

College of Science
Bachelor of Science in Computational Modeling and Data Analytics
 Major in Computational Modeling and Data Analytics (CMDA)
 For students graduating in calendar year **2018**

CORE REQUIREMENTS (50 Credits)

RESTRICTED ELECTIVES (12 Credits)

Complete all following courses in CMDA, Statistics, Math, & Computer Science

Complete four courses from the list below

CMDA 3605* ¹	Math Modeling: Methods, Tools (Pre: CMDA 2006)	(3)()	CMDA 4604*	Int Topics in Math Modeling (Pre: CMDA 3606)	(3)()
CMDA 3606*	Math Modeling: Methods, Tools (Pre: CMDA 3605)	(3)()	CMDA/STAT 4664*	Computational Stochastic Modeling (Pre: CMDA 2006)	(3)()
CMDA/CS 3634*	CS Founds for CMDA (Pre: CS 2114)	(3)()	CMDA 4964/4994* ²	Field Study/Undergraduate Research	(3)()
CMDA/STAT/CS 3654* ¹	Intr Data Analytics and Visualization (Pre: CMDA 2006, CS 1114)	(3)()	CS 3114*	Data Structures and Algorithms (Pre: CS 2114, 2505, MATH 2534)	(3)()
CMDA/STAT/CS 4654* ¹	Intermed Data Analytics & ML (Pre: CMDA 2006)	(3)()	CS 4104*	Data and Algorithm Analysis (Pre: CS 3114; MATH 3034 or 3134)	(3)()
CMDA 4864* ¹	CMDA Capstone (Pre: (CMDA 3605, 3606) or (CMDA 3654, 4654) or (CMDA 3634, CS 2114))	(3)()	CS 4824*	Machine Learning (Pre: ECE 2574, STAT 4604 or STAT 4705 or STAT 4714)	(3)()
CS 1114	Introduction to Software Design	(3)()	CS 4604*	Database Management Systems (Pre: CS 3114)	(3)()
CS 2114	Software Design and Data Structures (Pre: CS 1114 (C) or CS 1124 (C))	(3)()	MATH 3134*	Applied Combinatorics (Pre: MATH 1226, MATH 2534 or MATH 3034)	(3)()
MATH 1225	Calculus of a Single Variable	(4)()	MATH 4144*	Linear Algebra (Pre: MATH 3144)	(3)()
MATH 1226	Calculus of a Single Variable (Pre: MATH 1225)	(4)()	MATH 4175*	Cryptography (Pre: MATH >3000 + some programming)	(3)()
MATH 2114	Introduction to Linear Algebra (Pre: MATH 1225 (B) or MATH 1226 (P))	(3)()	MATH 4176*	Cryptography (Pre: MATH 4175)	(3)()
MATH 2204* [#]	Intro Multivariable Calculus (Pre: MATH 1226)	(3)()	MATH 4425*	Fourier Series PDE (Pre: MATH 2214, 2204, 3224)	(3)()
MATH 2214* [#]	Intro Differential Equations (Pre: MATH 2114, 1226)	(3)()	MATH 4426*	Fourier Series PDE (Pre: MATH 4425)	(3)()
STAT 3005* [#]	Statistical Methods (Pre: MATH 1226)	(3)()	MATH 4445*	Numerical Analysis (Pre: MATH 2214, 2204)	(3)()
STAT 3006* [#]	Statistical Methods (Pre: STAT 3005)	(3)()	MATH 4446*	Numerical Analysis (Pre: MATH 2214, 2204)	(3)()
STAT 3104* [#]	Probability & Distributions (Pre: (MATH 1206 or 1226 or 2015 or 1026 or 1526), (MATH 3005 or 3615))	(3)()	STAT 4004*	Methods Statistical Computing (Pre: STAT 4105, 4214)	(3)()
			STAT 4204*	Experimental Designs (Pre: STAT 3006 or 3616 or 4106 or 4706)	(3)()
			STAT 4214*	Methods of Regression Analysis (Pre: STAT 3006 or 3616 or 4106 or 4706)	(3)()
			STAT 4364*	Introduction to Statistical Genomics (Pre: STAT 3006, MATH 1226, CS 1044 or 1054 or 1114)	(3)()
			STAT 4444*	Applied Bayesian Statistics (Pre: MATH 2204; STAT 3104 or 4105 or 4705 AND STAT 3006 or 3616 or 4706)	(3)()
			STAT 4504*	Applied Multivariate Analysis (Pre: STAT 3006 or 4706)	(3)()
			STAT 4534*	Applied Time Series (Pre: STAT 3006)	(3)()
			PHYS 4755*	Intro Computational Physics (Pre: PHYS 2306, CS 1044)	(3)()
			PHYS 4756*	Intro Computational Physics (Pre: PHYS 4455, 4755)	(3)()
			BIOL 4075*	Bioinformatics Methods (Pre: BIOL 3774, BCHM 3114)	(3)()
			BIOL 4076*	Bioinformatics Methods (Pre: BIOL 3774, BCHM 3114)	(3)()

* Courses for computing “in-major GPA.”

CMDA 2005 and CMDA 2006 will substitute for MATH 2204, MATH 2214, STAT 3005, STAT 3006 and STAT 3104.

1 Prerequisites for this course include MATH 2114, MATH 2214, MATH 2204, STAT 3005, STAT 3006, and STAT 3104.

2 A maximum of 3 credits from either 4964, Field Study (for internship or other summer experience), or 4994, Undergraduate Research, may count as a CMDA elective with prior approval from the COS.

Prerequisites: Students are required to double check course prerequisites and equivalents.

Progress Toward Degree (two conditions are required for continuation in the major):

- (1) Upon having attempted 72 semester credits (including transfer, AP, advanced standing, credit by examination, course withdrawal) majors must have completed the following courses with grades of C- or better in two or fewer attempts (including attempts that were withdrawn): STAT 3005, 3006, 3104; MATH 1225, 1226, 2114, 2204, 2214; CS 1114, 2114.
- (2) Upon having attempted 90 semester credits, students must have an in-major GPA of 2.0 or better.

Foreign Language

The College of Science requires three units of a single foreign or classical language during high school or the second semester of a college-level foreign or classical language. These credit hours do not count toward the total minimum hours required for the declared degree program.

Graduation Requirements: 120 credit hours are required for graduation. These credits must include the courses required for the major (see above section). To graduate, a student must have at least a 2.0 in-major GPA and overall GPA. If 120 credit hours are reached and a student does not meet the GPA requirement, the student must take additional in-major courses to raise the in-major GPA to a 2.0.

Requirements for the College and University Curriculum for Liberal Education (CLE)

Consult the University Undergraduate Course Catalogue or the CLE Guide at <http://www.cle.prov.vt.edu/> for approved courses.

Area 1
Writing & Discourse (6)
_____ (3) ()
_____ (3) ()

Area 2
Ideas, Cultural Traditions & Values (6)
_____ (3) ()
_____ (3) ()

Area 3
Society & Human Behavior (6)
_____ (3) ()
_____ (3) ()

Free Electives (26)	
_____	(3) ()
_____	(3) ()
_____	(3) ()
_____	(3) ()
_____	(3) ()
_____	(3) ()
_____	(3) ()
_____	(2) ()

Area 4
Scientific Reasoning & Discovery (8)
_____ (4) ()
_____ (4) ()

Area 6
Creativity & Aesthetic Experience (3)
_____ (3) ()

Area 7
Critical Issues in a Global Context (3)
_____ (3) ()

A note about CLE Area 4 requirements: You must take 2 semesters of the same lab science (including labs).