Data Structures and Algorithms

MSIT 501 Foundations of Programming, Data Structures and Algorithms

These are in addition to the required 30 credit hours of courses at the 600 level. Courses at the 500 level, when required, must be successfully completed prior to taking courses at the 600 level. All 500-level courses must be completed with a grade of B or higher to continue in the program. MSIT 501 is a prerequisite to CISC 503.

### **Curriculum for the M.S. in Computer Science**

The M.S. in Computer Science is offered with five concentrations along with a no concentration option. Students must complete a total of 30 credits. Core courses, concentrations and electives are listed below. If the thesis option is elected, a thesis will replace two of the elective courses. Plans for the thesis option must be made with and approved by the program office.

#### **Core Courses** (3 credits each)

CISC 610 Programming Languages

CISC 615 Design and Analysis of Algorithms

CISC 640 Operating Systems

CISC 660 Database Management Systems

CISC 680 Software Engineering

#### **Artificial Intelligence Concentration** (4 courses, 3 credits each)

CISC 662 Data Mining and Knowledge Discovery in Databases

CISC 664 Information Retrieval and Web Search Engine Technology

CISC 670 Artificial Intelligence

CISC 685 Interaction Design

#### **Computer Systems Concentration, Courses** (3 credits each)

ISEC 660 Advanced Network Security

CISC 650 Computer Networks

CISC 665 Distributed Systems

#### **Data Science Concentration Courses** (3 credits each)

CISC 662 Data Mining and Knowledge Discovery in Databases

CISC 664 Information Retrieval and Web Search Engine Technology

CISC 672 Data Visualization

MMIS 671 Fundamentals of Data Analytics and Business Intelligence

#### **Information Assurance and Cybersecurity Concentration Courses** (3 credits each) **(Choose four)**

ISEC 615 Fundamentals of Security Technologies

ISEC 620 Applied Cryptography  
ISEC 640 Database Security  
ISEC 650 Computer and Network Forensics  
ISEC 660 Advanced Network Security

**Real-World Computing Concentration Courses** (3 credits each)

CISC 665 Distributed Systems  
CISC 668 Mobile Application Development  
CISC 670 Artificial Intelligence  
CISC 681 Computer Graphics

**Software Engineering Concentration Courses** (3 credits each)

CISC 682 Software Requirements Engineering  
CISC 683 Object-Oriented Design  
CISC 684 Software Testing and Verification  
CISC 685 Interaction Design

**No Concentration Option** (5 courses, 3 credits each)

Select a mix of courses from Concentrations and/or Electives.

**Elective Courses** (3 credits each)

Any course in the concentrations aforementioned is also an elective course in the program. Additionally, any offerings of or CISC 690-Special Topics in Computer Science, will count as an elective.

**Master of Science in Cybersecurity Management**

The M.S. in Cybersecurity Management is a 30 credit-hour degree program designed for individuals who want to focus on security policy development and compliance by obtaining the necessary skills and abilities for the development of organizational policies related to information assurance/cybersecurity defense and the analysis of operational systems for compliance with applicable related laws and policies.

The M.S. in Cybersecurity Management is recognized by the National Security Agency (NSA) and its federal partners who have certified that NSU's curriculum in cybersecurity meets or exceeds the requirements and standards expected of a leader in cybersecurity research and education. NSA and its federal partners recognized that NSU's graduate curriculum met the additional requirements for educational specializations in network security engineering and information security policy development and compliance. As a result of this certification, Federal agencies may sponsor civilian and military personnel to take the college's certified graduate courses.

**Learning Outcomes**

A graduate with an M.S. in Cybersecurity management will have the ability to (1) communicate cybersecurity management concepts professionally, (2) develop of organizational policies related to cybersecurity for effective solutions, (3) apply knowledge of information security compliance with applicable polices to perform cyber risk management analysis using recognized cybersecurity standards; (4) demonstrate knowledge, skills, and abilities (KSAs) to apply security control measures to mitigate cyber risks.

## **Program-Specific Admission Requirements**

(For general requirements, see the section Admission.)

This program is designed for students with undergraduate majors in computer science, information systems, information technology, engineering, mathematics, or physics.

Applicants must have knowledge of data structures and algorithms and structured programming in a modern high-level language.

Applicants who do not have an adequate background may be required to take the following 500-level graduate course during the first term of the program:

MSIT 501 Foundations of Programming, Data Structures, and Algorithms (3 credits)

This course is in addition to the required credit hours at the 600 level. Courses at the 500 level, when required, must be completed prior to taking courses at the 600 level. All 500-level courses must be completed with a grade of 'B' or higher to continue in the program.

## **Curriculum for the M.S. in Cybersecurity Management**

Students must take all 10 required courses in the list that follows. Students who wish to take an elective (above the 10 required courses) must request approval from the program office before registration.

### **Core Courses** (3 credits each)

MMIS 621 Information Systems Project Management

MMIS 623 Ethics in Computing

MMIS 653 Telecommunications and Computer Networking

MMIS 680 Human-Computer Interaction

MSIT 630 Database Systems

ISEC 615 Fundamentals of Cybersecurity

ISEC 635 Information Security Operations Management

ISEC 655 Information Security Governance

ISEC 675 Information System Auditing

ISEC 695 Information Security Management Project

## **Curriculum for the Graduate Cybersecurity Management Certificate**

### **Cybersecurity Certificate Curriculum** 12 credits (4 courses, 3 credits each)

ISEC 615 Fundamentals of Cybersecurity

ISEC 635 Information Systems Operations Management

ISEC 655 Information Security Governance

ISEC 675 Information System Auditing

## **Master of Science in Data Analytics**

The Master of Science in Data Analytics is a 30 credit-hour degree program at Nova Southeastern University's College of Computing and Engineering. Offered online and on-campus in South Florida, the Master of Science in Data Analytics program focuses on the application of concepts and methods central to data analytics, database management,

data warehousing, data mining, data visualization, forecasting and predictive modeling. The program incorporates creativity, vision, strategic planning, and technology for analytics and decision making. This program blends theory and practice into a learning experience that develops skills applicable to complex, real-world problems and organizations.

### **Learning Outcomes**

A graduate with a M.S. in Data Analytics will have the ability to (1) communicate data analytics concepts, designs, and solutions effectively and professionally; (2) apply knowledge of data analytics to produce effective designs and solutions for specific problems; (3) identify, analyze, and synthesize scholarly literature relating to the field of data analytics, (4) evaluate data analytics techniques for management planning and decision making.

### **Program-Specific Admission Requirements**

(For general requirements, see the section Admission.)

The Master of Science in Data Analytics is designed for students with undergraduate majors in computer science, business, information systems, information technology, engineering, mathematics, or physics.

### **Curriculum for the M.S. in Data Analytics**

#### **Core Courses** (7 courses, 3 credits each):

MSIT 501 Fundamentals of Programming, Data Structures, and Algorithms

MSIT 630 Database Systems

MMIS 642 Data Warehousing

MMIS 643 Data Mining

MMIS 671 Data Analytics

CISC 672 Data Visualization

MMIS 692 Data Analytics Project

#### **Choose three courses** (3 courses, 3 credits each):

ISEC 615 Fundamentals of Cybersecurity

MMIS 621 Information Systems Project Management

MMIS 623 Ethics in Computing

MMIS 644 UX Strategy for Social Media

CISC 685 Interaction Design

### **Curriculum for the Graduate Data Analytics Certificate**

#### **Data Analytics Certificate** 12 Credits (4 courses, 3 credits each)

MMIS 642 Data Warehousing

MMIS 643 Data Mining

MMIS 671 Data Analytics

MSIT 630 Database Systems

### **Master of Science in Information Assurance and Cybersecurity**

The Master of Science in Information Assurance and Cybersecurity is a 30 credit-hour

degree program designed for someone who wants to focus on network security engineering by obtaining the necessary skills and abilities for the design of secure network infrastructures and security analysis of network traffic.

This program was developed to address the rapidly growing global problems of maintaining and securing computer information. Offered online and on-campus in South Florida the Master of Science in Information Assurance and Cybersecurity degree program addresses important topics such as, threats and vulnerabilities, cryptography, authentication and access control, security models, network security, trusted computer systems, distributed systems security, Internet security, applications security, and security management and policies.

The National Security Agency (NSA) and its federal partners have certified that NSU's curriculum in information security meets or exceeds the requirements and standards expected of a leader in cybersecurity education. In particular, NSA and its federal partner recognized that NSU's graduate curriculum met the additional requirements for educational specializations in network security engineering and information security policy development and compliance. As a result of this recognition federal agencies may sponsor civilian and military personnel to take the school's certified graduate courses.

NSU is designated as a National Center of Academic Excellence in Cybersecurity (NCAE-C) - Cyber Defense (CD), and NSU's College of Computing and Engineering is hosting the Center for Information Protection, Education, and Research (CIPHER).

### **Learning Outcomes**

A graduate with an M.S. in Information Assurance and Cybersecurity will have the ability to (1) describe the primary types of access control and the potential applications of each type; (2) demonstrate an understanding of the fundamental concepts, technologies, and challenges of telecommunications and network security; (3) demonstrate an understanding of the key concepts of information security governance and risk management, including current best practices in business continuity and disaster recovery planning; (4) describe the components of effective security architecture and the various security models that can be used in the design of secure architectures; (5) possess an understanding of the major cryptographic algorithms used in information security and how each can be effectively integrated into a secure information infrastructure; (6) understand the common techniques to achieve effective physical security of protected information systems.

### **Program-Specific Admission Requirements**

(For general requirements, see the section Admission.)

The Master of Science in Information Assurance & Cybersecurity degree is designed for students with undergraduate majors in computer science, information systems, information technology, engineering, mathematics, or physics. Applicants must have knowledge of data structures and algorithms, assembly language and computer architecture, structured programming in a modern high-level language, and discrete mathematics.

Applicants who do not have an adequate background may be required to take one or more of the following 500-level graduate courses during the first two terms of the student's program (Courses are 3 credits each)

- CISC 501 Computer Organization and Architecture
- CISC 502 Mathematics in Computing
- CISC 503 Data Structures and Algorithms
- MSIT 501 Foundations of Programming, Data Structures and Algorithms

These are in addition to the required credit hours at the 600 level. Courses at the 500 level, when required, must be completed prior to taking courses at the 600 level. All 500-level courses must be completed with a grade 'B' or higher to continue in the program. MSIT 501 is prerequisite to CISC 503.

Students must take all 10 required courses. Students who wish to take an elective (above the 10 required courses) must request approval from the program office before registration.

**Core Courses** (10 courses, 3 credits each)

CISC 640 Operating Systems  
CISC 650 Computer Networks  
CISC 680 Software Engineering  
ISEC 615 Fundamentals of Cybersecurity  
ISEC 620 Applied Cryptography  
ISEC 640 Database Security

ISEC 650 Computer and Network Forensics  
ISEC 660 Advanced Network Security  
ISEC 690 Information Security Project  
MSIT 630 Database Systems

**Master of Science in Information Systems**

The M.S. in Information Systems is a 30 credit-hour degree program. It focuses on the application of information technology to the collection, retention, and dissemination of information for management planning and decision-making.

The program concentrates on areas such as project management, decision support systems, computer languages, client-server and distributed computing, database systems and data warehousing, telecommunications, system analysis and design, human-computer interaction, electronic commerce, information security, computer graphics, and multimedia.

The program concentrates on areas such as project management, database systems and data warehousing, user experience (UX) and human-computer interaction, information assurance and cybersecurity management, and data analytics/business intelligence.

Offered online and on-campus in South Florida, The Master of Science in Information Systems degree program blends theory and practice into a learning experience that develops skills applicable to complex real-world problems. It is designed to give students

a thorough knowledge of the field and to provide an enduring foundation for future professional growth.

Students have the option to earn the M.S. in Information Systems following one of the concentration options, listed below. The concentration in Cybersecurity Management is recognized by the National Security Agency (NSA) based on its certification of the college's curriculum under NSA national training standards and is also designated by NSA for the training of System Security Administrators. Graduates possess the necessary skills and abilities for the secure configuration, operation and maintenance of a computer system. As a result of this certification, Federal agencies may sponsor civilian and military personnel to take the college's certified graduate courses. These programs are available online or on-campus.

### **Learning Outcomes**

A graduate with a M.S. in Management Information Systems will have the ability to (1) communicate management information systems concepts, designs, and solutions effectively and professionally; (2) apply knowledge of management information systems to produce effective designs and solutions for specific problems; (3) identify, analyze, and synthesize scholarly literature relating to the field of management information systems; (4) evaluate software development tools, software systems, and modern computing platforms.

### **Program-Specific Admission Requirements**

(For general requirements, see the section Admission.)

These programs are designed for students with undergraduate majors in information systems, information technology, business administration, or a related field, and having knowledge and significant experience in computer applications.

Applicants who do not have adequate backgrounds may be required to take the following

500- level graduate course during the first term of the student's program:

MSIT 501 Foundations of Programming, Data Structures, and Algorithms (3 credits)

This course is in addition to the required 30 credit hours at the 600 level. The Master of Science in Information Systems has three concentrations options, along with a no concentration option. Students must complete 30 credits. Core courses, concentrations and electives are listed below.

### **Curriculum for the M.S. in Information Systems**

All students, regardless of concentration, must complete the core courses listed below. Students may pursue the no concentration option or select one of three concentrations. For each, the required courses are listed.

#### **Core Courses (3 credits each)**

ISEC 615 Fundamentals of Cybersecurity

MMIS 621 Information Systems Project Management

MMIS 623 Ethics in Computing

MSIT 630 Database Systems  
MMIS 653 Telecommunications and Computer Networking  
MMIS 671 Fundamentals of Analytics and Business Intelligence  
MMIS 680 Human-Computer Interaction

**Artificial Intelligence Management Concentration Courses (4 courses, 3 credits each)**

ISEC 0635 Information Security Operations Management (3 credits)  
MMIS 677 Technology Management (3 credits)  
MSIT 675 Deep Learning (3 credits)

**Business Intelligence / Data Analytics Concentration Courses (3 credits each)**

MMIS 642 Data Warehousing  
MMIS 643 Data Mining  
MMIS 692 Capstone Project in Business Intelligence

**Information Assurance and Cybersecurity Management Concentration Courses (3 credits each)**

ISEC 675 Information System Auditing  
ISEC 695 Information Security Management Project  
Take one:  
ISEC 635 Information Security Operations Management  
ISEC 655 Information Security Governance

**User Experience (UX)/Human-Computer Interaction Concentration Courses (3 credits each)**

CISC 685 Interaction Design  
MMIS 636 Computer-Supported Cooperative Work  
MMIS 644 Social Media

**No Concentration (3 credits each)**

Select a mix of courses from Concentrations aforementioned and/or any offerings of 600-level courses prefixed MMIS, or ISEC as electives.

**Electives (3 credits each)**

The following are sample elective courses that are not part of concentrations, but will count as electives:

MMIS 646 Information Visualization  
MMIS 691 Special Topics in Information Systems

**Master of Science in Information Technology**

The Master of Science in Information Technology is a 30 credit-hour degree designed to provide students with a thorough knowledge of organizational information systems, application technologies, and systems infrastructure. It focuses on meeting the needs of users within an organizational and societal context through the selection, creation, application, integration, and administration of computing technologies and resources.

Students take five core courses covering database systems, platform technologies, telecommunications and networking, software development, and security technologies.



Three courses are then taken in one of the following three concentrations of the student's choosing: application development, data analytics, or information assurance and cybersecurity management. Students taking the no concentration option will need to take five elective courses. For students taking a concentration option, remaining courses are electives drawn from information technology, information security, or information systems course offerings.

### **Learning Outcomes**

A graduate with a M.S. in Information technology will have the ability to (1) communicate Information technology concepts, designs, and solutions effectively and professionally; (2) apply knowledge of information technology to produce effective designs and solutions for specific problems; (3) identify, analyze, and synthesize professional literature relating to the field of information technology; and (4) use current technologies, tools, software systems, modern computing platforms, and apply best practices to develop real-world solutions for specific problems (e.g., applications, deployments, etc.)

### **Program-Specific Admission Requirements**

(For general requirements, see the section Admission.)

The Master of Science in Information Technology degree is designed for students with undergraduate majors in science, math, engineering, or business. In addition, applicants must have knowledge of structured programming in a modern high-level language.

Applicants who do not have an adequate background may be required to take the following 500-level graduate course during the first term of the program:

MSIT 501 Foundations of Programming, Data Structures, and Algorithms (3 credits)

This course is in addition to the required 30 credit hours at the 600 level. Courses at the 500 level, when required, must be completed prior to taking courses at the 600 level. All 500-level courses must be completed with a grade of 'B' or higher to continue in the program.

### **Curriculum for the M.S. in Information Technology**

The M.S. in Information Technology is offered with three concentrations. Students must complete a total of 30 credits.

#### **Core Courses** (3 credits each)

MSIT 630 Database Systems  
MSIT 650 Platform Technologies  
MMIS 653 Telecommunications and Computer Networking  
MSIT 660 Software Development  
ISEC 615 Fundamentals of Security Technologies

#### **Application Development Concentration Courses** (3 credits each)

CISC 668 Mobile Application Development  
CISC 685 Interaction Design  
MMIS 665 Web Services

### **Artificial Intelligence Management Concentration Courses (4 courses, 3 credits each)**

ISEC 0635 Information Security Operations Management (3 credits)  
MMIS 677 Technology Management (3 credits)  
MSIT 675 Deep Learning (3 credits)

### **Data Analytics Concentration Courses (3 credits each)**

MMIS 642 Data Warehousing  
MMIS 643 Data Mining  
MMIS 671 Fundamentals of Analytics and Business Intelligence

### **Information Assurance and Cybersecurity Management Courses (3 credits each)**

ISEC 635 Information Security Operations Management  
ISEC 655 Information Security Governance  
ISEC 675 Governance System Auditing

**No Concentration** (3 credits each) Select a mix of courses from Concentrations and/or Electives.

### **Elective Courses (3 credits each)**

Students select any 600-level courses at the college with prefix MMIS, MSIT, or ISEC (Except ISEC 600, 620, 640, 650 or 660).

### **Master of Science in Technology and Organizational Leadership**

The Master of Science in Technology and Organizational Leadership is a 30 credit-hour degree program at Nova Southeastern University's College of Computing and Engineering.

Offered online and on-campus in South Florida, the Master of Science in Technology and Organizational Leadership program focuses on the application of organizational leadership applied to technology infrastructures and organizations. The program incorporates creativity, vision, strategic planning, technology, ethics, motivation, teamwork, group and organizational development for management planning and decision making. This program blends theory and practice into a learning experience that develops skills applicable to complex, real-world problems and organizations.

### **Learning Outcomes**

A graduate with a M.S. in Technology and Organizational Leadership will have the ability to (1) communicate technology and organizational leadership concepts, designs, and solutions effectively and professionally; (2) apply knowledge of technology and organizational leadership to produce effective designs and solutions for specific problems; (3) identify, analyze, and synthesize scholarly literature relating to the field of technology and organizational leadership; (4) evaluate group and organizational development techniques for management planning and decision making.

### **Program-Specific Admission Requirements**

(For general requirements, see the section Admission.)

The Master of Science in Technology and Organizational Leadership is designed for

students with undergraduate majors in computer science, information systems, information technology, engineering, mathematics, or physics. Applicants must have knowledge of data structures and algorithms, assembly language and computer architecture, structured programming in a modern high-level language, and discrete mathematics. Applicants must have knowledge of data structures and algorithms and structured programming in a modern high-level language. Applicants who do not have an adequate background may be required to take the following 500-level graduate course during the first term of the program:

MSIT 501 Foundations of Programming, Data Structures, and Algorithms

This course is in addition to the required credit hours at the 600 level. Courses at the 500 level, when required, must be completed prior to taking courses at the 600 level. MSIT 501 must be completed with a grade of 'B' or higher to continue in the program.

### **Curriculum for the M.S. in Technology and Organizational Leadership**

#### **Core (30 Credits):**

Complete six courses (3 Credits each for a total of 18 Credits)

FIN 5008 Business Finance

ISEC 615 Fundamentals of Cybersecurity

ISEC 635 Information Security Operations Management

MMIS 621 Information Systems Project Management

MMIS 671 Data Analytics

MMIS 680 Human Computer Interaction

Choose two courses (3 Credits each for total of 6 Credits)

MSL 0680 Leadership Theory and Practice

MGT 5105 Managing Organizational Behavior in a Dynamic and Complex World

MGT 5380 Building and Leading Teams

MGT 5631 Leading People and Organizations

Choose two courses (3 Credits each for total of 6 Credits)

MMIS 623 Ethics in Computing

MMIS 636 Computer-Supported Cooperative Work

MMIS 644 UX Strategy for Social Media

ISEC 655 Information Security Governance

ISEC 675 Information System Auditing

MSIT 630 Database Systems

#### **Ph.D. in Computer Science**

This program offers a course of study leading to the degree of Doctor of Philosophy (Ph.D.) in Computer Science (CS). The program combines traditional and online instruction to provide professionals the opportunity to pursue graduate study while continuing to work in their current positions. The program is especially well suited to those in industry, education, or government who are involved with one of the many areas of computer science and information technology. It provides research-oriented professionals with knowledge in the major areas of computer science and the ability to develop creative solutions to substantive real-world problems.

A graduate with a Ph.D. in Computer Science will have the ability to: (1) acquire advanced knowledge and deeper understanding of the field of computer science; (2) communicate professionally and ethically about computer science research issues; (3) identify, analyze, and synthesize scholarly literature related to the field of computer science; and (4) generate new knowledge through research/scholarship and disseminate that knowledge to others by demonstrating the necessary technical and intellectual skills to produce a written document that makes an original contribution to the field of computer science.

### **Program-Specific Admission Requirements**

This program is designed for the student with a bachelor's or master's degree in computer science, or a closely related field.

### **Ph.D. in Computer Science Pathways**

#### **B.S. to Ph.D. Computer Science Pathway**

For students who have completed a bachelor's degree in computer science or a closely related field.

Program-Specific Admission Requirements

(For general requirements, see the section Admission.)

#### **Admission based on B.S. CS or closely related B.S. degree**

GPA 3.2 or higher

Must have taken courses in:

Calculus I & II

Linear Algebra

Probability and Statistics

Programming

Computer Organization and Architecture

Discrete Math

Data Structures and Algorithms

#### **Grade Point Average**

Students must maintain a GPA of 3.2 or higher during the program.

Students will have two terms to raise their GPA to the acceptable level or will be dismissed from the program.

#### **Enroute to Ph.D. M.S.**

Students must complete the five core courses and any five 600-level elective courses below for a total of 30 credits.

#### **Curriculum for the B.S. to Ph.D. Computer Science Pathway**

Curriculum (Minimum of 66 Credits; 30 Credits of 600/700-level Courses; 12 Credits of 800-level Courses; 24 Credits 900-level Courses)

**Courses** (10 courses, 3 credits each for total of 30 Credits)

CISC 610 Programming Languages

CISC 615 Design and Analysis Algorithms

CISC 640 Operating Systems  
CISC 660 Database Management Systems  
CISC 680 Software Engineering

**Elective Courses** (5 courses, 3 credits each for total of 15 Credits)

ISEC 615 Fundamentals of Cybersecurity  
ISEC 620 Applied Cryptography  
ISEC 640 Database Security  
ISEC 650 Computer Networks Forensics  
ISEC 660 Advanced Network Security  
CISC 650 Computer Networks  
CISC 662 Data Mining and Knowledge Discovery in Databases  
CISC 664 Information Retrieval and Web Search Engine Technology  
CISC 665 Distributed Systems  
CISC 668 Mobile Application Development  
CISC 670 Artificial Intelligence  
MMIS 671 Data Analytics  
CISC 672 Data Visualization  
CISC 681 Computer Graphics  
CISC 682 Software Requirements Engineering  
CISC 683 Object-Oriented Design  
CISC 684 Software Testing and Verification  
CISC 685 Interaction Design  
CISC 690 Special Topics in Computer Science

**Research Courses** (3 Courses at 4 credits each for a total of 12 Credits)

Each student will be required to complete at least three CISC 885 doctoral research courses. These courses will be taken at the end of the student's coursework. These faculty supported directed study courses will enable the student to identify a viable research topic and conduct preliminary research that will lead to formal candidacy.

CISC 885 Doctoral Research

**Dissertation Courses** (3 Courses at 8 Credits each for a total of 24 Credits)

Students must complete 24 credits of CISC 901 dissertation courses. Students who do not complete the dissertation within 24 credits will register for CISC 920 Continuing Dissertation (four credits) until the dissertation is complete.

CISC 901 Doctoral Dissertation  
CISC 920 Continuing Dissertation

**M.S. to Ph.D. Computer Science Pathway**

For student's that have completed a master's degree in computer science or a closely related field.

**Program-Specific Admission Requirements**

(For general requirements, see the section Admission.)

## **Admission based on M.S. CS or closely related M.S. degree**

GPA 3.2 or higher

Must have taken courses in:

Calculus I & II

Linear Algebra

Probability and Statistics

Programming

Computer Organization and Architecture

Discrete Math

Data Structures and Algorithms

## **Grade Point Average**

Students must maintain a GPA of 3.2 or higher during the program.

Students will have two terms to raise their GPA to the acceptable level or will be dismissed from the program.

## **Curriculum for the M.S. to Ph.D. Computer Science Pathway**

Curriculum (Minimum of 51 Credits; 15 Credits of 600-level Courses; 12 Credits of 800-level Courses; 24 Credits 900-level Courses)

### **Core Courses** (5 courses, 3 credits each for total of 15 Credits)

Students must substitute an elective for any of the following core courses for which they have passed an M.S. course equivalent within the past five years.

CISC 610 Programming Languages

CISC 615 Design and Analysis Algorithms

CISC 640 Operating Systems

CISC 660 Database Management Systems

CISC 680 Software Engineering

### **Elective Courses** (5 courses, 3 credits each for total of 15 Credits)

ISEC 615 Fundamentals of Cybersecurity

ISEC 620 Applied Cryptography

ISEC 640 Database Security

ISEC 650 Computer Networks Forensics

ISEC 660 Advanced Network Security

CISC 650 Computer Networks

CISC 662 Data Mining and Knowledge Discovery in Databases

CISC 664 Information Retrieval and Web Search Engine Technology

CISC 665 Distributed Systems

CISC 668 Mobile Application Development

CISC 670 Artificial Intelligence

MMIS 671 Data Analytics

CISC 672 Data Visualization

CISC 681 Computer Graphics

CISC 682 Software Requirements Engineering

CISC 683 Object-Oriented Design  
CISC 684 Software Testing and Verification  
CISC 685 Interaction Design  
CISC 690 Special Topics in Computer Science

**Research Courses** (3 Courses at 4 Credits each for a total of 12 Credits)

Each student will be required to complete at least three CISD 885 doctoral research courses. These courses will be taken at the end of the student's coursework. These faculty supported directed study courses will enable the student to identify a viable research topic and conduct preliminary research that will lead to formal candidacy.

CISD 885 Doctoral Research

**Dissertation Courses** (3 Courses at 8 Credits each for a total of 24 Credits)

Students must complete 24 credits of CISD 901 dissertation courses. Students who do not complete the dissertation within 24 credits will register for CISD 920 Continuing Dissertation (four credits) until the dissertation is complete.

CISD 901 Doctoral Dissertation  
CISD 920 Continuing Dissertation

**Research Registrations:** The student pursues research under the direction of a faculty member. To register, students contact their advisor with the name of the faculty member under whose direction they would like to work and a brief explanation of the research area to be explored. The student must complete a 600-level course with the requested professor with a grade of B+ or higher.

**Dissertation Registrations**

Students must make three consecutive registrations (eight credits each) for CISD 901, Doctoral Dissertation, to total the 24 credits of dissertation required. Students whose dissertations are not completed within three registrations (one year) continue to register for CISD 920 Continuing Dissertation (four credits) each term until the dissertation is complete.

**Ph.D. in Cybersecurity Management (formerly Information Assurance)**

This program offers a course of study leading to the degree of Doctor of Philosophy (Ph.D.) in Cybersecurity Management. The program combines traditional and online instruction to provide professionals with the opportunity to pursue graduate study while continuing to work in their current positions. The Ph.D. in Cybersecurity Management is a comprehensive, multidisciplinary, research program that prepares graduates for key positions in academia, in federal, state, and local government agencies, and in business and industry. The curriculum combines both technically intensive and management-focused security courses to provide a comprehensive approach to the study of information assurance/information security. Each student must complete eight core courses, at least two research courses, and a dissertation.

A graduate with a Ph.D. in Cybersecurity Management will have the ability to: (1) acquire advanced knowledge and deeper understanding of the field of information

assurance; (2) communicate professionally and ethically about information assurance research issues identify, analyze, and synthesize scholarly literature related to information assurance; and (4) generate new knowledge through research/scholarship and disseminate that knowledge to others by demonstrating the necessary technical and intellectual skills to produce a written document that makes an original contribution to the field of information assurance/information security.

### **Program-Specific Admission Requirements**

(For general requirements, see the section Admission.)

This program is designed for individuals with experience in cybersecurity/information assurance/information security. Applications are recommended to possess a master's degree in cybersecurity information assurance (or closely associated degree) from a current National Center of Academic Excellence in Cybersecurity (NCAE-C) or a master's in Computer Science/Information Technology/Information Systems, with some coursework in cybersecurity/information security fundamentals. Additionally, students should have professional experience in information security and have a strong research potential in the areas of information security.

## **Ph.D. in Cybersecurity Management Pathways**

### **Cybersecurity Management B.S. to Ph.D. Program Pathway**

For students who have completed a bachelor's degree in Cybersecurity/Information Security or closely related BS degree

#### **Program-Specific Admission Requirements**

(For general requirements, see the section Admission.)

### **Admission based on BS in Cybersecurity/Information Security or closely related BS degree**

GPA 3.2 or higher

Must have taken courses in:

Probability and Statistics

Programming

### **Grade Point Average**

Students must maintain a GPA of 3.2 or higher during the program.

Students will have two terms to raise their GPA to the acceptable level or will be dismissed from the program.

### **Enroute to Ph.D. M.S.**

Students must complete the ten core courses below for a total of 30 credits.

### **Curriculum for the B.S. to Ph.D. Cybersecurity Management Pathway**

Curriculum (Minimum of 66 Credits; 30 Credits of 600/700-level Courses; 12 Credits of 800-level Courses; 24 Credits 900-level Courses)



**Core Courses** (10 Courses, 3 Credits each for total of 30 Credits)

MMIS 621 Information Systems Project Management

MMIS 623 Ethics in Computing

MSIT 630 Database Systems

MMIS 653 Telecommunication and Computer Networking

MMIS 680 Human Computer Interaction

ISEC 615 Fundamentals of Cybersecurity

ISEC 635 Information Security Operations Management

ISEC 675 Information System Auditing

ISEC 700 Research Seminar in Cybersecurity Management

RESD 700 Research Methods

**Research Courses** (3 Courses, 4 Credits each for a total of 12 Credits)

Each student will be required to complete at least three ISEC 885 doctoral research courses. These courses will be taken at the end of the student's coursework. These faculty supported directed study courses will enable the student to identify a viable research topic and conduct preliminary research that will lead to formal candidacy. Students must receive a B or higher in ISEC 700 and RESD 700 to register for ISEC 885.

ISEC 885 Doctoral Research

**Dissertation Courses** (3 Courses, 8 Credits each for a total of 24 Credits)

Students must complete 24 credits of ISEC 901 dissertation courses. Students who do not complete the dissertation within 24 credits will register for ISEC 920 Continuing Dissertation (4 credits) until the dissertation is complete.

Students must have an approved Idea Paper to register for ISEC 901.

ISEC 901 Doctoral Dissertation

ISEC 920 Continuing Dissertation

**Cybersecurity Management M.S. to Ph.D. Pathway**

For students who have completed a master's degree in Cybersecurity/Information Security or closely related MS degree

Program-Specific Admission Requirements

(For general requirements, see the section Admission.)

**Admission based on MS in Cybersecurity/Information Security or closely related MS degree including coursework in cybersecurity/information security.**

GPA 3.2 or higher

Must have taken courses in:

Probability and Statistics

Programming

## **Grade Point Average**

Students must maintain a GPA of 3.2 or higher during the program.

Students will have two terms to raise their GPA to the acceptable level or will be dismissed from the program.

## **Curriculum for the M.S. to Ph.D. Cybersecurity Management Pathway**

Curriculum (Minimum of 51 Credits; 15 Credits of 600/700-level Courses; 12 Credits of 800-level Courses; 24 Credits 900-level Courses)

### **Core Courses** (5 Courses, 3 Credits each for total of 15 Credits)

Students must substitute an elective for any of the following core courses for which they have passed an MS course equivalent from a National Center of Academic Excellence in Cybersecurity within the past five years.

ISEC 635 Information Systems Operations Management

ISEC 655 Information Security Governance

ISEC 675 Information System Auditing

ISEC 700 Research Seminar in Cybersecurity Management

RESD 700 Research Methods

### **Electives**

MMIS 621 Information Systems Project Management

MMIS 623 Ethics in Computing

MSIT 630 Database Systems

MMIS 636 Computer-Supported Cooperative Work

MMIS 642 Data Warehousing

MMIS 643 Data Mining

MMIS 644 UX Strategy for Social Media

MMIS 653 Telecommunication and Computer Networking

MMIS 671 Data Analytics

MMIS 680 Human Computer Interaction

CISC 685 Interaction Design

MMIS 690 Special Topics in Information Systems

MMIS 692 Data Analytics Project

ISEC 615 Fundamentals of Cybersecurity

ISEC 695 Information Security Project

### **Research Courses** (3 Courses at 4 Credits each for a total of 12 Credits)

Each student will be required to complete at least three ISEC 885 doctoral research courses. These courses will be taken at the end of the student's coursework. These faculty supported directed study courses will enable the student to identify a viable research topic and conduct preliminary research that will lead to formal candidacy. Students must receive a B or higher in ISEC 700 and RESD 700 to register for ISEC 885

ISEC 885 Doctoral Research

### **Dissertation Courses** (3 Courses at 8 Credits each for a total of 24 Credits)

Students must complete 24 credits of ISEC 901 dissertation courses. Students who do not complete the dissertation within 24 credits will register for ISEC 920 Continuing

Dissertation (4 credits) until the dissertation is complete. Students must have an approved Idea Paper to register for ISEC 901 -

ISEC 901 Doctoral Dissertation

ISEC 920 Continuing Dissertation

### **Ph.D. in Information Systems**

This program offers a course of study leading to the degree of Doctor of Philosophy (Ph.D.) in Information Systems. The program combines traditional and online instruction to provide information technology professionals with the opportunity to pursue graduate study while continuing to work in their current positions. The program is especially well suited to professionals working in areas such as information system planning, information security, systems analysis and design, project management, information system administration, information science, or software engineering. It provides information technology professionals with the knowledge and ability to develop creative solutions to substantive real-world problems in information systems. Each student must complete eight core courses, at least two research courses, and a dissertation. A graduate with a Ph.D. in Information Systems will have the ability to: (1) acquire advanced knowledge and deeper understanding of the field of information systems; (2) communicate professionally and ethically about information systems research issues; (3) identify, analyze, and synthesize scholarly literature related to information systems; and (4) generate new knowledge through research/scholarship and disseminate that knowledge to others by demonstrating the necessary technical and intellectual skills to produce a written document that makes an original contribution to the field of information systems.

### **Program-Specific Admission Requirements**

(For general requirements, refer to the Admissions section.)

This program is designed for the student with a master's degree in information systems, information science, computer science, information technology, or a related area. In addition to holding a relevant master's degree, the applicant should satisfy graduate prerequisites or have equivalent experience in information systems, programming languages, database systems, systems analysis and design, telecommunications and computer networks, and statistics.

### **Ph.D. in Information Systems Pathways**

#### **Information Systems B.S. to PhD Program Pathway**

For students who have completed a bachelor's degree in Information Systems or closely related BS degree

Program-Specific Admission Requirements

(For general requirements, see the section Admission.)

## **Admission based on BS in Information Systems or closely related BS degree**

GPA 3.2 or higher

Must have taken courses in:

Probability and Statistics

Programming

### **Grade Point Average**

Students must maintain a GPA of 3.2 or higher during the program.

Students will have two terms to raise their GPA to the acceptable level or will be dismissed from the program.

### **Enroute to Ph.D. M.S.**

Students must complete the eight core courses and any two 600 Level elective courses below for a total of 30 credits.

### **Curriculum for the B.S. to Ph.D. Program Pathway**

Curriculum (Minimum of 66 Credits; 30 Credits of 600/700-level Courses; 12 Credits of 800-level Courses; 24 Credits 900-level Courses)

#### **Core Courses** (8 courses, 3 credits each for total of 24 Credits)

ISEC 615 Fundamentals of Cybersecurity

MMIS 621 Information Systems Project Management

MMIS 623 Ethics in Computing

MSIT 630 Database Systems

MMIS 653 Telecommunication and Computer Networking

MMIS 671 Data Analytics

MMIS 680 Human Computer Interaction

RESD 700 Research Methods

#### **Electives** (2 courses, 3 credits each for total of 6 credits)

ISEC 635 Information Security Operations Management

MMIS 636 Computer-Supported Cooperative Work

MMIS 642 Data Warehousing

MMIS 643 Data Mining

MMIS 644 UX Strategy for Social Media

ISEC 655 Information Security Governance

ISEC 675 Information Systems Auditing

CISC 685 Interaction Design

MMIS 692 Data Analytics Project

MMIS 690 Special Topics in Information Systems

ISEC 695 Information Security Project

#### **Research Courses** (3 courses at 4 credits each for a total of 12 Credits)

Each student will be required to complete at least three ISEC 885 doctoral research courses. These courses will be taken at the end of the student's coursework. These faculty supported directed study courses will enable the student to identify a viable

research topic and conduct preliminary research that will lead to formal candidacy.  
DISS 885 Doctoral Research

**Dissertation Courses** (3 Courses at 8 Credits each for a total of 24 Credits)

Students must complete 24 credits of DISS 901 dissertation courses. Students who do not complete the dissertation within 24 credits will register for DISS 920 Continuing Dissertation (4 credits) until the dissertation is complete.

DISS 901 Doctoral Dissertation  
DISS 920 Continuing Dissertation

**Information Systems MS to PhD Program Pathway**

For students who have completed a master's degree in Information Systems or closely related MS degree

**Program-Specific Admission Requirements**

(For general requirements, see the section Admission.)

**Admission based on M.S. Information Systems or closely related M.S. degree**

GPA 3.2 or higher

Must have taken courses in:

- Probability and Statistics
- Programming

**Grade Point Average**

Students must maintain a GPA of 3.2 or higher during the program.

Students will have two terms to raise their GPA to the acceptable level or will be dismissed from the program.

**Enroute to Ph.D.**

Students must complete the minimum of 51 credits.

**Curriculum for the Ph.D. Information Systems Pathway**

Minimum of 51 Credits; 21 Credits of 600/700-level Courses; 12 Credits of 800-level Courses; 24 Credits 900-level Courses)

**Core** (5 Courses at 3 Credits each for a total of 15 Credits)

Students must substitute an elective for any of the following core courses for which they have passed an MS course equivalent within the past five years.

Select One:

RESD 700 Research Methods

Select One:

ISEC 615 Fundamentals of Cybersecurity

ISEC 635 Information Systems Operations Management

ISEC 655 Information Security Governance

ISEC 675 Information System Auditing

Select One:

MSIT 630 Database Systems

MMIS 671 Data Analytics  
MMIS 642 Data Warehousing  
MMIS 643 Data Mining

Select One:

MMIS 680 Human Computer Interaction  
MMIS 636 Computer-Supported Cooperative Work

MMIS 644 UX Strategy for Social Media  
CISC 685 Interaction Design

Select One Elective from the courses below that is not counted as part of the core or that has not been completed in the last five years:

MMIS 680 Human Computer Interaction  
MMIS 636 Computer-Supported Cooperative Work

MMIS 644 UX Strategy for Social Media  
CISC 685 Interaction Design

**Research Courses** (3 Courses at 4 Credits each for a total of 12 Credits)

Each student will be required to complete at least three DISS 885 doctoral research courses. These courses will be taken at the end of the student's coursework. These faculty supported directed study courses will enable the student to identify a viable research topic and conduct preliminary research that will lead to formal candidacy.

DISS 885 Doctoral Research

**Dissertation Courses** (3 Courses at 8 Credits each for a total of 24 Credits)

Students must complete 24 credits of DISS 901 dissertation courses. Students who do not complete the dissertation within 24 credits will register for DISS 920 Continuing Dissertation (four credits) until the dissertation is complete.

DISS 901 Doctoral Dissertation  
DISS 920 Continuing Dissertation

## Graduate Course Descriptions

### **CISC 501 Computer Organization and Architecture** (3 credits)

A comprehensive examination of the fundamental concepts, organization, and architectural structures of contemporary computers. Topics include: logic design, fundamental structure of computer hardware systems (CPU/ALU, memory, cache, registers, I/O), instruction sets, assembly language programming, computer arithmetic, pipelining, and memory hierarchy.

### **CISC 502 Mathematics in Computing** (3 credits)

Graph theory, lattices and boolean algebras, state models and abstract algebraic structures, logical systems, production systems, computability theory, recursive function theory.

### **CISC 503 Data Structures and Algorithms** (3 credits)

Sorting and searching, algorithms for tree structures, advanced data structures, graph algorithms, complexity, dynamic programming, optimization problems. Prerequisite: MSIT 501 or equivalent.

### **CISC 610 Programming Languages** (3 credits)

The study of the organization and types of programming languages including analysis of imperative, object-oriented, functional, and declarative language paradigms. Other topics include formal languages and language hierarchies, syntactic and semantic specification, context-free languages, abstraction, modularity, program structure and fundamental programming language concepts.

### **CISC 615 Design and Analysis of Algorithms** (3 credits)

Principles and techniques used in the design and analysis of computer algorithms. Topics include sorting, algorithms for tree structures, dynamic programming, greedy methods, advanced data structures, divide and conquer, graph algorithms, arithmetic operations, algorithms for parallel computers, matrix operations, string/pattern matching, network problems, approximation algorithms, and NP-completeness.

### **CISC 640 Operating Systems** (3 credits)

Concepts of computer operating systems are presented with an emphasis on structured design. Topics include operating systems structure, multiprocessing, synchronization and communication, task management, virtual memory management, file systems, protection and security, operating system extension techniques, fault tolerance, and systems programming. Recent developments in operating systems theory and implementation are covered.

### **CISC 650 Computer Networks** (3 credits)

The concepts of computer networks and network services, communication protocols, network and protocol architectures, packet switching techniques, the Internet architecture, topology, internetworking, TCP/IP, network design and analysis methods, switching, and routing. Topics include wired and wireless Ethernet, software and conceptual models, error detection, error correction, transfer and routing protocols,

congestion and flow control, quality-of-service, network programming, security, current and future applications.

**CISC 660 Database Management Systems (3 credits)**

Concepts of three levels of database architectures and their relationships, DBMS internals and their functions with associated API interfaces, various types of data models and their implementations in both internal and external perspectives, principles and techniques for database design and implementation, organizations of data and file structures and access methods, theory of query processing and optimization, mechanisms of concurrency control and transaction processing, and other new trends of database technologies.

**CISC 662 Data Mining and Knowledge Discovery in Databases (3 credits)** Concepts, principles, and techniques of data mining and knowledge discovery. Topics include, but not limited to, classification and inductive learning, association rules mining, neural network and Bayes methods, cluster analysis, rough sets and fuzzy sets approaches for data mining, statistical methods for data mining, model and metrics for evaluating data mining results, etc.

**CISC 664 Information Retrieval and Web Search Engine Technology (3 credits)**

Topics would include, but not be limited to, fundamentals of search engine architecture and crawling techniques, text processing and link analysis, retrieval models, indexing and ranking, indexing construction and query processing, evaluating and optimizing of search engine. Prerequisite: CISC 662.

**CISC 665 Distributed Systems (3 credits)**

Concepts and design of distributed systems and applications with an emphasis on protocols and distributed state. Topics include distributed systems architecture (system models, communication, and peer-to-peer systems); middleware (distributed objects, security, directory services, and web services); distributed systems infrastructure (distributed file systems, and distributed shared memory); distributed state coordination (time and global states, coordination, transactions, concurrency control, and replication); mobile and ubiquitous computing and future research directions. This course extends the foundation of operating systems and computer networking.

**CISC 668 Mobile Application Development (3 credits)**

Study of the development of real-world mobile applications using a variety of software engineering techniques and platforms. Topics include data management, persistence mechanisms, user-interface design, and application lifecycles. Prerequisites: MCIS 665 OR MSIT 665 OR CISC 665.

**CISC 670 Artificial Intelligence (3 credits)**

Theory and practice of artificial intelligence and knowledge-based expert systems. Topics include knowledge representation and inference, heuristic and adversary search, genetic algorithms, machine learning, neural computing, reasoning under uncertainty, symbolic programming using Lisp, logic programming using Prolog, and expert systems. Development and implementation of algorithms for intelligent systems is emphasized.



Examples from current application areas such as robotics, planning, machine vision, natural language processing, and intelligent agents are used to reinforce the concepts.

**CISC 672 Data Visualization (3 credits)**

Information visualization focuses on visualization techniques to help people understand, analyze, and make decisions based on data. This course will examine principles and techniques for developing effective visualizations and provide experience in manipulating data and producing visualizations using tools such as Tableau and Python with related libraries such as pandas, NumPy, and matplotlib.

**CISC 680 Software Engineering (3 credits)**

The development of software-intensive systems; software quality factors; software engineering principles; system life-cycle models and paradigms; requirements definition and analysis; behavioral specification; software design; implementation; software testing techniques; verification and validation; system evolution; software project management.

**CISC 681 Computer Graphics (3 credits)**

Principles of computer graphics, including fundamental raster operations including scan conversion, fill methods, and anti-aliasing. Coordinate systems, transformations, scene graphs and other 3D modeling methods. Rendering, hidden surface removal and ray tracing. Animation; graphical user interfaces. Modern computer graphics languages.

**CISC 682 Software Requirements Engineering (3 credits)**

Focuses on the requirements phase situated within the larger development process. Specific topics include requirement gathering, specification languages, methodologies, and tools.

**CISC 683 Object-Oriented Design (3 credits)**

Principles and concepts of the object-oriented paradigm. Notation and techniques for the analysis, design, and implementation of object-oriented systems. Mechanisms for reuse, including composition, inheritance, design patterns, and application frameworks. Object-oriented programming.

**CISC 684 Software Testing and Verification (3 credits)**

Focuses on the testing phases situated within the larger development process. Students will learn and practice various ways of testing for correctness as well as secondary factors such as performance, robustness, reliability, security, and others. Students from other programs may be able to take this course as an elective; contact your academic advisor to register. Note that the course expects students to have academic or professional experience in software development.

**CISC 685 Interaction Design (3 credits)**

The course provides fundamentals of interaction design (ID) with a focus on user experience (UX). Topics include aspects of interaction design and design thinking, user-centered design (UCD) lifecycle, user experience research, UI guidelines, personas, walkthroughs and journey maps, wireframes and sitemaps, prototyping, and web-based or mobile design evaluations. Students will integrate software engineering design and

testing processes into interface design approaches. Students will produce a redesign prototype concept of an interactive technology.

**CISC 690 Special Topics in Computer Science (3 credits)**

This seminar focuses on the professor's current research interests. Prerequisite: Consent of the course professor and program director based on student's qualifications.

**CISC 699 Master's Thesis in Computer Science (3 credits)**

The student develops a framework within which research will be conducted and offers evidence of qualifications to pursue the research. Concepts and theories underlying the student's thesis research are articulated; the problem is clearly stated; specific, measurable goals are specified; a literature review is presented; the methods of conducting research are delineated; and strategies to achieve the goal are supplied. Registration for CISC 699 must be repeated for three more credits, for a total of six thesis credits. Prerequisite: Completion of eight courses at the 600-level.

**CISD 885 Doctoral Research (4 credits)**

The student pursues research under the direction of a faculty member. To register, students contact their advisor with the name of the faculty member under whose direction they would like to work and a brief explanation of the research area to be explored. The student must complete a 700-level course with the requested professor with a grade of B+ or higher.

**CISD 901 Doctoral Dissertation (8 credits)**

The student develops an accepted proposal for the study, conducts the research as proposed, submits an acceptable report, and successfully defends the dissertation.

**CISD 920 Continuing Dissertation (4 credits)**

Students who have not completed the dissertation after three registrations of Doctoral Dissertation must register for Continuing Dissertation each term in order to receive faculty and administrative advice and support related to the dissertation. Prerequisite: 24 credits of Doctoral Dissertation

**DISS 885 Doctoral Research (4 credits)**

The student pursues research under the direction of a faculty member. To register, students contact their advisor with the name of the faculty member under whose direction they would like to work and a brief explanation of the research area to be explored. The student must complete a 700-level course with the requested professor with a grade of B+ or higher.

**DISS 901 Doctoral Dissertation (8 credits)**

The student develops an accepted proposal for the study, conducts the research as proposed, submits an acceptable report, and successfully defends the dissertation.

**DISS 920 Continuing Dissertation (4 credits)**

Students who have not completed the dissertation after three registrations of Doctoral Dissertation must register for Continuing Dissertation each term in order to receive faculty

sand administrative advice and support related to the dissertation. Prerequisite: 24 credits of Doctoral Dissertation.

### **ISEC 615 Fundamentals of Cybersecurity (3 credits)**

An overview of the technical aspects of cybersecurity. Issues discussed include confidentiality, integrity, and availability (CIA), as well as authentication, access control, trust, and non-repudiation. Furthermore, topics covered include the threat types and attack vectors used for compromising computer and network security. Investigation of fundamental cybersecurity and assurance technologies that can be applied to mitigate threat vectors. The selection of appropriate information security applications, security lifecycles, as well as controls utilized to protect computers and networks from the variety of threat vectors will also be covered. Students who do not have prior exposure to computer networking are recommended to take MMIS 653, Telecommunications and Computer Networking, prior to taking this course.

### **ISEC 620 Applied Cryptography (3 credits)**

Fundamental concept, principle, and theory of cryptography and its applications. Topics include, but not necessarily limited, CIA triad, symmetric encryption/decryption techniques such as DES and AES, asymmetric encryption/decryption technique such as RSA, cryptographic theory and data integrity algorithms such as cryptographic hash functions, message authentication codes (MAC), digital signatures, cryptographic protocols, cryptanalysis, key management and distribution, etc. Students who do not have prior exposure to operating systems and computer networks are highly recommended to take CISC640 - Operating Systems & CISC650 - Computer Networks, prior to taking this course. Prerequisites: CISC 502 (or equivalent), CISC 640, and CISC 650.

### **ISEC 635 Information Security Operations Management (3 credits)**

Provides an understanding to implement effectively the information security vision and strategy set forth by the executive management. The emphasis will be on the management of an information security program. Focus is on the implementation of information security policy, information security planning, development of information security processes, and establishment of information security measures. Concepts and techniques from the management and organizational behavior disciplines will be integrated in order to identify and propose solutions to the problems of information security administration. Prerequisite: ISEC 615.

### **ISEC 640 Database Security (3 credits)**

This course will focus on issues related to the design and implementation of secure data stores. Emphasis will be placed on multilevel security in database systems, covert channels, and security measures for relational and object-oriented database systems. **Prerequisites:** MSIT 630 or CISC 660.

### **ISEC 650 Computer and Network Forensics (3 credits)**

This course is designed to provide an overview of the techniques and technologies that are being applied to the practice of digital and network forensics. The knowledge of computer and network forensics has become essential in securing today's network-centric computing environment. This new course will give the students both the fundamental knowledge and hands-on practice on computer and network forensics.

**ISEC 655 Information Security Governance (3 credits)**

Challenges and opportunities of effectively governing an organization's information security requirements and resources. Information security governance lays out the vision for the information security program. Discussions include what constitutes good

information security governance, and development of an effective information security strategy and policy. Also focuses on how to improve information security accountability, regulatory compliance, and maturity.

**ISEC 660 Advanced Network Security (3 credits)**

Fundamental concepts, principles, and practical networking and internetworking issues relevant to the design, analysis, and implementation of enterprise-level trusted networked information systems. Topics include networking and security architectures, techniques, and protocols at the various layers of the Internet model. Security problems in distributed application environments will be analyzed and solutions discussed and implemented. Prerequisites: CISC 640, and CISC 650.

**ISEC 675 Information Systems Auditing (3 credits)**

This course will evaluate fundamental concepts related to an information systems audit. Principles and practices related to secure operation of existing information technology. Information security accountability, development of internal control objectives and framework, and identification of appropriate information systems audit procedures covering security, compliance, risk mitigation, and business continuity.

**ISEC 690 Information Security Project (3 credits)**

This project course focuses on integrating best practices for protecting critical information infrastructures through national cybersecurity standards and systems assessments in order to help students develop a final information security project focusing on Network Security Engineering. Students may enroll in this class only after completing all of the information security core courses. Upon request, the course may be taken concurrently with one of the prerequisite courses. Such a request will only be approved in the last term of a student's matriculation, and students taking a prerequisite concurrently are subject to the same expectations as those who have completed all prerequisites. Students will work in teams to enhance their team building and communication skills, along with working on a real-life organizational project focus on Network Security Engineering.

**ISEC 695 Information Security Management Project (3 credits)**

This project course focuses on integrating best practices for protecting critical information infrastructures through national cybersecurity standards and systems assessments in order to help students develop a final information security project focusing on Information Security Policy Development and Compliance. Students may enroll in this class only after completing all of the information security core courses. Upon request, the course may be taken concurrently with one of the prerequisite courses. Such a request will only be approved in the last term of a student's matriculation, and students taking a prerequisite concurrently are subject to the same expectations as those who have completed all prerequisites. Students will work in teams to enhance their team building and communication skills, along with working on a real-life organizational project focus on Information Security Policy Development and Compliance.

**ISEC 700 Research Seminar I Cybersecurity (3 credits)**

This course is designed to provide PhD students with a review of current viable research topics in information security/information assurance that can be aligned with current CCE faculty expertise and research interests. The topics will include both technical and human-centric research topics. The course will be structured as a doctoral seminar course. Based on the current research being conducted by CCE faculty and new areas of potential investigation, a series of current refereed papers will be provided to the students for detailed review, discussion, and further exploration of relevant literature. The course will also include discussions of the various research methodologies that could be employed to investigate the problem presented and applied novel solutions.

**ISEC 885 Doctoral Research (4 credits)**

The student pursues research under the direction of a faculty member. To register, students contact their advisor with the name of the faculty member under whose direction they would like to work and a brief explanation of the research area to be explored. The student must complete a 700-level course with the requested professor with a grade of B+ or higher.

**ISEC 901 Doctoral Dissertation (8 credits)**

The student develops an accepted proposal for the study, conducts the research as proposed, submits an acceptable report, and successfully defends the dissertation.

**ISEC 920 Continuing Dissertation (4 credits)**

Students who have not completed the dissertation after three registrations of Doctoral Dissertation must register for Continuing Dissertation each term in order to receive faculty and administrative advice and support related to the dissertation. Prerequisite: 24 credits of Doctoral Dissertation.

**MMIS 621 Information Systems Project Management (3 credits)**

This course provides a socio-technical perspective to the management of projects within the field of information systems. Course content includes planning, scheduling, organizing, and implementing projects and exploring current trends and issues in information systems project management.

**MMIS 623 Ethics in Computing (3 credits)**

In this course we examine the impact of the computer and the Internet on our society. Topics include ethical decision-making and frameworks, professional codes, free speech, intellectual property, cybercrime, privacy, security, and digital identity.

**MMIS 636 Computer-Supported Cooperative Work (3 credits)**

The scope of the CSCW field will be examined, including theoretical, practical, technical, and social issues and future directions of the field. Focus will be on challenges people face working in online groups and core dimensions of online cooperative work. Students will examine theoretical CSCW models, review and critique innovations in collaborative technologies, and address social and organizational challenges of CSCW environments. Various group interactions and concerns in online collaborative activities are addressed such as awareness, communication, decision-making, shared writing and editing, coordination, meeting and meeting spaces, information management, and other contextual factors in the workplace.

**MMIS 642 Data Warehousing (3 credits)**

This course includes the various factors involved in developing data warehouses and data marts: planning, design, implementation, and evaluation; review of vendor data warehouse products; cases involving contemporary implementations in business, government, and industry; techniques for maximizing effectiveness through OLAP and data mining. Prerequisite: MSIT 630.

**MMIS 643 Data Mining (3 credits)**

This course emphasizes the fundamental concepts and techniques of data mining. Concepts will be illustrated with case studies of real data mining examples. The focus is to find knowledge from huge amounts of data being handled electronically. Students will gain hands-on experience using data mining tools on real data. Prerequisite/s: QNT 5040 or QNT 5160 or MMIS 0671 AND MMIS 0630 or MSIT 0630.

**MMIS 644 UX Strategy for Social Media (3 credits)**

The course provides an overview of the social media ecology and strategy planning for content creation and content sharing in industry, education, and other professional arenas. The focus is on research, application, effective practices and uses, and emerging technology platforms in social media, online communication, and social computing. Topics may cover social media ecology platforms, social media content sharing; curating content, user activity metrics and analytics such as actions metrics and web data; measuring the value of the impact of social media; infotention; information credibility, computer-mediated/online communication; security and privacy; social media planning.

**MMIS 653 Telecommunications and Computer Networking (3 credits)**

This course provides a framework for understanding computer network functionality, characteristics, and configurations. Topics include network topologies, protocols, and architectures and emerging trends in network technologies and services. The role of optical technologies in supporting national and international implementations is explored. Strategies for network planning, implementation, management, and security are introduced. Recent advances in standardization, internetworking, and deployment of LANs (local area networks), MANs (metropolitan area networks), and WANs (wide area networks) are introduced.

**MMIS 671 Data Analytics (3 credits)**

This course examines concepts and methods central to data analytics. The focus is on the effective application of optimization and machine learning models for solving well-structured problems.

**MMIS 680 Human-Computer Interaction (3 credits)**

The course examines the dynamics of human-computer interaction (HCI) pertaining to the study of user interactions with modern technology platforms. Provides an overview of user-centered approaches in the design and evaluation of technology applications. Areas to be addressed include user experience (UX) and design concepts and strategies, user experience levels, interaction concepts, user interface inspections and heuristic evaluation, usability and user experience observation and testing, web site usability, and usable security and privacy.

**MMIS 691 Special Topics in Information Systems (3 credits)**

This course allows students to leverage their coursework by working on a project for a real-world organization.

**MMIS 692 Data Analytics Project (3 credits)**

This capstone project requires students to employ the knowledge and skills assimilated in the pre-requisite courses to design and develop a business intelligence application that leads to direct and measurable value for an organization.

**MMIS 699 Master's Thesis in Management Information Systems (3 credits)**

The student develops a framework within which research will be conducted and offers evidence of qualifications to pursue the research. Concepts and theories underlying the student's thesis research are articulated; the problem is clearly stated; specific, measurable goals are specified; a literature review is presented; the methods of conducting research are delineated; and strategy to achieve the goal is given. Registration for MMIS 699 must be repeated for three more credits, for a total of six thesis credits. Prerequisite: Completion of eight courses at the 600-level.

**MSIT 501 Foundations of Programming, Data Structures, and Algorithms (3 credits)**

Concepts and foundations of computer science, including procedural and object-oriented programming, data structures, algorithms, and algorithm design, are introduced through programming in Python.

**MSIT 630 Database Systems (3 credits)**

Methodologies and principles of database analysis and design are presented. Conceptual modeling and specifications of databases, database design process and tools, functional analysis, the entity-relationship model, and advanced semantic modeling methods are discussed. Topics include theories of database systems, including the architectures of database systems, logical and physical database organizations, data models for database systems (network, hierarchical, relational, and object-oriented model), relational algebra and calculus, query languages, normal forms, null values and partial information, relational database design utilizing dependencies, view design and integration, concurrency control, query optimization, client-server database applications, distributed databases, object-oriented databases, and the current research and development trends of database analysis, design, modeling, and applications.

**MSIT 650 Platform and Network Technologies (3 credits)**

An information technology application development and administration perspective of operating systems and networks. Operating system and network concepts of interfacing, virtual machines, process management, storage management, protection, security, network infrastructure, communication protocols, configuration, and administration are presented.

**MSIT 660 Software Development (3 credits)**

The development of application software in support of Information Technology deployments; software quality factors; software development principles; life-cycle models; requirements definition and analysis; behavioral specification; software design; implementation; software testing; verification and validation; maintenance; software

project management; and programming language impacts on information technology application development.

**MSIT 665 Web Services** (3 credits)

Concepts and principles of web application development are presented. The focus of this course is on distributed application design and implementation. Topics include the role of the GUI and front-end development tools, HTTP, HTML, web services, and database interaction. Discussions include the various relationships between web applications and business processes along with concerns for meeting customer requirements. Prerequisites: MSIT 650 and MSIT 660 or equivalent.

**MSIT 691 Special Topics in Information Technology** (3 credits)

This seminar focuses on the professor's current research interests. Requires consent of course professor and program director.

**RESO 700 Research Methods** (3 credits)

This course provides a comprehensive introduction to both quantitative and qualitative inquiry approaches in a variety of research settings. It presents an in-depth treatment of the research process from identifying and developing research problems, to selecting appropriate study designs, to data collection, analysis, interpretation, and presentation of findings. Special emphasis is placed on the appropriate choice of methodologies for a variety of problem situations.



## **The College of Computing and Engineering Faculty**

Charmaine Barreto, Ph.D., Syracuse University. Associate Professor. Human computer interaction, telecommunications and network management, web design, management information systems, systems analysis and design, project management, business statistics, survey design, research methods, library and information science, knowledge management.

Travis J.A. Craddock, Ph.D., University of Alberta. Assistant Professor. Molecular systems neuroscience, computational and theoretical studies of subatomic radioactive decay, subneural biomolecular information processing, nanoscale neuroscience descriptions of memory, consciousness and cognitive dysfunction.

Laurie P. Dringus, Ph.D., Nova Southeastern University. Professor. Human-computer interaction, information systems, computer-mediated communication, computer-supported collaborative work, interaction design, user experience and usability evaluation, and online learning.

Mohammed Hosseini Farid, Ph.D., Nova Southern University. Biomechanics, Computational Mechanics, Nonlinear Solid Mechanics, Tissue Engineering, Biomedical Imaging, Material characterization, Material modeling, Nano-composites.

Mary Harward, Ph.D., Nova Southern University. Instructor. Data science, analytics, database and information systems, project management, and knowledge management.

Ajoy Kumar, Ph.D., Florida Atlantic University, Assistant Professor. Program languages, data structures and cybersecurity.

Michael J. Laszlo, Ph.D., Princeton University. Professor. Computer graphics, data structures and algorithms, software engineering, programming.

Yair Levy, Ph.D., Florida International University. Professor. Cybersecurity skills and competencies, social engineering, cybersecurity awareness and cyber threat prevention, as well as experimental research design.

Wei Li, Ph.D., Mississippi State University. Professor. Computer security, network security, software engineering, artificial intelligence, database systems.

Peixiang Liu, Ph.D., Imperial College London. Professor. Computer networks, QoS routing, database systems, machine learning.

Thomas W. MacFarland, Ed.D., Associate Professor (on Administrative Leave). Institutional research, assessment of student learning outcomes, Federal data resources, K-12 computer science education.

Frank Mitropoulos, Ph.D., Nova Southeastern University. Professor. Programming languages, data structures, software engineering, object-oriented design, mobile application design and development.

Sumitra Mukherjee, Ph.D., Carnegie Mellon University. Professor. Artificial intelligence, machine learning, analytics, business intelligence, database security, data management.

Ali Panahi, Ph.D. Southern Illinois University. Assistant Professor. Muscle fatigue and motion analysis, Recurrence Quantification Analysis (RQA), ergonomics, Powder Injection Molding (PIM).

José A. Ramos, Ph.D., Georgia Institute of Technology. Professor. Control systems, mechatronics, system identification, signal processing, stochastic processes, multivariate statistics, optimization theory.

Manuel Salinas, Ph.D., Florida International University. Assistant Professor. Vascular tissue engineering, artificial organs, and cardiovascular biomechanics.

Greg Simco, Ph.D., Nova Southeastern University. Professor, Chair. Operating systems, data communications, computer networks, client-server computing, distributed systems, systems performance evaluation.

Junping Sun, Ph.D., Wayne State University. Professor. Database management systems, data warehousing, knowledge discovery and data mining.

Ling Wang, Ph.D., Purdue University. Professor, Research methodology and statistics, learning systems and technologies, information privacy, computing ethics.