BACHELOR OF SCIENCE IN MATHEMATICS AND COMPUTING

Code	Title	Credit Hours
Wellness Requirement		
APPH 1040	Scientific Foundations of Health	2
or APPH 10	The Science of Physical Activity and Health	
or APPH 10	Flourishing: Strategies for Well-being and Resilience	
Core IMPACTS		
Institutional Priority		
CS 1301	Introduction to Computing	3
Mathematics and Quantitative Skills		
MATH 1552	Integral Calculus	4
Political Science and U.S. History		
HIST 2111	The United States to 1877	3
or HIST 2112	The United States since 1877	
or INTA 1200	American Government in Comparative Perspective	
or POL 1101	Government of the United States	
or PUBP 3000	American Constitutional Issues	
Arts, Humanities, and Ethics		
Any HUM		6
Communicating in Writing		
ENGL 1101	English Composition I	3
ENGL 1102	English Composition II	3
Technology, Mathematics, and Sciences		
Lab Science		8
MATH 1551	Differential Calculus	2
or MATH 1550	Introduction to Differential Calculus	
MATH 1554	Linear Algebra	4
or MATH 15	Linear Algebra with Abstract Vector Spaces	
Social Sciences		
Any SS		9
Field of Study		
CS 1331	Introduction to Object Oriented Programming	3
CS 2110	Computer Organization and Programming	4
MATH 2551	Multivariable Calculus	4
or MATH 25	Honors Multivariable Calculus	
MATH 2552	Differential Equations	4
or MATH 2562	Honors Differential Equations	
MATH/CS 2740	Foundations of Mathematics and Computing	3
Major Requirements		
CS 3001	Computing, Society, and Professionalism	3
CS 1332	Data Structures and Algorithms for Applications	3
MATH 3406	A Second Course in Linear Algebra	3
MATH 4317	Analysis I	3
MATH/CX 3740	Probability and Statistics for Computing and Machine Learning	3
Concentration Requirements		27
Engineering or Science Electives [1]		6
Free Electives		9
Total Credit Hours		**122**

[1] Any course at the 3000/4000 level with prefix AE, BIOS, BMED, CHBE, CHEM, CEE, COE, COS, EAS, ECON, ECE, ISYE, MSE, ME, NEUR, NRE, PHYS, PSYC except for ISYE 3770, CEE 3770, ECE 3077, any MATH, CS, CX courses.

Concentration Requirements

Code	Title	Credit Hours
Theoretical Computer Science and Discrete Math Concentration		
MATH 3012	Applied Combinatorics	3
CS 2050	Introduction to Discrete Mathematics for Computer Science	3
or CS 2051	Honors - Induction to Discrete Mathematics for Computer Science	
CS 3510	Design and Analysis of Algorithms	3
or CS 3511	Design and Analysis of Algorithms, Honors	
CS 4510	Automata and Complexity Theory	3
CS 4540	Advanced Algorithms	3
Select two courses from List A:		6
MATH 4012	Algebraic Structures in Coding Theory	
MATH 4022	Introduction to Graph Theory	
MATH 4032	Combinatorial Analysis	
MATH 4107	Introduction to Abstract Algebra I	
MATH 4108	Introduction to Abstract Algebra II	
MATH 4150	Introduction to Number Theory	
MATH 4210	Mathematical Foundations of Data Science	
MATH 4221	Stochastic Processes I	
MATH 4222	Stochastic Processes II	
MATH 4280	Introduction to Information Theory	
MATH 4318	Analysis II	
MATH 4580	Linear Programming	
MATH 4803	Special Topics (Advanced Statistical Theory for Machine Learning)	
Select two courses from List B:		6
CS 3235	Introduction to Information Security	
CS 3600	Introduction to Artificial Intelligence	
CS 3790	Introduction to Cognitive Science	
CS 4641	Machine Learning	
CS 4644	Deep Learning	
CX 4220	Introduction to High Performance Computing	
CX 4240	Introduction to Computing for Data Analysis	
CX/MATH 4640	Numerical Analysis I	
CX/MATH 4641	Numerical Analysis II	
ECE 3084	Signals and Systems	
ECE 3251	Optimization for Information Systems	

ISYE 4133	Advanced Optimization	
Total Credit Hours		**27**

Code	Title	Credit Hours
Modeling, Simulation, Data and Applied Math Concentration		
MATH 4347	Partial Differential Equations I	3
CX 4220	Introduction to High Performance Computing	3
CX 4230	Computer Simulation	3
MATH/CX 4640	Numerical Analysis I	3
Select one course from ML List:		3
CS 4641	Machine Learning	
CX 4240	Introduction to Computing for Data Analysis	
MATH 4210	Mathematical Foundations of Data Science	
Select two courses from List A:		6
MATH 3012	Applied Combinatorics	
MATH 4022	Introduction to Graph Theory	
MATH 4221	Stochastic Processes I	
MATH 4222	Stochastic Processes II	
MATH 4280	Introduction to Information Theory	
MATH 4318	Analysis II	
MATH 4320	Complex Analysis	
MATH 4441	Differential Geometry	
MATH 4541	Dynamics and Bifurcations I	
MATH 4580	Linear Programming	
MATH 4755	Mathematical Biology	
MATH 4782	Quantum Information and Quantum Computing	
MATH 4803	Special Topics (Advanced Statistical Theory for Machine Learning)	
MATH 4803	Special Topics (Introduction to Stochastic Calculus)	
Select two courses from List B:		6
CS 4644	Deep Learning	
CX 4140	Computational Modeling Algorithms	
CX 4232	Simulation and Military Gaming	
CX 4242	Data and Visual Analytics	
CX/MATH 4641	Numerical Analysis II	
CX/MATH 4740	Computational Methods for Simulation and Machine Learning	
CX/MATH 4803	Special Topics in Computational Science and Engineering (Inverse Problems)	
ISYE 4133	Advanced Optimization	
EAS 4610	Earth System Modeling	
EAS 4630	Physics of the Earth	
Total Credit Hours		**27**

Code	Title	Credit Hours
Mathematical Intelligence and Data Science Concentration		
CS 3600	Introduction to Artificial Intelligence	3
MATH/CX 4740	Computational Methods for Simulation and Machine Learning	3
Select one course from the following:		3
CS 3630	Introduction to Perception and Robotics	
CS 3790	Introduction to Cognitive Science	
PSYC 3040	Sensation and Perception	
Select one course from the ML list:		3
CS 4641	Machine Learning	
CX 4240	Introduction to Computing for Data Analysis	
MATH 4210	Mathematical Foundations of Data Science	
Select one course from the following:		3
CS 3510	Design and Analysis of Algorithms	
CS 3511	Design and Analysis of Algorithms, Honors	
CX 4140	Computational Modeling Algorithms	
Select two courses from List A:		6
MATH 3012	Applied Combinatorics	
MATH 4022	Introduction to Graph Theory	
MATH 4107	Introduction to Abstract Algebra I	
MATH 4221	Stochastic Processes I	
MATH 4222	Stochastic Processes II	
MATH 4280	Introduction to Information Theory	
MATH 4318	Analysis II	
MATH 4320	Complex Analysis	
MATH 4347	Partial Differential Equations I	
MATH 4441	Differential Geometry	
MATH 4541	Dynamics and Bifurcations I	
MATH 4580	Linear Programming	
MATH 4803	Special Topics (Advanced Statistical Theory for Machine Learning)	
MATH 4803	Special Topics (Introduction to Stochastic Calculus)	
MATH 4803	Special Topics (Introduction to Geometric Methods in Machine Learning)	
MATH 4803	Special Topics (Introduction to Measure Transport and Generative Models)	
Select two courses from List B:		6
CS 4476	Introduction to Computer Vision	
CS 4540	Advanced Algorithms	
CS 4635	Knowledge-Based Artificial Intelligence	
CS 4644	Deep Learning	
CS 4646	Machine Learning for Trading	
CS 4649	Robot Intelli Planning	
CS 4650	Natural Language Understanding	
CS 4731	Game AI	
CX/MATH 4640	Numerical Analysis I	
CX 4641	Numerical Analysis II	
CX/MATH 4803	Special Topics in Computational Science and Engineering (Inverse Problems)	
ECE 4270	Fundamentals of Digital Signal Processing	
ECE 4271	Applications of Digital Signal Processing	
ISYE 4133	Advanced Optimization	
Total Credit Hours		**27**

BSMS Option

Undergraduate College of Engineering, College of Sciences and Computer Science majors and Master of Science with a major in Management

This option is open to all undergraduate College of Engineering and Computer Science students. Students must submit a BSMS application meet admissions criteria to be considered for the option.

Students may double count up to 6 credit hours of letter-grade 4000-level College of Engineering (if COE major), College of Sciences (if COS major), or Computer Science (if CS major) courses towards electives in the Master of Science with a major in Management (MS-MGT) program. Course selection for double-counted 4000-level courses must be approved by the MS-MGT program advisor. Students must still complete the 12 credit hour MS-MGT core.

Students are encouraged to reach out to the Scheller College of Business for more information.