

B.S. Degree – Data Analytics Major Degree Requirements

Computational Analytics Specialization

The program requirements for the Bachelor of Science degree with a major in Data Analytics and a specialization in **Computational Analytics** are given below. A minimum of 129 total degree hours are required for graduation. The Required Core courses follow a strict prerequisite structure. Some courses are only offered once per year. Failure to successfully enroll in and complete these courses *will* delay graduation.

Data Analytics Major Requirements

Course Number	Course Title	Credit Hours	Terms Offered
Prerequisites			
CSE 1223 or 1224 ^a	Intro to Computer Programming in Java or Python	3	AU/SP/SU
Math 1152 ^b	Calculus II	5	AU/SP/SU
LING 2000 ^c	Introduction to Linguistics	3	AU/SP/SU
Required Core			
Math 2568	Linear Algebra	3	AU/SP/SU
ISE 3230	Systems Modeling and Optimization	3	AU
CSE 2221 ^b	Software I: Software Components	4	AU/SP/SU
CSE 2231	Software II: Development and Design	4	AU/SP/SU
CSE 2321	Foundations I: Discrete Structures	3	AU/SP/SU
CSE 2421 or 3430	Systems I: Computer Systems and Organization	4	AU/SP/SU
CSE 3241	Databases I: Computer Architecture	3	AU/SP/SU
CSE 3244 or 5242	Data Management in the Cloud or Advanced Database Systems	3	AU/SP
CSE 5243	Data Mining	3	AU/SP
CSE 5544 or ISE 5760	Data Visualization	3	AU/SP
STAT 3201	Probability for Data Analytics	3	AU/SP
STAT 3202	Statistical Inference for Data Analytics	4	AU/SP/SU
STAT 3301	Statistical Modeling for Discovery I	3	AU
STAT 3302	Statistical Modeling for Discovery II	3	SP
STAT 4620	Statistical Learning	2	AU
STAT 3303	Statistical Decision Making	3	SP
TOTAL		51	

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Electives	Choose 10 credit hours from the list below	10	AU/SP/SU
CSE 591x or STAT 4911	CSE or Data Analytics capstone course	4	CSE – AU/SP/SU STAT – SP
TOTAL		14	

^a CSE 1222 or CSE placement level A can also fulfill this prerequisite; however, 1223 or 1224 is *strongly preferred*.

^b Math 1152 and CSE 2221 must be completed before applying to the Data Analytics major program.

^c Linguistics 2000 is required for students pursuing the Linguistics and Text Analytics focus, but is it recommended for all CAN students.

Specialization Electives: Choose a minimum of 10 credit hours from the electives listed below.

Courses are grouped to show possible focus areas. Students may select any combination of courses to meet the 10-credit hour requirement. The prerequisites listed below are strictly enforced.

ELECTIVES: CYBER-SECURITY FOCUS			
COURSE	TITLE	HOURS	PREREQUISITES
CSE 3461	Computer Networking and Internet Technologies	3	CSE 2421. Prereq or concur: CSE 2431
CSE 4471	Information Security	3	CSE 2231 and 2321
CSE 5472 OR 5473	Info Security Projects OR Network Security	3	CSE 3901 or 3902 or 3903 or 3461

ELECTIVES: MACHINE INTELLIGENCE FOCUS			
COURSE	TITLE	HOURS	PREREQUISITES
CSE 2331	Foundations II	3	CSE 2231 and 2321 and STAT 3202
CSE 3521	Survey of Artificial Intelligence I	3	CSE 2331
Choose two of the following:			
CSE 5245	Intro to Network Science	3	CSE 2331
CSE 5523	Machine Learning and Statistical Pattern Recognition	3	CSE 3521 and STAT 3202
CSE 5524	Computer Vision for Human-Computer Interaction	3	CSE 2331
CSE 5526	Intro to Neural Networks	3	CSE 3521 or 5521

ELECTIVES: CORE (SYSTEMS OR THEORY) FOCUS			
COURSE	TITLE	HOURS	PREREQUISITES
CSE 2331	Foundations II: Structures & Algorithms	3	CSE 2231 and 2321 and STAT 3202
CSE 2431	Systems II: Operating Systems	3	CSE 2421
CSE 3901/3902/3903	CSE Junior Project Choice	4	CSE 2231 and 2321 and 2421/3430
Choose one of the following:			
CSE 5245	Intro to Network Science	3	CSE 2331
CSE 5361	Numerical Methods	3	CSE 2231 and MATH 2568
CSE 5441	Intro to Parallel Computing	3	CSE 2231 and 2321 and 2421/3430 and MATH 2568

ELECTIVES: LINGUISTICS AND TEXT ANALYTICS FOCUS			
COURSE	TITLE	HOURS	PREREQUISITES
LING 5801	Computational Linguistics I	3	LING 3802 and 5000 and CSE 3321 and 3521
LING 5802	Computational Linguistics II	3	LING 5801
CSE 5525	Foundations of Speech and Language Processing	3	CSE 3521 and STAT 3202
Choose one of the following:			
LING 4100	Phonetics	3	LING 2000
LING 4200	Syntax	3	LING 2000
LING 4300	Phonology	3	LING 2000
LING 4400	Linguistic Meaning	3	LING 2000

General Education and College of Arts & Sciences Requirements

Students must satisfy the General Education requirements for the Bachelor of Science degree in the College of Arts and Sciences. Math 1151^d is required for the major core curriculum; it is suggested that students use this course to satisfy the category indicated in the table below. Students in the Data Analytics major satisfy the GE's embedded literacy requirements by taking Stat 3301 (embedded literacy in data analysis) and Stat 3302 (embedded literacies in advanced writing and technology).

GE Category ^e	Suggested Course	Category Credit Hours
Launch Seminar (GENED 1201)		1
F: Writing and Information Literacy		3
F: Mathematical and Quantitative Reasoning/Data Analysis	Math 1151 ^d (5 cr. hrs.)	3-5
F: Literary, Visual and Performing Arts		3
F: Historical and Cultural Studies		3
F: Natural Science		4-5
F: Social and Behavioral Sciences		3
F: Race, Ethnicity, and Gender Diversity		3
T: Citizenship for a Diverse and Just World		4-6
T: Student Choice		4-6
Reflection Seminar (GENED 4001)		1
World Languages		12
ARTSSCI 1100.xx Survey		1
Minimum Total Credit Hours (w/Math 1151)		51

^d Math 1151 may be replaced by Math 1140 and 1141.

^e F: GE Foundations; T: GE Theme.

Sample Four-Year Curriculum

This should be used as a **guide** only. Semester offerings are subject to change. Students should meet with the Data Analytics academic advisor every semester to ensure an on-time graduation.

Year	Autumn		Spring	
	Course	Hours	Course	Hours
1	ASC 1100.10	1	GENED 1201	1
	MATH 1151/1141/1161/1181H	5	MATH 1152/2162/1172/2182H	5
	CSE 1223, 1224, or equiv	3	CSE 2221	4
	GE World Language 1	4	GE World Language 2	4
	GE Writing and Info Literacy	3	GE Social and Behavioral Sciences	3
	Total: 16		Total: 17	
2	CSE 2231	4	MATH 2568	3
	CSE 2321	3	CSE 2421 or 3430	4
	STAT 3201	3	STAT 3202	4
	GE World Language 3	4	GE Natural Science	4-5
	LING 2000	3		
	Total: 17		Total: 14-15	
3	ISE 3230	3	CSE 3244	3
	CSE 3241	3	STAT 3302	3
	STAT 3301	3	Computational Analytics Elec ^g	4
	GE Citizenship for a Diverse and Just World	3	GE Literary, Visual and Performing Arts	3
	GE Race, Ethnicity, and Gender Diversity	3	GE Historical and Cultural Studies	3
		Total: 15		Total: 16
4	CSE 5243	3	CSE 5544 or ISE 5760	3
	STAT 4620	2	STAT 3303	3
	Computational Analytics Elec ^g	3	Computational Analytics Elec ^g	3
	GE Thematic Pathway Choice ^f	3	CSE 591x/STAT 4911	4
	GE Citizenship for a Diverse and Just World	3	GE Thematic Pathway Choice ^f	3
	Elective	2	GENED 4001	1
		Total: 16a		Total: 17

^f The 4–6 GE Thematic Pathway Choice credit hours must be taken in the same theme.

^g From approved list of major specialization elective courses.