

Computer Science (MR)

Degree Requirements

Degrees earned will be distributed as: "Master of Computer Science" without track specifications. Students may request a department letter upon successful completion of a track curriculum.

Master of Computer Science (MR)

Code	Title	Hours
Core Courses		9
Select a minimum of three courses from "Core Courses" listed below		
Required Course		1
CSC 600	Computer Science Graduate Orientation	
Electives Courses ¹		12
CSC 500 or 700-level courses		
Electives or Other Restricted Electives		9
Take any combination of 500- or 700-level courses in Computer Science, the College of Engineering or the College of Sciences		
Total Hours		31

¹ Students can apply 3 credit hours of CSC 630 to the elective area.

Core Courses

Code	Title	Hours
Select a minimum of three courses: one from either category with two from the remaining category		9
Theory		
CSC 503	Computational Applied Logic	3
CSC 505	Design and Analysis Of Algorithms	3
CSC 512	Compiler Construction	3
CSC 514	Foundations of Cryptography	3
CSC 565	Graph Theory	3
CSC 579	Introduction to Computer Performance Modeling	3
CSC 580	Numerical Analysis II	3
CSC 707	Automata, Languages and Computability Theory	3
Systems Category		
CSC 501	Operating Systems Principles	3
CSC 506	Architecture Of Parallel Computers	3
CSC 510	Software Engineering	3
CSC 520	Artificial Intelligence I	3
or CSC 720	Artificial Intelligence II	
CSC 540	Database Management Concepts and Systems	3
CSC 561	Principles of Computer Graphics	3
CSC 570	Computer Networks	3
or CSC 573	Internet Protocols	
CSC 574	Computer and Network Security	3

Master of Computer Science (MR) with Data Science Track

Code	Title	Hours
Required Courses		4
CSC 591	Special Topics In Computer Science (Foundations of Data Science)	
CSC 600	Computer Science Graduate Orientation	
Data Science		6
Any two courses from the "Algorithmics" Category listed below		
Data Science Electives		9
Select three courses from at least two categories listed below		
Computer Science Core Courses, Graduate Electives or Restricted Electives		12
Take any combination from the available categories listed below		
Total Hours		31

Algorithmics Category

Code	Title	Hours
CSC 505	Design and Analysis Of Algorithms	3
CSC 520	Artificial Intelligence I	3
CSC 522	Automated Learning and Data Analysis	3
CSC 720	Artificial Intelligence II	3
CSC 722	Advanced Topics in Machine Learning	3
CSC 591	Special Topics In Computer Science (Topics include: Graph Data Mining; Spatial and Temporal Data Mining; Machine Learning for User Adaption; Advanced Algorithms; Algorithms for Data Guided Business Intelligence)	1-6
CSC 791	Advanced Topics In Computer Science (Topics include: Graph Data Mining; Spatial and Temporal Data Mining; Machine Learning for User Adaption; Advanced Algorithms; Algorithms for Data Guided Business Intelligence)	1-6

Systems Category

Code	Title	Hours
CSC 540	Database Management Concepts and Systems	3
CSC 541	Advanced Data Structures	3
CSC 547	Cloud Computing Technology	3
CSC 548	Parallel Systems	3
CSC 591	Special Topics In Computer Science	1-6
CSC 724	Advanced Distributed Systems	3
CSC 742	Advanced Topics in Database Management Systems	3
CSC 750	Service-Oriented Computing	3

Applications Category

Code	Title	Hours
CSC 530	Computational Methods for Molecular Biology	3
CSC 554	Human-Computer Interaction	3

CSC 555	Social Computing and Decentralized Artificial Intelligence	3
CSC 561	Principles of Computer Graphics	3
CSC 591	Special Topics In Computer Science (Topics Include: Spoken Dialogue Systems; Intelligent Game Learning; Educational Data Mining)	1-6

Master of Computer Science (MR) with Security Track

Code	Title	Hours
Required Courses		4
CSC 574	Computer and Network Security	
CSC 600	Computer Science Graduate Orientation	
Security Core Courses		9
Select three courses from "Security Core Courses" listed below		
Security Foundations Courses		9
Select three courses from at least two categories under "Security Foundations Courses" listed below		
Computer Science Core Courses, Graduate Electives or Restricted Electives		9
Take any combination from the available categories listed below		
Total Hours		31

Security Core Courses

Code	Title	Hours
Select three of the following courses:		
CSC 514	Foundations of Cryptography	3
CSC 515	Software Security	3
CSC 705	Operating Systems Security	3
CSC 774	Advanced Network Security	3
CSC 533	Privacy in the Digital Age	3
CSC 591	Special Topics In Computer Science (Specifically: Systems Attacks and Defenses)	1-6

Security Foundation Courses

Code	Title	Hours
Select three courses from at least two categories below:		
Systems Foundations		
CSC 501	Operating Systems Principles	3
CSC 510	Software Engineering	3
CSC 540	Database Management Concepts and Systems	3
CSC 548	Parallel Systems	3
CSC 570	Computer Networks	3
CSC 573	Internet Protocols	3
CSC 575	Introduction to Wireless Networking	3
CSC 712	Software Testing and Reliability	3
CSC 724	Advanced Distributed Systems	3
Theory Foundations		

CSC 505	Design and Analysis Of Algorithms	3
CSC 512	Compiler Construction	3
CSC 541	Advanced Data Structures	3
CSC 565	Graph Theory	3
CSC 707	Automata, Languages and Computability Theory	3
CSC 722	Advanced Topics in Machine Learning	3

Privacy Foundations

CSC 522	Automated Learning and Data Analysis	3
CSC 554	Human-Computer Interaction	3
CSC 555	Social Computing and Decentralized Artificial Intelligence	3
CSC 591	Special Topics In Computer Science (Specifically: Foundations of Data Science)	1-6

Master of Computer Science (MR) with Software Engineering Track

Code	Title	Hours
Required Courses		
CSC 510	Software Engineering	
CSC 600	Computer Science Graduate Orientation	
Software Science Courses		9
Select three courses from "Software Science Courses" listed below		
Software Foundations Courses		6
Select two courses from "Software Foundations Courses" listed below		
Computer Science Core Courses, Graduate Electives or Restricted Electives		12
Take any combination from the available categories listed below		
Thesis Research Projects		N/A
Thesis Research Project opportunities will be communicated by faculty		
Total Hours		27

Software Science Courses

Code	Title	Hours
Select three courses from the following:		
CSC 515	Software Security	3
CSC 519	DevOps: Modern Software Engineering Practices	3
CSC 591	Special Topics In Computer Science	1-6
CSC 710	Software Engineering as a Human Activity	3
CSC 712	Software Testing and Reliability	3
CSC 791	Advanced Topics In Computer Science (Specifically: Automated Software Engineering)	1-6

Software Foundations

Code	Title	Hours
Select two courses from the following:		6
CSC 503	Computational Applied Logic	3
CSC 512	Compiler Construction	3
CSC 517	Object-Oriented Design and Development	3
CSC 520	Artificial Intelligence I	3
CSC 522	Automated Learning and Data Analysis	3
CSC 540	Database Management Concepts and Systems	3
CSC 547	Cloud Computing Technology	3
CSC 554	Human-Computer Interaction	3
CSC 750	Service-Oriented Computing	3

Additional Requirements

- At least 21 hours must be in graduate 500- and 700-level Computer Science courses (note: the Graduate School does not allow 500- and 700-level courses to be taken pass-fail).
- "Restricted elective" courses may be any graduate letter-graded (500- or 700-level) course within the College of Engineering (including Computer Science), or within the College of Sciences. Exceptions that will *not* count towards graduation:
 - ST 511 (if taken after Spring 2014)
 - special topics courses (including EGR 590) in departments other than Computer Science (if taken after Fall 2012).
- All Computer Science credits must be at or above the 500 level.
- To graduate, a student must have at least a 3.00 grade point average (GPA). In addition, for students beginning their degree on or after Fall 2013, the GPA in the group of courses used to satisfy the core course requirement must be at least 3.0 as well. For additional Graduate School requirements regarding degree completion see the Graduate School Handbook.
- A maximum of four special topics courses (either CSC 591 or CSC 791) may be counted towards graduation (for students beginning Fall 2012 or later).
- Registration by MCS students in Independent Study (CSC 630) requires approval by the faculty member who will supervise the work, followed by submission to the DGP of a one page written description of the topic and expected outputs, and approval of the DGP. A grade of "S" will require submission of a report describing the work done, and the results obtained. A maximum of three credits of CSC 630 may be counted towards graduation.
- Minors are neither required nor permitted.

Accelerated Bachelor's/Master's Degree Requirements

The Accelerated Bachelors/Master's (ABM) degree program allows exceptional undergraduate students at NC State an opportunity to complete the requirements for both the Bachelor's and Master's degrees at an accelerated pace. These undergraduate students may double count up to 12 credits and obtain a non-thesis Master's degree in the same field within 12 months of completing the Bachelor's degree, or obtain a thesis-based Master's degree in the same field within 18 months of completing the Bachelor's degree.

This degree program also provides an opportunity for the Directors of Graduate Programs (DGPs) at NC State to recruit rising juniors in their major to their graduate programs. However, permission to pursue an

ABM degree program does not guarantee admission to the Graduate School. Admission is contingent on meeting eligibility requirements at the time of entering the graduate program.

Faculty

Department Head

Georgios N. Rouskas, *Interim Department Head and Alumni Distinguished Graduate Professor*

Distinguished Professors

Tiffany M. Barnes

Laurie A. Williams, *Goodnight Distinguished University Professor in Security Sciences and Co-Director - NCSU Science of Security Lablet*

Distinguished University Professor

James C. Lester II, *Goodnight Distinguished University Professor in Artificial Intelligence and Machine Learning and Director of the Center for Educational Informatics*

Alumni Distinguished Graduate Professor

Georgios N. Rouskas, *Interim Department Head*

Munindar P. Singh, *SAS Institute Distinguished Professor of Computer Science and Co-Director - NCSU Science of Security Lablet*

Full Professor

Min Chi

Rada Y. Chirkova

Rudra Dutta, *Associate Department Head*

William H. Enck, *Goodnight Distinguished Professor in Security Sciences and Director of Wolfpack Security & Privacy Research (WSPR) Laboratory*

Edward F. Gehringer

Xiaohui (Helen) Gu

Christopher G. Healey, *Goodnight Distinguished Professor Analytics, Institute for Advanced Analytics*

Steffen Heber, *Director of Graduate Programs*

Noboru Matsuda

Timothy J. Menzies

R. Frank Mueller

David L. Roberts, *Assistant Director of Undergraduate Programs*

Matthias F. M. Stallmann

R. Raju Vatsavai

Associate Professors

Wesley K. G. Assunção

Justin Bradley

Marcelo d'Amorim

Anupam Das

Zhishan Guo

Khaled Harfoush

Arnav H. Jhala

Alexandros Kapravelos

Sandeep K. Kuttal

Jianqing Liu

Collin F. Lynch

Kemafor Anyanwu Ogan

Thomason W. Price

Sharath Kumar Raghvendra

Bradley G. Reaves

Muhammad Shahzad

Donald R. Sheehy

Kathryn T. Stolee

Sharma Vallin Thankachan

Benjamin A. Watson

Wujie Wen

Ruozhou Yu

Assistant Professors

Bitra Akram

Veronica M. Cateté

Peng Gao

Qiao (Georgie) Jin

Jung -Eun Kim

Chin Ho Lee

Huining Li

Jiajia Li

Xiaorui Liu

Yuchen Liu

Aditi Mallavarapu

John-Paul Ore

Dominik Wermke

Bowen Xu

Chenhan Xu

Dongkuan (DK) Xu

Man Ki Yoon

Teaching Professors

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Jamie A Jennings

Shuyin Jiao

Jason T. King

Chandrika Satyavolu

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Kimberly J. Titus

Teaching Assistant Professors

Abida Haque

Alexander Card

Adam Gaweda

Sterling M. McLeod

Lecturers

Aimee Allard

Margaret Heil, *Director of Senior Design Center*

ToniAnn Marini, *Assistant Director of Undergraduate Advising*

Director

Leslie Rand-Pickett, *Interim Director of External & Corporate Relations*

Emeritus Faculty

Dennis R. Bahler

Wu-show Chou

Edward W. Davis, Jr.

Jon Doyle

Robert J. Fornaro

Thomas L. Honeycutt

David F. McAllister

Harry Perros

Douglas S. Reeves

Woodrow Robbins

Gregory E. Rothermel

Carla D. Savage

William J. Stewart

Alan L. Tharp

David J. Tuente

Mladen A. Vouk

Adjunct Faculty

Aldo Dagnino

Christopher Parnin

Injong Rhee

Xipeng Shen