Date Submitted: 03/17/26 11:10 pm

Viewing: BS-DS : Bachelor of Science in Data Science

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Changes proposed by: ellisr

Catalog Pages Using this Program

Bachelor of Science in Data Science

Bachelor of Science in Data Science

Program Status	Active			
Requestor	Name	Robert Ellis ~~Ayesha Qamer~~	E-mail	ellisr@iit.edu ~~aqamer@iit.edu~~
Origination Date	2026-3-17 ~~2025-4-18~~			
Is this an interdisciplinary program?	Yes			
Is this an incubator program?				
Is this stem-eligible?	Yes			
Available for direct application?	Yes			
Academic Unit	Applied Mathematics			
College	College of Computing			

Contributing Academic Unit(s)

Academic Units
Computer Science

Program Title

In Workflow

1. CC Interdisciplinary Curriculum Committee Chair
2. Academic Affairs
3. Undergraduate Academic Affairs
4. CC Dean
5. Undergraduate Studies Committee Chair
6. Faculty Council Chair
7. Academic Affairs

Approval Path

1. 02/03/26 4:22 pm Xiaofan Li (lix): Approved for CC Interdisciplinary Curriculum Committee Chair
2. 02/04/26 10:39 am Ayesha Qamer (aqamer): Approved for Academic Affairs
3. 02/04/26 11:54 am Joseph Gorzkowski (jgorzkow): Approved for Undergraduate Academic Affairs
4. 02/04/26 12:01 pm Nicole Beebe (nbeebe1): Approved for CC Dean
5. 02/24/26 6:03 pm Kathiravan Krishnamurthy (kkrishn2): Rollback to Initiator

Bachelor of Science in Data Science

Effective Academic Year	2026 ~~2025~~ - 2027 ~~2026~~	Effective Term	Summer 2026
Academic Level	Undergraduate		

6. 02/25/26 11:00 am Xiaofan Li (lix): Approved for CC Interdisciplinary Curriculum Committee Chair
7. 02/25/26 2:29 pm Ayesha Qamer (aqamer): Rollback to Initiator
8. 02/27/26 12:43 pm Xiaofan Li (lix): Approved for CC Interdisciplinary Curriculum Committee Chair
9. 02/27/26 3:28 pm Ayesha Qamer (aqamer): Rollback to Initiator
10. 03/18/26 5:40 am Xiaofan Li (lix): Approved for CC Interdisciplinary Curriculum Committee Chair
11. 03/18/26 11:35 am Ayesha Qamer (aqamer): Approved for Academic Affairs
12. 03/18/26 4:06 pm Joseph Gorzkowski (jgorzkow): Approved for Undergraduate Academic Affairs
13. 03/19/26 2:14 pm Nicole Beebe (nbeebe1): Approved for CC Dean

History

1. Jun 14, 2022 by Kiah Ong (kong2)

2. Nov 11, 2022 by Patty Johnson Winston (winston)
3. Nov 11, 2022 by Patty Johnson Winston (winston)
4. Nov 11, 2022 by Patty Johnson Winston (winston)
5. Mar 10, 2025 by Robert Ellis (ellisr)
6. Apr 14, 2025 by Ayesha Qamer (aqamer)
7. Apr 18, 2025 by Ayesha Qamer (aqamer)

If all courses in a subject in your department are required, please enter each subject followed by the number ranges in the "Quick Add" field in the pop up box when you click the green plus button below. For example: ARCH 100-499.

What courses will factor the major GPA?

Program Type Degree

Degree Type Bachelor of Science (BS)

CIP Code
30.7001 - Data Science, General.

Program Code BS-DS

Program Attribute

Total Program Credit Hours 120

Please provide a summary and rationale for the requested program revision.

02/24/2026:
The proposed revisions to the BS in Data Science address:
• Risk of low enrollment in DS 100: DS 100 is still required, but upon agreement with advisor CS 100 or Math 100 can be taken instead

• Mistake, in hindsight, of omitting CS 330/Math 230 from original required courses (every other AMAT and CS BS degree requires it)
• Minor CS Programming requirement update removing CS 105 from the CS 105 and CS 201 sequence, as DS 151 provides additional programming experience
• Significant changes in H and S courses and how those impact the Data Science Communication and Ethics and Society course baskets
• Updating and modest expansion of Data Science Technical Depth courses and Data Science Electives courses reflecting recent course additions, eliminations, and better understanding of data science relevance of existing courses.

No significant change in credit hours of required courses is made, except that moving CS 330/Math 230 to required courses causes a reduction from 12 credits to 9 credits in Data Science Electives. HOWEVER, the recent UGSC rule change allowing double-counting of major requirements with the core curriculum allows students to make choices in the parts: Data Science Communication, Ethics and Society, and Data Science Electives, to double-count up to 15 credits. This is reflected in the broadened range of Free Elective credits, which is now 4-20. Two additional minor notes: DS 261 Ethics and Privacy in Data Science is undergoing a name change and moderate syllabus rewrite to DS 261 Data Ethics and Responsible AI. The existing content will be retained and streamlined, and additional AI learning objectives added to meet the requirements of the AI Management Certificate, where DS 261 will be an option. Second, DS 451, which has not yet run, will be cross-listed with CSP 571 to avoid running a very small DS 451 class. The syllabus for DS 451 is currently under revision, with possible prerequisite change, to make this work.

11/14/2025: Update SCI 522 to COM 523 because SCI 522 is discontinued and the replacement course with similar LOs is COM 523.

Spring 2024:
Proposed Changes:
(1) Reduce the Data Science Technical Depth credits from 12 credits to 9 credits.
(2) Reduce the free electives from 9 credits to 2-5 credits, subject to 120 minimum degree credits.
(3) Remove HIST 385 from the Ethics and Society requirement.
Overall, this reduces the total minimum number of credits from 127-130 to 120.

Rationale:
(1) Even after the reduction in Data Science Technical Depth credits, this degree remains robust and has more than the typical number of required courses at both lower and upper levels.
(2) The reduction in free electives is mainly to reach the minimum 120 credit hours for the degree.
(3) HIST 385 no longer exists as a course, according to the CIM system. There is no other reason for removing it, and it can be restored were the course to reactivate.

4/14/2025, AQ: Swapped out MATH 225 for STAT 225 as it was replaced/revised by AMAT.
4/18/2025, AQ: Fixed source code for catalog formatting purposes

Program Narrative and Justification

Narrative description of how the institution determined the need for the program. For example, describe what need this program will address and how the institution became aware of that need. If the program is replacing a current program(s), identify the current program(s) that is being replaced by the new program(s) and provide details describing the benefits of the new program(s). If the program will be offered in connection with, or in response to, an initative by a governmental entity, provide details of that initiative.

In the last decade, data science education has been mainly at the graduate level. Many universities have opened data science master's programs or programs of similar names. Illinois Tech also opened MAS in Data Science in 2013 and MAS in AI in 2019 to meet the demands from students. Although these programs have been successful with graduates working in many reputable companies and industries, many universities have now also realized the importance and benefits of data science education at the undergraduate levels. Prominent examples include the UC Berkeley BA in Data Science, Carnegie Mellon University B.S. in Statistics and Machine Learning, and the brand new University of Chicago BA in Data Science.

Narrative description of how the program was designed to meet local market needs, or for an online program, regional or national market needs. For example, indicate if Bureau of Labor Statistics data or State labor data systems information was used, and/or if State, regional, or local workforce agencies were consulted. Include how the course content, program length, academic level, admission requirements, and prerequisites were decided; including information received from potential employers about course content; and information regarding the target students and employers.

Data science has become an increasingly popular profession in industries, businesses, and government organizations across the economy and society, with a high projected job growth rate through 2030 and attractive median salary. Employees trained with the analytical and computational knowledge and skills of data science are highly sought after. As one of the highest-paying professions, data science and related majors are also increasingly popular among students.

Narrative description of any wage analysis the institution may have performed, including any consideration of Bureau of Labor Statistics wage data related to the new program.

"Data Scientist" is the #2 job in the 2021 Glassdoor ranking as of October, 2021; with closely related jobs "Data Engineer" and "Machine Learning Engineer" also making the top 50. The US Bureau of Labor Statistics predicts 31.4% cumulative growth in data science and other mathematical science occupations between 2020-2030, with median salary of $98,230.

Narrative description of how the program was reviewed or approved by, or developed in conjunction with, one or more of the following: a) business advisory committees; b) program integrity boards; c) public or private oversight or regulatory agencies (not including the state licensing/authorization agency and accrediting agency); and d) businesses that would likely employ graduates of the program. For example, describe the steps taken to develop the program, identify when and with whom discussions were held, provide relevant details of any proposals or correspondence generated, and/or describe any process used to evaluate the program.

The proposal was being put together in the fall of 2021. The details of the proposal were worked out by Lulu Kang(AMAT), Michael Pelsmajer (AMAT), and Robert Ellis (AMAT). After that, the Computer Science Department was looped in to help comment on the proposal.

In particular, a steering committee was formed to help with the program administration.

As of February, 2025, the committee consists of the following members.
Director and Chair of Steering Committee: Robert Ellis (AMAT)
Steering Committee: Michael Pelsmajer (AMAT), Ioan Raicu (CS), Binghui Wang (CS)

The original committee consisted of the following members.
Director and Chair of Steering Committee: Lulu Kang (AMAT)
Steering Committee: Robert Ellis (AMAT), Michael Pelsmajer (AMAT), Ioan Raicu (CS), Binghui Wang (CS), Kai Shu (CS)

Admission Entry Details

What are the enrollment estimates?

Year 1	8 ~~20~~	Year 2	10 ~~40~~	Year 3	12 ~~80~~

Attach Additional Program Justification Document(s): BS DS Proposed Changes Spring 2026 v2.docx

Academic Information

Advising

Since quality advising is a key component of good retention, graduation, and career placement, how will students be mentored? What student professional organizations will be formed? How will the department work with the Career Services office to develop industry connections?

The program administrator will work with the Applied Mathematics and Computer Science Departments to find suitable faculty and/or staff to serve as academic advisors to students in the program. Such advisors will need to be familiar with the curriculum the data science domain, and the university policy regarding the undergraduate study. The students are required to regularly get in touch with the academic advisor to report and receive feedback on their study, courses selection, and academic performances.

Connections have been established with the industry through our experience running the Master in Data Science program. We plan to enhance these connections and give students a wide range of options in internship and job opportunities.

Program Resources

Which program resources are necessary to offer this program?

Personnel

Describe the personnel requirements necessary to offer the program. Describe how and when resources will be made available to hire any additional personnel that are required.

Program Director (faculty). Responsible for the overall content of the curriculum and ensuring that needed courses are developed and taught, in conjunction with the steering committee and the Applied Mathematics and Computer Science Departments. Runs regular program assessments. Builds and maintains a network of corporate, non-profit, and government employers of data scientists; for the purposes of (1) Securing Math 4XX internships; (2) Developing case studies and projects for incorporation into data science courses; and (3) Updating curriculum content with the evolving skill sets required of data science practitioners. Assists post-graduation job placement of majors. Assists with fundraising efforts. Appointed by agreement of the Applied Mathematics and Computer Science Department chairs.

Program Coordinator (staff). Tracks majors through graduation and beyond, to maintain an alumni network to support identification of internship and career opportunities for current majors as well as engagement and fundraising. Supports guest speakers and seminars. Processes logistics for data science internships, and supports sharing agreements between faculty and outside organizations for internships, case studies, and data-sharing. Facilitates compliance with IIT regulations and employment law. Forms and coordinates vertically-integrated student data science pods, mixing new and experienced students for mentoring in academic success, conducting team projects, and preparing for careers. (This may be a part-time position initially until the program grows sufficiently.)

Proposed Catalog Entry

Admission Requirements

The admission requirements of the B.S. in Data Science program are similar to other undergraduate programs of the College of Computing. The administration staff of the program will work in coordination with the Undergraduate Admissions Office on marketing, recruitment and other aspects of the admission process.

Course Requirements

Data Science Requirements		**(24-25)**
DS 100	Introduction to the Profession [1]	3
DS 151	Introduction to Data Science	3
Select one of the two options:		6-7
MATH 252 & MATH 350	Introduction to Differential Equations and Introduction to Computational Mathematics	7
DS 251 & DS 351	Mathematical Foundations for Data Science I and Mathematical Foundations for Data Science II	6
DS 261	Ethics and Privacy in Data Science	3
DS 451	Data Science Life Cycle	3
or CSP 571	Data Preparation and Analysis	
MATH 474	Probability and Statistics	3
or MATH 476	Statistics	
MATH 484	Regression	3
or CS 484	Introduction to Machine Learning	
Applied Mathematics Requirements		**(17)**
MATH 151	Calculus I	5
MATH 152	Calculus II	5
MATH 251	Multivariate and Vector Calculus	4
MATH 332	Linear Algebra: Theory and Applications	3
Computer Science Requirements		**(13)**
Select one of the following sequences:		4
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 201	Accelerated Introduction to Computer Science	4
CS 330	Discrete Structures	3
or MATH 230	Introduction to Discrete Math	
CS 331	Data Structures and Algorithms	3
CS 425	Database Organization	3
Data Science Communication		**(3)**
Select one of the following:		3
COM 320	A.I.-Assisted Workflows	3
COM 421	Technical Communication	3
COM 428	Verbal and Visual Communication	3
COM 523	Communicating Science	3
INTM 301	Communications for the Workplace	3
ITM 300	Communication in the Workplace	3
~~SCI 522~~	~~Course SCI 522 Not Found~~	~~3~~
Ethics and Society		**(3)**
Select one of the following:		3
ITMM 485	Legal and Ethical Issues in Information Technology	3
~~PHIL 374~~	~~Course PHIL 374 Not Found~~	~~3~~
~~PHIL 375~~	~~Course PHIL 375 Not Found~~	~~3~~
PHIL 330	Philosophy of Data Science	3
PHIL 331	Political Philosophy of Artificial Intelligence	3
PHIL 372	Ethics of Technology and Communication	3
PHIL 381	Artificial Intelligence, Philosophy and Ethics	3
PHIL 382	Bioethics	3
SOC 362	Technology and Social Change	3
SSCI 345	AI and Public Policy	3
Data Science Technical Depth		**(9)**
Select three of the following:		9
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 482	Information and Knowledge Management Systems	3
CS 484	Introduction to Machine Learning	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 439	Network modeling and statistics	3
MATH 446	Introduction to Time Series	3
MATH 475	Probability	3
MATH 476	Statistics	3
MATH 477	Computational Linear Algebra for Science and Engineering	3
MATH 484	Regression	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
MATH 577	Computational Linear Algebra for Science and Engineering	3
Data Science Electives		(9)
~~Select 12 credit hours from the following courses, or any other courses in Data Science Technical Depth:~~		~~12~~
~~COM 383~~	~~Social Networks~~	~~3~~
Select 9 credit hours from the following courses, or any other courses in Data Science Technical Depth:		9
CAE 439	Introduction to Geographic Information Systems	3
CS 350	Computer Organization and Assembly Language Programming	3
CS 458	Introduction to Information Security	3
or ECE 443	Introduction to Computer Cyber Security	
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 525	Advanced Database Organization	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
DS 480	Data Science Projects	3
ECE 308	Signals and Systems	3
ECE 442	Internet of Things and Cyber Physical Systems	3
ECE 443	Introduction to Computer Cyber Security	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
ITMD 361	Fundamentals of Web Development	3
ITMD 362	Human-Computer Interaction and Web Design	3
ITMD 441	Web Application Foundations	3

ITMD 442	Full-Stack Web Development	3
ITMS 416	Foundations of Secure AI Systems	3
ITMS 418	Coding Security	3
ITMS 448	Cyber Security Technologies	3
ITMS 460	Secure AI Systems Engineering and Defense	3
ITMS 478	Cyber Security Management	3
MATH 380	Mathematical Modeling with Data	3
MATH 437	Network Optimization	3
MATH 453	Combinatorics	3
MATH 454	Graph Theory and Applications	3
MATH 481	Introduction to Stochastic Processes	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 225	Introduction to Geographic Information Systems	3
SSCI 325	Intermediate Geographic Information Systems	3
SSCI 388	Methods of Economic Impact Analysis	3
SSCI 480	Introduction to Survey Methodology	3
STAT 225	Introductory Statistics	3
Science Requirement and Electives		**(7-10)**
~~See Illinois Tech Core Curriculum, Section D~~		~~10~~
See Illinois Tech Core Curriculum, Section D [2]		7-10
Humanities and Social Science Requirements		**(6-21)**
~~See Illinois Tech Core Curriculum, Sections B and C~~		~~21~~
See Illinois Tech Core Curriculum, Sections B and C [3]		6-21
Interprofessional Projects (IPRO)		**(6)**
See Illinois Tech Core Curriculum, Section E		6
Free Electives		**(4-20)**
~~Select two to five credit hours [1]~~		~~2-5~~
Select four to twenty credit hours [4]		4-20

Minimum degree credits required: 120

1 CS 100 or MATH 100 may be substituted by agreement with the academic advisor.

2 If chosen as a Data Science Elective, one 3-credit ECE course can double-count with 3 credits of Science Requirement and Electives of the Core Curriculum, making the additional requirement in this category 7 credits instead of 10.

3 Various combinations of selections of courses for the Data Science Communication, Ethics and Society, and Data Science Elective requirements can double-count for up to 15 credits of Humanities and Social Science Requirements of the Core Curriculum, making the additional requirements in this category as low as 6 credits instead of 21.

4 Four (4) free elective credits are needed when MATH 252 and MATH 350 are taken instead of DS 251 and DS 351, and no courses are double-counted with the core curriculum. Twenty (20) free elective credits are needed when DS 251 and DS 351 are taken instead of MATH 252 and MATH 350, and fifteen (15) free elective credits are double-counted between the (i) Data Science Communication, Ethics and Society, and Data Science Electives requirements and the (ii) Core Curriculum C: Human Sciences Module and/or D.2: Natural Science or Engineering part of the STEM Module.

Sample Curriculum/Program Requirements

Year 1

Semester 1	Credit Hours	Semester 2	Credit Hours
DS 100	3	CS 116	2
DS 151	3	MATH 152	5
MATH 151	5	Ethics and Society	3
CS 115	2	Science Elective	4
Humanities 200-level course	3	Social Science Elective	3
	16		17

Year 2

Semester 1	Credit Hours	Semester 2	Credit Hours
CS 331	3	CS 330 or MATH 230	3
MATH 251	4	CS 425	3
MATH 332	3	~~Social Science Elective (300+)~~	~~3~~
Science Elective	3	DS 261	3
Humanities or Social Science Elective	3	MATH 474	3
		Science Elective	3
	16		15

Year 3

Semester 1	Credit Hours	Semester 2	Credit Hours
~~DS 251~~	~~3~~	~~DS 351~~	~~3~~
~~CS 484~~	~~3~~	CS 484	3
MATH 252	4	MATH 350	3

DS Elective	3	DS Communication	3
DS Elective	3	DS Tech Depth	3
Humanities Elective (300+)	3	~~DS Elective~~	~~3~~
Free Elective	3	Free Elective [1]	3
	16		15

Year 4

Semester 1	Credit Hours	Semester 2	Credit Hours
DS 451	3	DS 472	3
DS Tech Depth	3	DS Tech Depth	3
IPRO	3	IPRO	3
Social Science Elective (300+)	3	Social Science Elective (300+)	3
Humanities Elective (300+)	3		
	15		12

Total Credit Hours: 122

1 The 120 credit degree minimum can be achieved by taking fewer free elective credits than listed in this sample curriculum.

Specialization Requirements

Program Outcomes and Assessment Process

What are your learning objectives in this program? Please list each learning objective in the boxes below:

Note: These should be the same as described in your assessment plan at the bottom of this form.

Assess data collection, modeling, analysis, visualization, and explanation needs in the context of a client's needs

Appropriately collect, clean, evaluate, and prepare data for exploration, modeling, and analysis

Design, implement, and evaluate relevant computational systems to address data science needs

Choose and implement key statistical analysis methods and appropriate models for a given data analysis problem

Effectively derive and communicate useful insights from data, including through storytelling and visualization

Communicate effectively in a variety of professional contexts

Function effectively as a member or leader of a team engaged in activities appropriate to the discipline

Identify, analyze, and mitigate ethical, privacy, and data and algorithmic bias issues in practical data science contexts

Upload your assessment plan here:

BS DS Assessment Plan AY24.xlsx
AY25 BS-DS Assessment Plan.xlsx

Undergraduate Program Requirements

What courses will factor the major GPA?

CS 100 - Introduction to the Profession
DS 100 - Introduction to the Profession
MATH 100 - Introduction to the Profession
DS 151 - Introduction to Data Science
MATH 252 - Introduction to Differential Equations
MATH 350 - Introduction to Computational Mathematics
DS 251 - Mathematical Foundations for Data Science I
DS 351 - Mathematical Foundations for Data Science II
DS 261 - Ethics and Privacy in Data Science
DS 451 - Data Science Life Cycle
CSP 571 - Data Preparation and Analysis
MATH 474 - Probability and Statistics
MATH 476 - Statistics
MATH 484 - Regression
CS 484 - Introduction to Machine Learning
MATH 151 - Calculus I
MATH 152 - Calculus II
MATH 251 - Multivariate and Vector Calculus
MATH 332 - Linear Algebra: Theory and Applications
CS 115 - Object-Oriented Programming I
CS 116 - Object-Oriented Programming II
CS 201 - Accelerated Introduction to Computer Science
CS 330 - Discrete Structures
MATH 230 - Introduction to Discrete Math
CS 331 - Data Structures and Algorithms
CS 425 - Database Organization
CS 422 - Data Mining
CS 429 - Information Retrieval
CS 430 - Introduction to Algorithms
CS 451 - Introduction to Parallel and Distributed Computing

CS 481 - Artificial Intelligence Language Understanding
CS 482 - Information and Knowledge Management Systems
CS 522 - Advanced Data Mining
CS 577 - Deep Learning
CS 584 - Machine Learning
CSP 554 - Big Data Technologies
MATH 435 - Linear Optimization
MATH 439 - Network modeling and statistics
MATH 446 - Introduction to Time Series
MATH 475 - Probability
MATH 477 - Computational Linear Algebra for Science and Engineering
MATH 535 - Optimization I
MATH 546 - Introduction to Time Series
MATH 563 - Mathematical Statistics
MATH 564 - Regression
MATH 569 - Statistical Learning
MATH 574 - Bayesian Computational Statistics
MATH 577 - Computational Linear Algebra for Science and Engineering
CAE 439 - Introduction to Geographic Information Systems
CS 350 - Computer Organization and Assembly Language Programming
CS 458 - Introduction to Information Security
ECE 443 - Introduction to Computer Cyber Security
CS 480 - Introduction to Artificial Intelligence
CS 487 - Software Engineering I
CS 512 - Computer Vision
CS 520 - Data Integration, Warehousing, and Provenance
CS 525 - Advanced Database Organization
CS 546 - Parallel and Distributed Processing
CS 553 - Cloud Computing
CS 554 - Data-Intensive Computing
CS 578 - Interactive and Transparent Machine Learning
CS 579 - Online Social Network Analysis
CS 583 - Probabilistic Graphical Models
CS 585 - Natural Language Processing
DS 472 - Data Science Practicum
DS 480 - Data Science Projects
ECE 308 - Signals and Systems
ECE 442 - Internet of Things and Cyber Physical Systems
ECE 443 - Introduction to Computer Cyber Security
ECE 447 - Artificial Intelligence and Edge Computing
ECE 449 - Object-Oriented Programming and Machine Learning
ECE 481 - Image Processing
ECE 501 - Artificial Intelligence and Edge Computing
ECE 510 - Internet of Things and Cyber Physical Systems
ECE 511 - Analysis of Random Signals

ECE 520 - Information Theory and Applications
ECE 521 - Quantum Electronics
ECE 563 - Artificial Intelligence in Smart Grid
ECE 565 - Computer Vision and Image Processing
ECE 566 - Machine and Deep Learning
ECE 567 - Statistical Signal Processing
ITMD 361 - Fundamentals of Web Development
ITMD 362 - Human-Computer Interaction and Web Design
ITMD 441 - Web Application Foundations
ITMD 442 - Full-Stack Web Development
ITMS 416 - Foundations of Secure AI Systems
ITMS 418 - Coding Security
ITMS 448 - Cyber Security Technologies
ITMS 460 - Secure AI Systems Engineering and Defense
ITMS 478 - Cyber Security Management
STAT 225 - Introductory Statistics
MATH 380 - Mathematical Modeling with Data
MATH 437 - Network Optimization
MATH 453 - Combinatorics
MATH 454 - Graph Theory and Applications
MATH 481 - Introduction to Stochastic Processes
MATH 483 - Design and Analysis of Experiments
MATH 486 - Mathematical Modeling I
MATH 527 - Machine Learning in Finance: From Theory to Practice
MATH 565 - Monte Carlo Methods
SSCI 225 - Introduction to Geographic Information Systems
SSCI 325 - Intermediate Geographic Information Systems
SSCI 388 - Methods of Economic Impact Analysis
SSCI 480 - Introduction to Survey Methodology
EMGT 363 - Creativity, Inventions, and Entrepreneurship for Engineers and Scientists

Undergraduate Degree Requirements

Minimum credit hours 120

Specialization required?
No

Minor required?
No

Proposed General Curriculum

List Major Course Requirements		
Data Science Requirements		**(24-25)**
DS 100	Introduction to the Profession [1]	3
DS 151	Introduction to Data Science	3
Select one of the two options:		6 or 7
MATH 252 & MATH 350	Introduction to Differential Equations and Introduction to Computational Mathematics	7
DS 251 & DS 351	Mathematical Foundations for Data Science I and Mathematical Foundations for Data Science II	6
DS 261	Ethics and Privacy in Data Science	3
DS 451	Data Science Life Cycle	3
or CSP 571	Data Preparation and Analysis	
MATH 474	Probability and Statistics	3
or MATH 476	Statistics	
MATH 484	Regression	3
or CS 484	Introduction to Machine Learning	

1 ~~T~~CS 100 or MATH 100 may be substituted by agreement with the academic advisor.

List Mathematics Requirements		
Applied Mathematics Requirements		**(17)**
MATH 151	Calculus I	5
MATH 152	Calculus II	5
MATH 251	Multivariate and Vector Calculus	4
MATH 332	Linear Algebra: Theory and Applications	3

List Science Requirements		
Science Requirement and Electives		**(7-10)**
~~See Illinois Tech Core Curriculum, Section D~~		~~10~~
See Illinois Tech Core Curriculum, Section D [1]		7-10

1 ~~I~~f chosen as a Data Science Elective, one 3-credit ECE course can double-count with 3 credits of Science Requirement and Electives of the Core Curriculum, making the additional requirement in this category 7 credits instead of 10.

Computer Science Requirements		**(13)**

List Computer Science Requirements		
Select one of the following sequences:		4
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 201	Accelerated Introduction to Computer Science	4
CS 330	Discrete Structures	3
or MATH 230	Introduction to Discrete Math	
CS 331	Data Structures and Algorithms	3
CS 425	Database Organization	3
List Humanities and Social Sciences Requirements		
Humanities and Social Science Requirements		**(21)**
See Illinois Tech Core Curriculum, Sections B and C [2]		21

[2] Various combinations of selections of courses for the Data Science Communication, Ethics and Society, and Data Science Elective requirements can double-count for up to 15 credits of Humanities and Social Science Requirements of the Core Curriculum, making the additional requirements in this category as low as 6 credits instead of 21.

List Interprofessional Project (IPRO) Requirements		
Interprofessional Projects (IPRO)		**(6)**
See Illinois Tech Core Curriculum, Section E		6
List Technical Elective Course Options		
Data Science Communication		**(3)**
Select one of the following:		3
COM 320	A.I.-Assisted Workflows	3
COM 421	Technical Communication	3