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	Counts towards
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		**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**	

Core Courses

Code	Title	Hours	Counts towards
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 I	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	Counts towards
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	Counts towards
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	Counts towards
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	Counts towards
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	Counts towards
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	Counts towards
Select three of the following courses:		**9**	
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	Counts towards
Select three courses from at least two categories below:		**9**	
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	Counts towards
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	Counts towards
Select three courses from the following:		**9**	
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	Counts towards
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

1. 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).
2. "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).
3. All Computer Science credits must be at or above the 500 level.
4. 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.
5. 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).

6. 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.
7. 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

Gregory E. Rothermel, *Professor*

Distinguished University Research Professor

Donald L. Bitzer

Distinguished Professors

Tiffany M. Barnes

Mladen A. Vouk, *Vice Chancellor for Research Development*

Laurie A. Williams, *Co-Director - NCSU Science of Security Lablet*

Distinguished University Professor

James C. Lester II, *Director of the Center for Educational Informatics*

Michael A. Rappa, *Director, Institute for Advanced Analytics*

Alumni Distinguished Graduate Professor

Georgios N. Rouskas, *Director of Graduate Programs*

Munindar P. Singh, *Co- Director - NCSU Science of Security Lablet*

Full Professor

John W. Baugh

Min Chi

Rada Y. Chirkova

Huaiyu Dai

Rudra Dutta, *Associate Department Head*

William H. Enck, *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

Timothy J. Menzies

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Shiyan Jiang

Jung -Eun Kim

Chin Ho Lee

Jiajia Li

Huining Li

Jianqing Liu

Xiaorui Liu

Yuchen Liu

Yuan Liu

Aditi Mallavarapu

John-Paul Ore

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Dongkuan (DK) Xu

Vijay Shah

Dominik Wermke

Bowen Xu

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Isabella White

Lecturers

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Scott Gerard

Margaret Heil, *Director of Senior Design Center*

ToniAnn Marini, *Assistant Director of Undergraduate Advising*

Research Professor

Franc Brglez

Assistant Research Professor

Bita Akram

Director

Leslie Rand-Pickett, *Graduate Career Services*

Emeritus Faculty

Dennis R. Bahler

Wu-show Chou

Jon Doyle

Edward W. Davis, Jr.

Robert J. Fornaro

Thomas L. Honeycutt

David F. McAllister

Harry Perros

Douglas S. Reeves

Woodrow Robbins

Carla D. Savage

William J. Stewart

Alan L. Tharp

David J. Thuente

Adjunct Faculty

Ram Chillarege

Aldo Dagnino

Steven Hunter

Chris Martens

Wookhee Min

Peng Ning

Christopher Parnin

Injong Rhee

Robert St. Amant

Xiaogang (Cliff) Wang

Tao Xie