Ph.D. in Computational Analysis and Modeling
Ph.D. Curriculum

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Degree Codes: ES PhD CAM

Course Category	Number	Course Name		SCH
Math Core	MATH 414	Numerical Analysis	3	15
	MATH 415	Numerical Analysis	3	
	Pick one of the following two options or approved Math graduate course			
	MATH 407[1]	Partial Differential Equations	3	
	STAT 620 and 621[2]	Theory of Probability / Theory of Statistics	6	
	Take one[2] or two[1] additional Math courses in consultation with committee to support research		3 or 6	
CSC Core	Pick two of the following three courses or approved CS graduate course[3]			9
	CSC 520	Advanced Analytical Algorithms and Complexity	3	
	CSC 521	Advanced Computer Architecture	3	
	CSC 532	Advanced Topics: Software Engineering	3	
	Take one additional CSC courses in consultation with committee to support research		3	
Qualifying Examinations	CAM 685	Mathematics Written Qualifying Exam (winter or spring)	0	
	CAM 686	Computer Science Written Qualifying Exam (winter or spring)	0	
	CAM 687	Oral Comprehensive Exam[4]	0	
Doctoral Seminar	CAM 611	Doctoral Seminar (taken three times in fall quarters)	1	3
Research and Dissertation[5]	CAM 651	Pre-Candidacy Doctoral Research	1-9	9
	CAM 751	Post-Candidacy Dissertation Research	1-9	9
Electives	In consultation with advisory committee, at least 9 SCH must be from a third area including Chemistry, Physics, Biology, Forestry, Finance, Education, Psychology, Sociology, Statistics, or an Engineering discipline.			27
			Total	72

[1] If the student takes MATH 407 or another approved Math course, then they must take **two** additional approved Math courses.

[2] If the student takes STAT 620 and 621, then they must take **one** additional approved Math course.

[3] For students with non-CS backgrounds, CSC 220 and/or CSC 430 should be taken before these courses are attempted.

[4] The oral exam includes a lecture followed by a question/answer period on the student's proposed dissertation topic that exhibits a clear demonstration of an understanding of the principles and methods involved in his/her proposed area of specialization. A written proposal, uploaded in a student's plan of study and approved by their committee, is required before a student may enroll in CAM 687.

[5] Complete 9 SCH of CAM 651 prior to CAM 687. After successful passing CAM 687, complete 9 SCH of CAM 751. Registration in any quarter is for 1 to 3 semester hours or multiples thereof, up to a maximum of 9 semester hours per quarter.

*Students are expected to have published one or more peer reviewed journal publications or conference proceedings by the time they graduate.

Samples of Potential Tracks

Track Name	Supporting Core CS – 3 SCH MATH – 3 or 6 SCH[1,2]	Suggested Electives (In consultation with advisory committee, at least 9 SCH must be from a third area including Chemistry, Physics, Biology, Forestry, Finance, Education, Psychology, Sociology, Statistics, or an Engineering discipline.)
High Performance Computing, High Availability Computing	CSC 585 MATH 435 MATH 585 or 535	CSC 581　　CSC 582　　CSC 534　CSC 557 STAT 620　STAT 625　QA 625　MATH 575 CAM 650　　CAM 657
Cyberspace, Network Science, Information Assurance	CSC 475 MATH 435 MATH 535	CSC 450　CSC 554　CSC 575 CIS 521　　CIS 522 CIS 523　　CIS 524 CAM 657　CAM 650
Computation, Simulation, Modeling	CSC 557 MATH 574 MATH 575	CSC 585　　CSC 470　　CSC 570　　CSC 579 MATH 435　MATH 535 STAT 620　STAT 625　STAT 651 CAM 657　　CAM 650
Applied Statistics, Knowledge Discovery	CSC 579 STAT 507 STAT 506 or QA 625	STAT 507/QA 630　　STAT 625/QA 635 STAT 651　STAT 652　STAT 650　STAT 680 MATH 574　MATH 575　MATH 435　MATH 535 CAM 657　CAM 650
Data Science	CSC chosen in consultation with advisor MATH 505 MATH 435	CSC 575　　CSC 579　　CSC 585　　CSC 554　　CSC 576　　CSC 530　CSC 580 STAT 509　STAT 620　STAT 621　STAT 506　STAT 508 MATH 460 MATH 507　MATH 535 CAM 657　CAM 650
Computational Graph Theory or Applied Number Theory	CSC chosen in consultation with advisor MATH 460 MATH 408	CSC 450/554　CSC 579/580 STAT 620　STAT 621 MATH 574/575　　MATH 408/584　　MATH 470/588 CAM 657　　CAM 650
STEM Educational Modeling	CSC chosen in consultation with advisor MATH 407/408 MATH 435/460	EDCI 490　EDLE 500/730　EDLE 702/703/717 PSYC 502/543　PSYC 618/631　PSYC 541 STAT 506　STAT 507　MATH 408/460　MATH 505/535 CAM 657　　CAM 650

Plan of Study Important Information: When entering information in the plan of study, it is important to note that only core courses and all core courses need to be put in section 1.1, while all others are put in section 1.2 (i.e. special topics, seminar, and research courses).　See http://coes.latech.edu/grad-programs/plan–of-study-instructions.pdf for plan of study instructions.

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