

# BACHELOR OF SCIENCE IN DATA SCIENCE

## Required Courses

Code	Title	Credit Hours
<b>Data Science Requirements (24-25)</b>		
DS 100	Introduction to the Profession	3
DS 151	Introduction to Data Science	3
Select one of the two options:		6-7
DS 251 & DS 351	Mathematical Foundations for Data Science I and Mathematical Foundations for Data Science II	6
MATH 252 & MATH 350	Introduction to Differential Equations and Introduction to Computational Mathematics	7
DS 261	Ethics and Privacy in Data Science	3
DS 451 or CSP 571	Data Science Life Cycle Data Preparation and Analysis	3
MATH 474 or MATH 476	Probability and Statistics Statistics	3
MATH 484 or CS 484	Regression Introduction to Machine Learning	3
<b>Applied Mathematics Requirements (17)</b>		
MATH 151	Calculus I	5
MATH 152	Calculus II	5
MATH 251	Multivariate and Vector Calculus	4
MATH 332	Elementary Linear Algebra	3
<b>Computer Science Requirements (10-12)</b>		
Select one of the following sequences:		4-6
CS 115 & CS 116	Object-Oriented Programming I and Object-Oriented Programming II	4
CS 104 & CS 201	Introduction to Computer Programming for Engineers and Accelerated Introduction to Computer Science	6
CS 331	Data Structures and Algorithms	3
CS 425	Database Organization	3
<b>Communication (3)</b>		
Select one of the following:		3
COM 421	Technical Communication	3
COM 428	Verbal and Visual Communication	3
INTM 301	Communications for the Workplace	3
ITM 300	Communication in the Workplace	3
SCI 522	Public Engagement for Scientists	3
<b>Ethics and Society (3)</b>		
Select one of the following:		3
HIST 385	Women in Computing History	3
ITMM 485	Legal and Ethical Issues in Information Technology	3
PHIL 374	Ethics in Computer Science	3
PHIL 375	Computer Ethics	3
PHIL 381	Artificial Intelligence, Philosophy and Ethics	3
SOC 362	Technology and Social Change	3
<b>Data Science Technical Depth (12)</b>		
Select four of the following:		12
CS 422	Data Mining	3
CS 429	Information Retrieval	3
CS 430	Introduction to Algorithms	3
CS 451	Introduction to Parallel and Distributed Computing	3
CS 481	Artificial Intelligence Language Understanding	3
CS 522	Advanced Data Mining	3
CS 577	Deep Learning	3
CS 584	Machine Learning	3
CSP 554	Big Data Technologies	3
MATH 435	Linear Optimization	3
MATH 446	Introduction to Time Series	3
MATH 475	Probability	3
MATH 476	Statistics	3
MATH 535	Optimization I	3
MATH 546	Introduction to Time Series	3
MATH 563	Mathematical Statistics	3
MATH 564	Regression	3
MATH 569	Statistical Learning	3
MATH 574	Bayesian Computational Statistics	3
<b>Data Science Electives (12)</b>		
Select 12 credit hours from the following courses, or any other courses in Data Science Technical Depth:		12
COM 383	Social Networks	3
CS 458 or ECE 443	Introduction to Information Security Introduction to Computer Cyber Security	3
CS 480	Introduction to Artificial Intelligence	3
CS 487	Software Engineering I	3
CS 512	Computer Vision	3
CS 520	Data Integration, Warehousing, and Provenance	3
CS 546	Parallel and Distributed Processing	3
CS 553	Cloud Computing	3
CS 554	Data-Intensive Computing	3
CS 578	Interactive and Transparent Machine Learning	3
CS 579	Online Social Network Analysis	3
CS 583	Probabilistic Graphical Models	3
CS 585	Natural Language Processing	3
DS 472	Data Science Practicum	3-6
ECE 308	Signals and Systems	3
ECE 442	Internet of Things and Cyber Physical Systems	3
ECE 447	Artificial Intelligence and Edge Computing	3

ECE 449	Object-Oriented Programming and Machine Learning	3
ECE 481	Image Processing	3
ECE 501	Artificial Intelligence and Edge Computing	3
ECE 510	Internet of Things and Cyber Physical Systems	3
ECE 511	Analysis of Random Signals	3
ECE 520	Information Theory and Applications	3
ECE 521	Quantum Electronics	3
ECE 563	Artificial Intelligence in Smart Grid	3
ECE 565	Computer Vision and Image Processing	3
ECE 566	Machine and Deep Learning	3
ECE 567	Statistical Signal Processing	3
EMGT 363	Creativity, Inventions, and Entrepreneurship for Engineers and Scientists	3
ITMS 418	Coding Security	3
ITMS 448	Cyber Security Technologies	3
ITMS 478	Cyber Security Management	3
MATH 225	Introductory Statistics	3
MATH 380	Introduction to Mathematical Modeling	3
MATH 483	Design and Analysis of Experiments	3
MATH 497	Special Problems	1-20
MATH 527	Machine Learning in Finance: From Theory to Practice	3
MATH 565	Monte Carlo Methods	3
SSCI 325	Intermediate Geographic Information Systems	3
SSCI 480	Introduction to Survey Methodology	3
<b>Science Requirement and Electives</b>		<b>(10)</b>
See Illinois Tech Core Curriculum, Section D		10
<b>Humanities and Social Science Requirements</b>		<b>(21)</b>
See Illinois Tech Core Curriculum, Sections B and C		21
<b>Interprofessional Projects (IPRO)</b>		<b>(6)</b>
See Illinois Tech Core Curriculum, Section E		6
<b>Free Electives</b>		<b>(9)</b>
Select nine credit hours		9
<b>Total Credit Hours</b>		<b>127-130</b>

HUMANITIES 200-LEVEL COURSE	3	SOCIAL SCIENCE ELECTIVE	3
		<b>16</b>	<b>17</b>
<b>Year 2</b>			
<b>Semester 1</b>	<b>Credit Hours</b>	<b>Semester 2</b>	<b>Credit Hours</b>
MATH 251	4	MATH 474	3
MATH 332	3	DS 261	3
CS 331	3	CS 425	3
SCIENCE ELECTIVE	3	SOCIAL SCIENCE ELECTIVE	3
HUMANITIES OR SOCIAL SCIENCE ELECTIVE	3	SCIENCE ELECTIVE	3
		<b>16</b>	<b>15</b>
<b>Year 3</b>			
<b>Semester 1</b>	<b>Credit Hours</b>	<b>Semester 2</b>	<b>Credit Hours</b>
DS 251	3	DS 351	3
CS 484	3	COMMUNICATION	3
DS ELECTIVE	3	DS TECH DEPTH	3
FREE ELECTIVE	3	DS TECH DEPTH	3
HUMANITIES ELECTIVE (300+)	3	DS ELECTIVE	3
		<b>15</b>	<b>15</b>
<b>Year 4</b>			
<b>Semester 1</b>	<b>Credit Hours</b>	<b>Semester 2</b>	<b>Credit Hours</b>
DS 451	3	DS 472	3-6
FREE ELECTIVE	3	FREE ELECTIVE	3
DS TECH DEPTH	3	DS TECH DEPTH	3
IPRO	3	IPRO	3
SOCIAL SCIENCE ELECTIVE (300+)	3	HUMANITIES ELECTIVE (300+)	3
DS ELECTIVE	3		
		<b>18</b>	<b>15-18</b>
<b>Total Credit Hours: 127-130</b>			

## Bachelor of Science in Data Science Curriculum

		<b>Year 1</b>	
<b>Semester 1</b>	<b>Credit Hours</b>	<b>Semester 2</b>	<b>Credit Hours</b>
DS 100	3	ETHICS AND SOCIETY	3
DS 151	3	MATH 152	5
MATH 151	5	CS 116	2
CS 115	2	SCIENCE ELECTIVE	4