B.S. in Data Science

Data science is the study and practice of extracting information and structure from data that can then be used for reasoning and adding value to the solution of a problem. It has growing applications in health and medicine, finance, marketing, economics, genomics, social networks, cyber-security, journalism, and other fields where data is collected. It spans academic fields in computer science and mathematics such as machine learning and statistical inference, probability, linear algebra, computer programming, software engineering, high performance computing, and cloud computing. The B.S. in Data Science program has two options, Computing (in the Ying Wu College of Computing) and Statistics (in the Department of Mathematical Sciences in the College of Science and Liberal Arts).

B.S. in Data Science (Computing Option)

(120 credits)

First Year		
1st Semester		Credits
CS 100	Roadmap to Computing	3
MATH 111	Calculus I	4
PHYS 111	Physics I ¹	3
PHYS 111A	Physics I Lab ¹	1
ENGL 101	English Composition: Introduction to Academic Writing	3
FYS SEM	First-Year Student Seminar	0
	Term Credits	14
2nd Semester		
CS 113	Introduction to Computer Science I	3
MATH 112	Calculus II	4
PHYS 121	Physics II ¹	3
PHYS 121A	Physics II Lab ¹	1
ENGL 102	English Composition: Introduction to Writing for Research	3
	Term Credits	14
Second Year		
1st Semester		
CS 114	Introduction to Computer Science II	3
MATH 244	Introduction to Probability Theory	3
MATH 337	Linear Algebra	3
History and Human requirements/ger-2	nities GER 200 level (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education- 200-level/)	3
Social Sciences G social-science-ger	ER (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/	3
	Term Credits	15
2nd Semester		
CS 241	Foundations of Computer Science I	3
CS 280	Programming Language Concepts	3
IS 350	Computers, Society and Ethics	3
MATH 341	Statistical Methods II	3
YWCC 207	Computing & Effective Com	1
Data Science Elec	tive 1	3
	Term Credits	16
Third Year		
1st Semester		
CS 288	Intensive Programming in Linux	3
DS 340	Fundamentals and Principles of Data Science	3
CS 331	Database System Design & Mgmt	3
CS 370	Introduction to Artificial Intelligence	3

Term Credits 15 2nd Samester CS 435 Advanced Data Structures and Algorithm Design 3 CS 432 Data Minning 3 CS 375 Introduction to Machine Learning 3 History and Humaniss CSR 300-level) 3 History and Humaniss CSR 300-level) 1 Term Credits 16 Fourth Year 16 Tornth Year 16 Fourth Year 1 CS 450 Data Visualization 3 CS 442 Big Data Systems 3 CS 442 Data Science Capastone I 3 MATH 478 Staff Methods in Data Sti 3 And Senester 1 1 Humanities and Social Science Senior Seminar GER (http://catalog.njit.edu/undergraduate/academic-policles-procedures/ 3 Sc 493 Data Science Senior Seminar GER (http://catalog.njit.edu/undergraduate/academic-policles-procedures/ 3 Free Elective 1 7 For Credits 3 Sc 5439 Data Science Capastone II 3 MATH 344 Regeneral-duclation tra-equitements/hest-e-epatro	COM 312 or COM 313	Oral Presentations or Technical Writing	3	
GS 4150 Advanced Data Structures and Algorithm Design 3 Data Science Elcetive 2 0 3 CS 375 Introduction to Machine Learning 3 CS 375 Introduction to Machine Learning 3 History and Humanites CER 300×1 level (http://citatalog.nijt.edu/undergraduate/academic-policies-procedures/general-education-requirements/ger-200-level 1 Professional Dev in Computing 1 Term Credits 16 Fourth Year 1 14 Selection Se	-	Term Credits	15	
Data Science Elective ≥ 3 do not production to Machine Learning 3 do not product to Machine Learning <t< td=""><td>2nd Semester</td><td></td><td></td></t<>	2nd Semester			
GS 482 Data Mining 3 S375 Introduction to Machine Learning 3 History and Humanitles SER 300× level (http://citatolog.njit.edu/undergraduate/academic-policles-procedures/general-education-requirement/sger-300-level) 7 YUNCC 307 Professional Dev in Computing 1 Fourth Year Term Credits 16 Touth Year Nath Service S	CS 435	Advanced Data Structures and Algorithm Design	3	
GS 375 Introduction to Machine Learning 3 rhistory and Humanitities GER 300 + Ievel (http://catalog.nijt.edu/undergraduate/academic-policies-procedures/general-education-requirements/ge	Data Science Elect	ive 2	3	
History and Humanitiles CRR 300+ level (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/ger-200-level/) Professional Dev in Computing 16	CS 482	Data Mining	3	
requirements/gen3-ol-levely To processional Dev in Computing 16 Fourth Vear 15 Semistrate 16 Fourth Vear 15 Semistrate 16 Humanities and Social Science Senior Seminar GER (http://catalog.njit.edu/undergraduate/academic-policies-procedures/ general-education-requirements/hiss-capistone 16 Semistrate 16 Humanities and Social Science Senior Seminar GER (http://catalog.njit.edu/undergraduate/academic-policies-procedures/ general-education-requirements/hiss-capistone/ 16 Semistrate 16 Humanities and Social Science Senior Seminar GER (http://catalog.njit.edu/undergraduate/academic-policies-procedures/ general-education-requirements/hiss-capistone/ 16 Semistrate 16 Semistrate 16 Humanities and Social Science Senior Seminar GER (http://catalog.njit.edu/undergraduate/academic-policies-procedures/ general-education-requirements/hiss-capistone/ 16 Semistrate 16	CS 375	Introduction to Machine Learning	3	
Term Credits			3	
Fourth Year 1st Semester 158 Semester CS 4494 Big Data Systems 3 CS 4920 Data Science Capstone I 3 Text Data Science Capstone I 3 Text Data Science Capstone I 3 Text Decisiones Semior Semior Semior GER (http://catalog.njit.edu/undergraduate/academic-policies-procedures/ general-aducation-requirements/has-capstonen/) 3 Text Semiors Capstone II 3 Text Decisiones Capstone II 3 Author (academic-policies-procedures/ general-aducation-requirements/has-capstonen/) 3 Text Decisiones Capstone II 4 Text Decisiones Capstone II 4 Text Decisiones Capstone II 4 Text Decisiones Capstone II 5 Text Decisiones Capstone II 5 Text Decisiones Capstone II 6 </td <td>YWCC 307</td> <td>Professional Dev in Computing</td> <td>1</td>	YWCC 307	Professional Dev in Computing	1	
6st Semester CS 4500 Data Visualization 3 CS 4424 Big Data Systems 3 CS 4920 Data Science Capstone I 3 MATH 478 Stat Methods in Data Sci 3 Term Credits 108 Term Credits 108 Term Credits 108 Term Credits 108 CS 493 Data Science Capstone II 3 CS 493 Data Science Capstone II 3 Data Science Electiv± 108 Term Credits 109 Term Credits 109 Term Credits 10 <		Term Credits	16	
CS 440 Big Data Systems 3 CS 442 Big Data Systems 3 CS 492 Data Science Capstone I 3 MATH 478 Stat Methods in Data Sci 3 Data Science Elective 3 Term Credits 15 Term Credits 15 Term Credits 15 Term Credits 16 Science Senior Seminar GER (http://catalog.njit.edu/undergraduate/academic-policies-procedures/ 3 general-aducation-recurrents/his-sc-capstone/l 3 Separation Analysis 3 State Science Senior Seminar GER (http://catalog.njit.edu/undergraduate/academic-policies-procedures/ State Science Clearing Science Senior Seminar GER (http://catalog.njit.edu/undergraduate/academic-policies-procedures/ 3 State Science Clearing Science Senior Seminar GER (http://catalog.njit.edu/undergraduate/academic-policies-procedures/ 3 State Science Senior Seminar GER (http://catalog.njit.edu/undergraduate/academic-policies-procedures/ 3 State Science Senior Seminar GER (http://catalog.njit.edu/undergraduate/academic-policies-procedures/ 3 State Science Senior Analysis <td>Fourth Year</td> <td></td> <td></td>	Fourth Year			
CS 442 Big Data Systems 3 CS 492 Data Science Capstone I 3 MATH 478 Stat Methods in Data Sci 3 Data Science Electives 3 3 Term Credits 15 Term Credits 15 Term Credits 15 Humanities and Social Science Senior Seminar GER (http://catalog.njit.edu/undergraduate/academic-policies-procedures/ 3 Segmenar-deducation-requirements/inse-captoner/ 3 Tere Elective 1 9 Tere Elective 1 3 Segmenar-deducation-requirements/inse-captoner/ 3 Segmenar-deducation-requirements/inse-captoner/ 3 Segmenar-deducation-requirements/inse-captoner/ 3 Segmenar-deducation-requirements/inse-captoner/ 3 Tere Elective 1 3 Segmenar-deducation-requirements/inse-captoner/ 3 Term Credits 3 Term Credits 12 Term Credits 7	1st Semester			
CS 492 Data Science Capatone I 3 MATH 478 Sat Methods in Data Sci 3 Data Science Elective 3 Term Credits 15 Term Credits 15 Term Credits 15 Term Credits 3 Search Science Senior Senior Senior GER (http://catalog.njit.edu/undergraduate/academic-policies-procedures/ aparticulate/academic-policies-procedures/ procedures/ pr	CS 450	Data Visualization	3	
MATH 478 Stat Methods in Data Sci 3 Data Science Elective 3 63 Term Credits 15 Amainsties and Social Science Senior Seminar GER (http://catalog.njit.edu/undergraduate/academic-policies-procedures/ general-education-re-quirements/hs-capstone/) 3 Ges 493 Data Science Capstone II 3 Term Credits 15 Term Credits 15 Total Credits 16 Title Co-op Mork Experience I State Science (Computing Option) Electives Title Co-op Work Experience I 2 Title Co-op Work Experience I 3 State Science (Computing Option) Electives 3 Title Computer Systems 3 Science Sassa Intro to Computer Systems 3 CS 350 Intro to Computer Systems 3 CS 351 Introduction to Cybersecurity 3 CS 352 Introduction to Cybersecurity 3 CS 355 Introduction to Cybersecurity<	CS 444	Big Data Systems	3	
Data Science Electivs 3 15 Term Credits 15 And Semester Humanities and Social Science Senior Seminar GER (http://catalog.njit.edu/undergraduate/academic-policles-procedures/ ageneral-education-requirements/hss-capstone) 3 Tree Elective 1 2** 3 CS 493 Data Science Capstone II 3 MATH 344 Regression Analysis 3 Data Science Elective 4 3 Total Credits 15 Total Credits 25 Total Credits 26 Total Credits 26 <th co<="" td=""><td>CS 492</td><td>Data Science Capstone I</td><td>3</td></th>	<td>CS 492</td> <td>Data Science Capstone I</td> <td>3</td>	CS 492	Data Science Capstone I	3
Term Credits 15 2nd Semester Humanities and Social Science Senior Seminar GER (http://catalog.njit.edu/undergraduate/academic-policies-procedures/ general-education-requirements/hss-capstone/) 3 Secretary of Secretary	MATH 478	Stat Methods in Data Sci	3	
Romanities and Social Science Senior Seminar GER (http://catalog.njit.edu/undergraduate/academic-policies-procedures/ general-education-re-upiterments/hss-capstone/) Ges 493 Data Science Capstone II	Data Science Elect	ive 3	3	
Humanities and Social Science Senior Seminar GER (http://catalog.njit.edu/undergraduate/academic-policies-procedures/ 3 general-education-requirements/hss-capstone/) 3 Free Elective 1 ² 3 CS 493 Data Science Capstone II 3 Tarm Credits 13 Total Credits 15 Total Credits 150 Code Title Credits Data Science (Computing Option) Electives 150 VMCC 310 Co-op Work Experience I 3 CS 332 Principles of Operating Systems 3 CS 355 Intro to Computer Systems 3 CS 356 Introduction to Cybersecurity 3 CS 357 Fundamentals of Network Security 3 CS 485 Selected Topics In CS 3 CS 485 Selected Topics In CS 3 MGMT 316 Business Research Methods 3 MGMT 416 Artificial Intelligence for Business Decisions 3 MRKT 378 Marketing Research 3 MATH 439		Term Credits	15	
general-education-returements/hss-scapstone/l Free Elective 1 2	2nd Semester			
Free Elective 1 2 3 CS 493 Data Science Capstone II 3 MATH 344 Regression Analysis 3 Data Science Elective 4 3 Term Credits 15 Total Credits 15 Total Credits 120 Coop Work Experience I Credits Data Science (Computing Option) Electives 3 YWCC 310 Co-op Work Experience I 3 CS 332 Principles of Operating Systems 3 CS 335 Intro to Computer Systems 3 CS 351 Introduction to Cybersecurity 3 CS 356 Introduction to Computer Networks 3 CS 357 Fundamentals of Network Security 3 CS 485 Selected Topics In CS 3 GS 485 Selected Topics In CS 3 MGMT 316 Business Research Methods 3 MRKT 378 Marketing Analytics 3 MRKT 430 Marketing Analytics 3 MATH 345 Multivariate Distribut			3	
CS 493 Data Science Capstone II 3 MATH 344 Regression Analysis 3 Data Science Elective 1 Term Credits 15 Term Credits 150 Total Credits 120 Code Title Credits Code Principles of Operating Systems 3 Code Specical Topics In Code Code		requirements/nss-capstone/)		
MATH 344 Regression Analysis 3 Data Science Elective 4 15 Term Credits 15 Total Credits 15 Code Title Credits Science (Computing Option) Electives 19 Credits 20 One Work Experience I 2 CS 332 Principles of Operating Systems 3 CS 332 Principles of Operating Systems 3 CS 356 Introduction to Computer Systems 3 CS 351 Introduction to Computer Networks 3 CS 356 Introduction to Computer Network Security 3 CS 356 Introduction to Computer Network Security 3 CS 485 Selected Topics In CS 3 3 CS 485 Selected Topics In CS 3		Data Original Organization II		
Data Science Elective 4 Term Credits 15 Total Credits 120 Code Title Credits Data Science (Computing Option) Electives ************************************		·		
Term Credits 15 Total Credits Cede Title Credits Data Science (Computing Option) Electives YWCC 310 Co-op Work Experience I 3 S 332 Principles of Operating Systems 3 CS 350 Introduction to Computer Systems 3 CS 351 Introduction to Computer Networks 3 CS 356 Introduction to Computer Networks 3 CS 357 Fundamentals of Network Security 3 CS 485 C selected Topics In CS 3 MGMT 316 Business Research Methods 3 MGMT 416 Artificial Intelligence for Business Decisions 3 MRKT 378 Marketing Analytics 3 MRKT 378 Marketing Analytics 3 MRKT 30 Marketing Analytics In				
Total Credits 120 Code Title Credits Data Science (Computing Option) Electives TWCC 310 Co-op Work Experience I 3 CS 332 Principles of Operating Systems 3 CS 350 Intro to Computer Systems 3 CS 351 Introduction to Cybersecurity 3 CS 356 Introduction to Computer Networks 3 CS 357 Fundamentals of Network Security 3 CS 408 Cryptography and Internet Security 3 CS 485 Selected Topics In CS 3 MGMT 316 Business Research Methods 3 MGMT 378 Marketing Analytics 3 MRKT 378 Marketing Analytics 3 MRKT 30 Marketing Research 3 MATH 345 Multivariate Distributions 3 MATH 388 Introduction to Chaos Theory 3 MATH 391 Numerical Linear Algebra 3 MATH 447 Applied Time Series Analysis 3 MATH 448 Stochastic Simulation 3	Data Science Elect		3	
Code Title Credits Data Science (Computing Option) Electives VMCC 310 Co-op Work Experience I 3 CS 332 Principles of Operating Systems 3 CS 332 Intro to Computer Systems 3 CS 351 Introduction to Cybersecurity 3 CS 356 Introduction to Computer Networks 3 CS 357 Fundamentals of Network Security 3 CS 408 Cryptography and Internet Security 3 CS 495 Selected Topics In CS 3 MGMT 316 Business Research Methods 3 MGMT 316 Artificial Intelligence for Business Decisions 3 MRKT 378 Marketing Analytics 3 MRKT 378 Marketing Research 3 MATH 345 Multivariate Distributions 3 MATH 381 Introduction to Chaos Theory 3 MATH 391 Numerical Linear Algebra 3 MATH 440 Applied Time Series Analysis 3 MATH 448 Stochastic Simulation 3 MATH 4461 Intro		Town Cradita	4.5	
Data Science (Computing Option) Electives YWCC 310 Co-op Work Experience I 3 CS 332 Principles of Operating Systems 3 CS 350 Intro to Computer Systems 3 CS 351 Introduction to Cybersecurity 3 CS 356 Introduction to Computer Networks 3 CS 357 Fundamentals of Network Security 3 CS 408 Cryptography and Internet Security 3 CS 485 Selected Topics In CS 3 MGMT 316 Business Research Methods 3 MGMT 416 Artificial Intelligence for Business Decisions 3 MRKT 378 Marketing Analytics 3 MRKT 430 Marketing Research 3 MATH 345 Multivariate Distributions 3 MATH 381 Introduction to Chaos Theory 3 MATH 391 Numerical Linear Algebra 3 MATH 430 Analytical and Computational Neuroscience 3 MATH 447 Applied Time Series Analysis 3 MATH 4481 Stochastic Simulation 3				
YWCC 310 Co-op Work Experience I 3 CS 332 Principles of Operating Systems 3 CS 350 Intro to Computer Systems 3 CS 351 Introduction to Cybersecurity 3 CS 356 Introduction to Computer Networks 3 CS 357 Fundamentals of Network Security 3 CS 408 Cryptography and Internet Security 3 CS 408 Selected Topics In CS 3 MGMT 316 Business Research Methods 3 MGMT 416 Artificial Intelligence for Business Decisions 3 MRKT 378 Marketing Analytics 3 MRKT 340 Marketing Research 3 MATH 345 Multivariate Distributions 3 MATH 388 Introduction to Chaos Theory 3 MATH 391 Numerical Linear Algebra 3 MATH 430 Analytical and Computational Neuroscience 3 MATH 447 Applied Time Series Analysis 3 MATH 448 Stochastic Simulation 3 MATH 461 Introduction to Statistical Com				
CS 332 Principles of Operating Systems 3 CS 350 Intro to Computer Systems 3 CS 351 Introduction to Cybersecurity 3 CS 356 Introduction to Computer Networks 3 CS 357 Fundamentals of Network Security 3 CS 408 Cryptography and Internet Security 3 CS 485 Selected Topics In CS 3 MGMT 316 Business Research Methods 3 MGMT 416 Artificial Intelligence for Business Decisions 3 MRKT 378 Marketing Analytics 3 MRKT 430 Marketing Research 3 MATH 345 Multivariate Distributions 3 MATH 38 Introduction to Chaos Theory 3 MATH 381 Numerical Linear Algebra 3 MATH 430 Analytical and Computational Neuroscience 3 MATH 447 Applied Time Series Analysis 3 MATH 448 Stochastic Simulation 3 MATH 461 Introduction to Statistical Computing with SAS and R 3 IS 333 Social Network Analysis 3	Code	Total Credits	120	
CS 350 Intro to Computer Systems 3 CS 351 Introduction to Cybersecurity 3 CS 356 Introduction to Computer Networks 3 CS 357 Fundamentals of Network Security 3 CS 408 Cryptography and Internet Security 3 CS 485 Selected Topics In CS 3 MGMT 316 Business Research Methods 3 MGMT 416 Artificial Intelligence for Business Decisions 3 MRKT 378 Marketing Analytics 3 MRKT 430 Marketing Research 3 MATH 345 Multivariate Distributions 3 MATH 388 Introduction to Chaos Theory 3 MATH 391 Numerical Linear Algebra 3 MATH 430 Analytical and Computational Neuroscience 3 MATH 447 Applied Time Series Analysis 3 MATH 448 Stochastic Simulation 3 MATH 461 Introduction to Statistical Computing with SAS and R 3 IS 333 Social Network Analysis 3		Total Credits Title	120	
CS 351 Introduction to Cybersecurity 3 CS 356 Introduction to Computer Networks 3 CS 357 Fundamentals of Network Security 3 CS 408 Cryptography and Internet Security 3 CS 485 Selected Topics In CS 3 MGMT 316 Business Research Methods 3 MGMT 416 Artificial Intelligence for Business Decisions 3 MRKT 378 Marketing Analytics 3 MRKT 430 Marketing Research 3 MATH 345 Multivariate Distributions 3 MATH 388 Introduction to Chaos Theory 3 MATH 391 Numerical Linear Algebra 3 MATH 430 Analytical and Computational Neuroscience 3 MATH 447 Applied Time Series Analysis 3 MATH 448 Stochastic Simulation 3 MATH 461 Introduction to Statistical Computing with SAS and R 3 IS 333 Social Network Analysis 3	Data Science (Com	Total Credits Title aputing Option) Electives	120 Credits	
CS 356 Introduction to Computer Networks 3 CS 357 Fundamentals of Network Security 3 CS 408 Cryptography and Internet Security 3 CS 485 Selected Topics In CS 3 MGMT 316 Business Research Methods 3 MGMT 416 Artificial Intelligence for Business Decisions 3 MRKT 378 Marketing Analytics 3 MRKT 430 Marketing Research 3 MATH 345 Multivariate Distributions 3 MATH 388 Introduction to Chaos Theory 3 MATH 391 Numerical Linear Algebra 3 MATH 430 Analytical and Computational Neuroscience 3 MATH 447 Applied Time Series Analysis 3 MATH 448 Stochastic Simulation 3 MATH 461 Introduction to Statistical Computing with SAS and R 3 IS 333 Social Network Analysis 3	Data Science (Con YWCC 310	Total Credits Title Inputing Option) Electives Co-op Work Experience I	120 Credits	
CS 357 Fundamentals of Network Security 3 CS 408 Cryptography and Internet Security 3 CS 485 Selected Topics In CS 3 MGMT 316 Business Research Methods 3 MGMT 416 Artificial Intelligence for Business Decisions 3 MRKT 378 Marketing Analytics 3 MRKT 430 Marketing Research 3 MATH 345 Multivariate Distributions 3 MATH 388 Introduction to Chaos Theory 3 MATH 391 Numerical Linear Algebra 3 MATH 430 Analytical and Computational Neuroscience 3 MATH 447 Applied Time Series Analysis 3 MATH 448 Stochastic Simulation 3 MATH 461 Introduction to Statistical Computing with SAS and R 3 IS 333 Social Network Analysis 3	Data Science (Con YWCC 310 CS 332	Total Credits Title Aputing Option) Electives Co-op Work Experience I Principles of Operating Systems	120 Credits 3 3	
CS 408 Cryptography and Internet Security 3 CS 485 Selected Topics In CS 3 MGMT 316 Business Research Methods 3 MGMT 416 Artificial Intelligence for Business Decisions 3 MRKT 378 Marketing Analytics 3 MRKT 430 Marketing Research 3 MATH 345 Multivariate Distributions 3 MATH 388 Introduction to Chaos Theory 3 MATH 391 Numerical Linear Algebra 3 MATH 430 Analytical and Computational Neuroscience 3 MATH 447 Applied Time Series Analysis 3 MATH 448 Stochastic Simulation 3 MATH 461 Introduction to Statistical Computing with SAS and R 3 IS 333 Social Network Analysis 3	Data Science (Com YWCC 310 CS 332 CS 350	Total Credits Title Aputing Option) Electives Co-op Work Experience I Principles of Operating Systems Intro to Computer Systems	120 Credits 3 3 3	
CS 485 Selected Topics In CS 3 MGMT 316 Business Research Methods 3 MGMT 416 Artificial Intelligence for Business Decisions 3 MRKT 378 Marketing Analytics 3 MRKT 430 Marketing Research 3 MATH 345 Multivariate Distributions 3 MATH 388 Introduction to Chaos Theory 3 MATH 391 Numerical Linear Algebra 3 MATH 430 Analytical and Computational Neuroscience 3 MATH 447 Applied Time Series Analysis 3 MATH 448 Stochastic Simulation 3 MATH 461 Introduction to Statistical Computing with SAS and R 3 IS 333 Social Network Analysis 3	Data Science (Com YWCC 310 CS 332 CS 350 CS 351	Title Inputing Option) Electives Co-op Work Experience I Principles of Operating Systems Intro to Computer Systems Introduction to Cybersecurity	120 Credits 3 3 3	
MGMT 316 Business Research Methods 3 MGMT 416 Artificial Intelligence for Business Decisions 3 MRKT 378 Marketing Analytics 3 MRKT 430 Marketing Research 3 MATH 345 Multivariate Distributions 3 MATH 388 Introduction to Chaos Theory 3 MATH 391 Numerical Linear Algebra 3 MATH 430 Analytical and Computational Neuroscience 3 MATH 447 Applied Time Series Analysis 3 MATH 448 Stochastic Simulation 3 MATH 461 Introduction to Statistical Computing with SAS and R 3 IS 333 Social Network Analysis 3	Data Science (Com YWCC 310 CS 332 CS 350 CS 351 CS 356	Title Inputing Option) Electives Co-op Work Experience I Principles of Operating Systems Intro to Computer Systems Introduction to Cybersecurity Introduction to Computer Networks	120 Credits 3 3 3 3 3	
MGMT 416 Artificial Intelligence for Business Decisions 3 MRKT 378 Marketing Analytics 3 MRKT 430 Marketing Research 3 MATH 345 Multivariate Distributions 3 MATH 388 Introduction to Chaos Theory 3 MATH 391 Numerical Linear Algebra 3 MATH 430 Analytical and Computational Neuroscience 3 MATH 447 Applied Time Series Analysis 3 MATH 448 Stochastic Simulation 3 MATH 461 Introduction to Statistical Computing with SAS and R IS 333 Social Network Analysis 3	Data Science (Com YWCC 310 CS 332 CS 350 CS 351 CS 356 CS 357	Title Inputing Option) Electives Co-op Work Experience I Principles of Operating Systems Intro to Computer Systems Introduction to Cybersecurity Introduction to Computer Networks Fundamentals of Network Security	120 Credits 3 3 3 3 3 3	
MRKT 378Marketing Analytics3MRKT 430Marketing Research3MATH 345Multivariate Distributions3MATH 388Introduction to Chaos Theory3MATH 391Numerical Linear Algebra3MATH 430Analytical and Computational Neuroscience3MATH 447Applied Time Series Analysis3MATH 448Stochastic Simulation3MATH 461Introduction to Statistical Computing with SAS and R3IS 333Social Network Analysis3	Data Science (Com YWCC 310 CS 332 CS 350 CS 351 CS 356 CS 357 CS 408	Title Inputing Option) Electives Co-op Work Experience I Principles of Operating Systems Intro to Computer Systems Introduction to Cybersecurity Introduction to Computer Networks Fundamentals of Network Security Cryptography and Internet Security	120 Credits 3 3 3 3 3 3 3 3	
MRKT 430 Marketing Research 3 MATH 345 Multivariate Distributions 3 MATH 388 Introduction to Chaos Theory 3 MATH 391 Numerical Linear Algebra 3 MATH 430 Analytical and Computational Neuroscience 3 MATH 447 Applied Time Series Analysis 3 MATH 448 Stochastic Simulation 3 MATH 461 Introduction to Statistical Computing with SAS and R IS 333 Social Network Analysis 3	Data Science (Com YWCC 310 CS 332 CS 350 CS 351 CS 356 CS 357 CS 408 CS 485	Title Inputing Option) Electives Co-op Work Experience I Principles of Operating Systems Intro to Computer Systems Introduction to Cybersecurity Introduction to Computer Networks Fundamentals of Network Security Cryptography and Internet Security Selected Topics In CS	120 Credits 3 3 3 3 3 3 3 3 3	
MATH 345 MATH 345 MATH 388 Introduction to Chaos Theory 3 MATH 391 Numerical Linear Algebra 3 MATH 430 Analytical and Computational Neuroscience 3 MATH 447 Applied Time Series Analysis 3 MATH 448 Stochastic Simulation 3 MATH 461 Introduction to Statistical Computing with SAS and R IS 333 Social Network Analysis 3	Data Science (Com YWCC 310 CS 332 CS 350 CS 351 CS 356 CS 357 CS 408 CS 485 MGMT 316	Title Inputing Option) Electives Co-op Work Experience I Principles of Operating Systems Intro to Computer Systems Introduction to Cybersecurity Introduction to Computer Networks Fundamentals of Network Security Cryptography and Internet Security Selected Topics In CS Business Research Methods	120 Credits 3 3 3 3 3 3 3 3 3 3 3 3	
MATH 388 Introduction to Chaos Theory 3 MATH 391 Numerical Linear Algebra 3 MATH 430 Analytical and Computational Neuroscience 3 MATH 447 Applied Time Series Analysis 3 MATH 448 Stochastic Simulation 3 MATH 461 Introduction to Statistical Computing with SAS and R IS 333 Social Network Analysis 3	Data Science (Com YWCC 310 CS 332 CS 350 CS 351 CS 356 CS 357 CS 408 CS 485 MGMT 316 MGMT 416	Title Inputing Option) Electives Co-op Work Experience I Principles of Operating Systems Intro to Computer Systems Introduction to Cybersecurity Introduction to Computer Networks Fundamentals of Network Security Cryptography and Internet Security Selected Topics In CS Business Research Methods Artificial Intelligence for Business Decisions	120 Credits 3 3 3 3 3 3 3 3 3 3 3 3 3 3	
MATH 391 Numerical Linear Algebra 3 MATH 430 Analytical and Computational Neuroscience 3 MATH 447 Applied Time Series Analysis 3 MATH 448 Stochastic Simulation 3 MATH 461 Introduction to Statistical Computing with SAS and R 3 IS 333 Social Network Analysis 3	Data Science (Com YWCC 310 CS 332 CS 350 CS 351 CS 356 CS 357 CS 408 CS 485 MGMT 316 MGMT 416 MRKT 378	Title Inputing Option) Electives Co-op Work Experience I Principles of Operating Systems Intro to Computer Systems Introduction to Cybersecurity Introduction to Computer Networks Fundamentals of Network Security Cryptography and Internet Security Selected Topics In CS Business Research Methods Artificial Intelligence for Business Decisions Marketing Analytics	120 Credits 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	
MATH 430Analytical and Computational Neuroscience3MATH 447Applied Time Series Analysis3MATH 448Stochastic Simulation3MATH 461Introduction to Statistical Computing with SAS and R3IS 333Social Network Analysis3	Data Science (Com YWCC 310 CS 332 CS 350 CS 351 CS 356 CS 357 CS 408 CS 485 MGMT 316 MGMT 416 MRKT 378 MRKT 430	Title Inputing Option) Electives Co-op Work Experience I Principles of Operating Systems Intro to Computer Systems Introduction to Cybersecurity Introduction to Computer Networks Fundamentals of Network Security Cryptography and Internet Security Selected Topics In CS Business Research Methods Artificial Intelligence for Business Decisions Marketing Analytics Marketing Research	120 Credits 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	
MATH 447 Applied Time Series Analysis 3 MATH 448 Stochastic Simulation 3 MATH 461 Introduction to Statistical Computing with SAS and R 3 IS 333 Social Network Analysis 3	Data Science (Com YWCC 310 CS 332 CS 350 CS 351 CS 356 CS 357 CS 408 CS 485 MGMT 316 MGMT 416 MRKT 378 MRKT 430 MATH 345	Title Inputing Option) Electives Co-op Work Experience I Principles of Operating Systems Intro to Computer Systems Introduction to Cybersecurity Introduction to Computer Networks Fundamentals of Network Security Cryptography and Internet Security Selected Topics In CS Business Research Methods Artificial Intelligence for Business Decisions Marketing Analytics Marketing Research Multivariate Distributions	120 Credits 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	
MATH 448 Stochastic Simulation 3 MATH 461 Introduction to Statistical Computing with SAS and R 3 IS 333 Social Network Analysis 3	Data Science (Com YWCC 310 CS 332 CS 350 CS 351 CS 356 CS 357 CS 408 CS 485 MGMT 316 MGMT 416 MRKT 378 MRKT 430 MATH 345 MATH 388	Title sputing Option) Electives Co-op Work Experience I Principles of Operating Systems Intro to Computer Systems Introduction to Cybersecurity Introduction to Computer Networks Fundamentals of Network Security Cryptography and Internet Security Selected Topics In CS Business Research Methods Artificial Intelligence for Business Decisions Marketing Analytics Marketing Research Multivariate Distributions Introduction to Chaos Theory Numerical Linear Algebra	120 Credits 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	
MATH 461 Introduction to Statistical Computing with SAS and R 3 IS 333 Social Network Analysis 3	Data Science (Com YWCC 310 CS 332 CS 350 CS 351 CS 356 CS 357 CS 408 CS 485 MGMT 316 MGMT 416 MRKT 378 MRKT 430 MATH 345 MATH 388 MATH 391	Title sputing Option) Electives Co-op Work Experience I Principles of Operating Systems Intro to Computer Systems Introduction to Cybersecurity Introduction to Computer Networks Fundamentals of Network Security Cryptography and Internet Security Selected Topics In CS Business Research Methods Artificial Intelligence for Business Decisions Marketing Analytics Marketing Research Multivariate Distributions Introduction to Chaos Theory Numerical Linear Algebra	120 Credits 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	
IS 333 Social Network Analysis 3	Data Science (Com YWCC 310 CS 332 CS 350 CS 351 CS 356 CS 357 CS 408 CS 485 MGMT 316 MGMT 416 MRKT 378 MRKT 430 MATH 345 MATH 388 MATH 391 MATH 430 MATH 447	Title Aputing Option) Electives Co-op Work Experience I Principles of Operating Systems Intro to Computer Systems Introduction to Cybersecurity Introduction to Computer Networks Fundamentals of Network Security Cryptography and Internet Security Selected Topics In CS Business Research Methods Artificial Intelligence for Business Decisions Marketing Analytics Marketing Research Multivariate Distributions Introduction to Chaos Theory Numerical Linear Algebra Analytical and Computational Neuroscience Applied Time Series Analysis	120 Credits 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	
	Data Science (Com YWCC 310 CS 332 CS 350 CS 351 CS 356 CS 357 CS 408 CS 485 MGMT 316 MGMT 416 MRKT 378 MRKT 430 MATH 345 MATH 388 MATH 391 MATH 440 MATH 447 MATH 448	Title Aputing Option) Electives Co-op Work Experience I Principles of Operating Systems Intro to Computer Systems Introduction to Cybersecurity Introduction to Computer Networks Fundamentals of Network Security Cryptography and Internet Security Selected Topics In CS Business Research Methods Artificial Intelligence for Business Decisions Marketing Analytics Marketing Research Multivariate Distributions Introduction to Chaos Theory Numerical Linear Algebra Analytical and Computational Neuroscience Applied Time Series Analysis Stochastic Simulation	120 Credits 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	
IS 392 Web Mining and Information Retrieval 3	Data Science (Com YWCC 310 CS 332 CS 350 CS 351 CS 356 CS 357 CS 408 CS 485 MGMT 316 MGMT 416 MRKT 378 MRKT 430 MATH 345 MATH 388 MATH 391 MATH 440 MATH 447 MATH 448 MATH 448	Title Aputing Option) Electives Co-op Work Experience I Principles of Operating Systems Intro to Computer Systems Introduction to Cybersecurity Introduction to Computer Networks Fundamentals of Network Security Cryptography and Internet Security Selected Topics In CS Business Research Methods Artificial Intelligence for Business Decisions Marketing Analytics Marketing Research Multivariate Distributions Introduction to Chaos Theory Numerical Linear Algebra Analytical and Computational Neuroscience Applied Time Series Analysis Stochastic Simulation	120 Credits 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	
	Data Science (Com YWCC 310 CS 332 CS 350 CS 351 CS 356 CS 357 CS 408 CS 485 MGMT 316 MGMT 416 MRKT 378 MRKT 430 MATH 345 MATH 388 MATH 391 MATH 430 MATH 447 MATH 448 MATH 448 MATH 461 IS 333	Title Apputing Option) Electives Co-op Work Experience I Principles of Operating Systems Intro to Computer Systems Introduction to Cybersecurity Introduction to Computer Networks Fundamentals of Network Security Cryptography and Internet Security Selected Topics In CS Business Research Methods Artificial Intelligence for Business Decisions Marketing Analytics Marketing Research Multivariate Distributions Introduction to Chaos Theory Numerical Linear Algebra Analytical and Computational Neuroscience Applied Time Series Analysis Stochastic Simulation Introduction to Statistical Computing with SAS and R Social Network Analysis	120 Credits 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	

FIN 218	Financial Markets and Institutions	3
FIN 306	Blockchain Technology for Business	3
FIN 310	Data-Driven Financial Modeling	3
FIN 320	Fin Data Analytics	3
IT 430	Ethical Hacking for System Administrators	3
IT 485	Special Topics in Information Technology I	3

B.S. in Data Science (Statistics Option)

(120 credits)

First Year		
1st Semester		Credits
CS 100	Roadmap to Computing	3
MATH 111	Calculus I	4
PHYS 111	Physics I ¹	3
PHYS 111A	Physics I Lab ¹	1
ENGL 101	English Composition: Introduction to Academic Writing	3
FYS SEM	First-Year Student Seminar	0
	Term Credits	14
2nd Semester		
CS 113	Introduction to Computer Science I	3
MATH 112	Calculus II	4
PHYS 121	Physics II ¹	3
PHYS 121A	Physics II Lab ¹	1
ENGL 102	English Composition: Introduction to Writing for Research	3
	Term Credits	14
Second Year		
1st Semester		
CS 114	Introduction to Computer Science II	3
MATH 244	Introduction to Probability Theory	3
MATH 337	Linear Algebra	3
History and Huma requirements/ger-	anities GER 200 level (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education- 200-level/)	3
Social Sciences C social-science-ge	GER (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-requirements/r/)	3
	Term Credits	15
2nd Semester		
CS 241	Foundations of Computer Science I	3
CS 280	Programming Language Concepts	3
MATH 213	Calculus III B	4
MATH 341	Statistical Methods II	3
History and Huma requirements/ger-	anities GER 300+ level (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education- 300-level/)	3
	Term Credits	16
Third Year		
1st Semester		
MATH 340	Applied Numerical Methods	3
MATH 344	Regression Analysis	3
MATH 391	Numerical Linear Algebra	3
CS 288	Intensive Programming in Linux	3
DS 340	Fundamentals and Principles of Data Science	3
	Term Credits	15

4 B.S. in Data Science

2nd Semester		
MATH 345	Multivariate Distributions	3
MATH 447	Applied Time Series Analysis	3
MATH 478	Stat Methods in Data Sci	3
Data Science Elec	ctive 1	3
History and Huma	nities GER 300+ level (http://catalog.njit.edu/undergraduate/academic-policies-procedures/general-education-	3
requirements/ger-		
	Term Credits	15
Fourth Year		
1st Semester		
MATH 448	Stochastic Simulation	3
MATH 461	Introduction to Statistical Computing with SAS and R	3
MATH 462	Statistics and Statistical Learning (Capstone I)	3
CS 450	Data Visualization	3
Data Science Elec	ctive 2	3
	Term Credits	15
2nd Semester		
MATH 463	Statistics and Statistical Learning (Capstone II)	3
Math Upper Level	Elective (300+ level)	3
Data Science Elec	ctive 3	3
Humanities and S	ocial Science Senior Seminar GER (http://catalog.njit.edu/undergraduate/academic-policies-procedures/	3
-	-requirements/hss-capstone/)	
Free Elective ²		4
	Term Credits	16
	Total Credits	120
Code	Title	Credits
	tistics Option) Electives	
YWCC 310	Co-op Work Experience I	3
CS 331	Database System Design & Mgmt	3
CS 332	Principles of Operating Systems	3
CS 350	Intro to Computer Systems	3
CS 351	Introduction to Cybersecurity	3
CS 356	Introduction to Computer Networks	3
CS 357	Fundamentals of Network Security	3
CS 370	Introduction to Artificial Intelligence	3
CS 375	Introduction to Machine Learning	3
CS 444	Big Data Systems	3
CS 408	Cryptography and Internet Security	3
CS 435	Advanced Data Structures and Algorithm Design	3
CS 482	Data Mining	3
MGMT 316	Business Research Methods	3
MGMT 416	Artificial Intelligence for Business Decisions	3
MRKT 378	Marketing Analytics	3
MRKT 430	Marketing Research	3
MATH 222	Differential Equations	4
MATH 388	Introduction to Chaos Theory	3
MATH 430	Analytical and Computational Neuroscience	3
MATH 453	High-Performance Numerical Computing	3
MATH 477	Stochastic Processes	3
* *		
IS 333	Social Network Analysis	3
IS 333 IS 392	Social Network Analysis Web Mining and Information Retrieval	3
IS 333 IS 392 FIN 218	Social Network Analysis Web Mining and Information Retrieval Financial Markets and Institutions	3 3 3

FIN 306	Blockchain Technology for Business	3
FIN 310	Data-Driven Financial Modeling	3
FIN 320	Fin Data Analytics	3
IT 430	Ethical Hacking for System Administrators	3
IT 485	Special Topics in Information Technology I	3

Students considering switching to Data Science should take PHYS 111/111A and 121/121A. Do not take PHYS 102/102A.

A free elective is any 3 credit course except a course that is already required for your program or any course covering prerequisite material for first semester courses in your program. Free electives should be chosen in consultation with your advisor.