

Computational Data Science

1. University Requirements: (23-24)

Writing, Rhetoric and American Cultures (WRA)	4
Integrative Studies in Humanities (IAH)	8
IAH 201-210 and IAH 211 or >	
Integrative Studies in Social Sciences (ISS)	8
ISS 2XX and ISS 3XX	
Bioscience (See 3A Below)	

2. College Requirements: (28)

*EGR 100	Introduction to Engineering Design	2
*CMSE 202	Computational Modeling Tools & Techniques	4
*MTH 132	Calculus I	3
*MTH 133	Calculus II	4
MTH 234	Multivariable Calculus	4
MTH 235	Differential Equations	3
*PHY 183	Physics for Scientists & Engineers I	4
*PHY 184	Physics for Scientists & Engineers II	4
<i>*College Admission Requirement</i>		

3. Major Requirements: (59-62)

a. Bioscience: (4-6)

Select one course from Group 1 and one course from Group 2.

Group 1

**BS 161	Cell and Molecular Biology	3
ENT 205	Pests, Society, & the Environment	3
IBIO 150	Integrating Biology: From DNA to Populations	3
MMG 141	Introductory Human Genetics	3
MMG 201	Fundamentals of Microbiology	3
PLB 105	Plant Biology	3
PSL 250	Introductory Physiology	4

Group 2

BS 171	Cell and Molecular Biology Laboratory	2
**CEM 161	Chemistry Laboratory I	1
CEM 162	Chemistry Laboratory II	1
PHY 191	Physics Laboratory for Scientists I	1
PHY 192	Physics Laboratory for Scientists II	1
PLB 106	Plant Biology Laboratory	1

***These courses may have prerequisites, which are not otherwise required in the program. Students should check course descriptions to ensure they are aware of prerequisites.*

b. All of the following courses: (43)

CMSE 201	Intro to Computational Modeling & Data Analysis	4
CMSE 381	Fundamentals of Data Sci Methods	4
CMSE 382	Optimization Methods in Data Sci	4
CMSE 495	Experiential Learning in Data Sci (W)	4
CSE 232	Introduction to Programming II	4
CSE 331	Algorithms and Data Structures	3
CSE 404	Intro to Machine Learning	3
CSE 482	Big Data Analysis	3
CSE 480	Database Systems	3
MTH 314	Matrix Algebra w/ Comp Applications	3
STT 180	Introduction to Data Science	4
STT 380	Probability and Stats for Data Sci	4

c. Two of the following courses: (6)

CSE 402	Biometrics and Pattern Recognition	3
***CSE 415	Introduction to Parallel Computing	3
CSE 431	Algorithm Engineering	3
CSE 440	Introduction to Artificial Intelligence	3

d. Two of the following courses: (6-7)

***CMSE 401	Methods for Parallel Computing	4
CMSE 402	Visualization of Scientific Datasets	3
CSE 402	Biometrics and Pattern Recognition	3
***CSE 415	Introduction to Parallel Computing	3
CSE 431	Algorithm Engineering	3
CSE 440	Introduction to Artificial Intelligence	3
CSE 471	Media Processing and Multimedia Computing	3
CSE 472	Computer Graphics	3
MTH 451	Numerical Analysis I	3
MTH 468	Predictive Analysis	3
STT 464	Statistics for Biologists	3
STT 465	Bayesian Statistical Methods	3

**** Both CSE 415 and CMSE 401 may not be used to fulfill requirements c and d*

Other Electives (Variable)

Total Credits Required for Degree 120

The requirements listed above apply to students admitted to the major of Computational Data Science in the Department of Computer Science and Engineering beginning Fall 2019. The Department of Computer Science and Engineering (CSE) constantly reviews program requirements and reserves the right to make changes as necessary. Consequently, each student is strongly encouraged to consult with their advisor to obtain assistance in planning an appropriate schedule of courses. Students who have questions about Computational Data Science should contact the Computer Science and Engineering Department Advising Office, 3201 Engineering Building, phone (517) 353-5455.

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Computational Data Science Sample Program

Freshman Year				Sophomore Year			
Fall	Credits	Spring	Credits	Fall	Credits	Spring	Credits
MTH 132	3	MTH 133	4	MTH 234	4	MTH 235	3
ISS 2XX	4	CMSE 201	4	CMSE 202	4	CSE 232	4
EGR 100	2	STT 180	4	MTH 314	3	STT 380	4
Elective	6	WRA 101	4	PHY 183	4	PHY 184	4
Total	15	Total	16	Total	15	Total	15
Junior Year				Senior Year			
Fall	Credits	Spring	Credits	Fall	Credits	Spring	Credits
CMSE 381	4	CSE 480	3	Biosci/Lab	4	Elective	4
CSE 331	3	CMSE 382	4	CDS Elective	3	CMSE 495	4
IAH 201-210	4	Major Elect	3	CSE 404	3	CSE 482	3
ISS 3XX	4	IAH 211 or >	4	Major Elect	3	CDS Elective	3
Elective	3			Elective	3		
Total	15	Total	14	Total	16	Total	14

Program Objectives

A graduate of the MSU Computational Data Science is prepared to be

- successful in a computing-related profession, or
- successful in graduate study.

To achieve these objectives the department prepares students in the application of fundamental computing principles and software development skills. This preparation includes the design and implementation of systems that solve complex problems. Our graduates will be trained in teamwork, effective communication, professionalism, ethics, and the engagement of learning and applying new ideas and technologies as the field evolves.

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Notes:
