College of Science

Bachelor of Science in Computational Modeling and Data Analytics

Major in Computational Modeling and Data Analytics (CMDA)

Option: Economics

For students graduating in calendar year **2018**

APPROVED
COMMISSION ON UNDERGRADUATE
STUDIES AND POLICIES

CORE REQUIREMENTS (50 Credits)

Complete all following courses in CMDA, STAT, MATH & CS

CMDA 3605*	Math Modeling: Methods, Tools (Pre: CMDA 2006)	(3)( )
CMDA 3606*	Math Modeling: Methods, Tools (Pre: CMDA 3605)	(3)( )
CMDA/CS 3634*	CS Founds for CMDA (Pre: CS 2114)	(3)( )
CMDA/STAT/CS 3654*[1]	Intr Data Analytics and Visualization (Pre: CMDA 2006, CS 1114)	(3)( )
CMDA/STAT/CS 4654*[1]	Intermed Data Analytics & ML (Pre: CMDA 2006)	(3)( )
CMDA 4864*[1]	CMDA Capstone (Pre: (CMDA 3605, 3606) or (CMDA 3654, 4654) or (CMDA 3634, CS 2114))	(3)( )
CS 1114	Introduction to Software Design	(3)( )
CS 2114	Software Design and Data Structures (Pre: CS 1114 (C) or CS 1124 (C))	(3)( )
MATH 1225	Calculus of a Single Variable	(4)( )
MATH 1226	Calculus of a Single Variable (Pre: MATH 1225)	(4)( )
MATH 2114	Introduction to Linear Algebra (Pre: MATH 1225 (B) or MATH 1226 (P))	(3)( )
MATH 2204*[#]	Intro Multivariable Calculus (Pre: MATH 1226)	(3)( )
MATH 2214*[#]	Introductory Differential Equations (Pre: MATH 2114, 1226)	(3)( )
STAT 3005*[#]	Statistical Methods (Pre: MATH 1226)	(3)( )
STAT 3006*[#]	Statistical Methods (Pre: STAT 3005)	(3)( )
STAT 3104*[#]	Probability and Distributions (Pre: (MATH 1206 or 1226 or 2015 or 1026 or 1526), (MATH 3005 or 3615))	(3)( )

ECONOMICS OPTION (18 Credits)

Complete all courses from the list below

ECON 2005*	Principles of Economics	(3)( )
ECON 2006*	Principles of Economics	(3)( )
ECON 3104*	Microeconomic Theory (Pre: ECON 2005, MATH 1226)	(3)( )
ECON 3204*	Macroeconomic Theory (Pre: ECON 2006 or 2115 or 2125 or 2026H), (ECON 3104 or 4104H), (MATH 1206 or 1226 or 1526 or 2015 or 1026))	(3)( )
ECON 4304*	Econometrics (Pre: STAT 3005)	(3)( )
ECON 4424*	Theory of Games & Econ Behavior (Pre: ECON 3104)	(3)( )

ECONOMICS ELECTIVES (3 Credits)

Complete one courses from the list below

ECON 4044*	Public Economics (Pre: ECON 3104)	(3)( )
ECON 4054*	Public Finance (Pre: ECON 3104)	(3)( )
ECON 4074*	Labor Economics (Pre: (ECON 2005 or 2116 or 2126 or 2025H), ECON 3254)	(3)( )
ECON 4084*	Industry Structure (Pre: ECON 3104 or 4924)	(3)( )
ECON 4124*	Growth and Development (Pre: ECON 2006, (ECON 2025H or 3104))	(3)( )
ECON 4135*	International Economics (Pre: ECON 3104 or 2025H)	(3)( )
ECON 4136*	International Economics (Pre: ECON 3204 or 4204H)	(3)( )
ECON 4404*	Economics of Organization (Pre: ECON 3104 or 4924 or 2025H)	(3)( )
ECON 4434*	Experimental Economics (Pre: (ECON 3104 or 2025H), (BIT 2406 or STAT 2004 or STAT 3005))	(3)( )
NEUR/ECON/ PSYC 4454*	Neuroeconomics (Pre: NEUR 2026 or ECON 3104)	

RESTRICTED ELECTIVES (3 credits)

Complete one course from the list below

CMDA 4604*	Int Topics in Math Modeling (Pre: CMDA 3606)	(3)( )
CMDA/STAT 4664*	Computational Intensive Stochastic Modeling (Pre: CMDA 2006)	(3)( )
CMDA 4964/4994*	Field Study/Undergraduate Research	(3)( )
ECON 4994*	Undergraduate Research	(3)( )
MATH 4445*	Intro to Numerical Analysis (Pre: MATH 2406H or (CMDA 2005, 2006) or (MATH 2214 or 2214H), (MATH 2224 or 2224H))	(3)( )
STAT 4204*	Experimental Designs (Pre: STAT 3006 or 3616 or 4106 or 4706)	(3)( )
STAT 4444*	Applied Bayesian Statistcs (Pre: MATH 2224, (STAT 3104 or 4105 or 4705), (STAT 3006 or 3616 or 4706))	(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, STAT 3104.
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; ECON 2005, 2006, 3104, 3204.
(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) ( )

Free Electives (20)
_____ (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).