DATA SCIENCE (BS)

The Bachelor of Science in Data Science is designed to meet the growing demand for data scientists or data analysts who can manage and analyze structured and unstructured data sets and extract meaningful knowledge to inform decisions. The curriculum consists of courses in computer science, mathematics and data management. Students learn about data processing and application development, machine learning and statistical modeling techniques, and the analytical and communication skills to explain results in a meaningful way. DePaul offers a Bachelor of Science degree through the School of Computing and a Bachelor of Arts degree in the College of Science and Health. The two programs share a common core of courses focusing on fundamental skills in data science that students take during the first two years. After the second year, the two degrees diverge in their emphasis and level of specialization.

Program Requirements	Quarter Hours
Liberal Studies Requirements	76
Major Requirements	100
Open Electives	16
Total hours required	**192**

Learning Outcomes

Students will be able to:

- Explain how data is represented for analytic applications.
- Select and apply techniques for data preparation including normalization and reduction.
- Perform exploratory analysis to gain preliminary understanding of data.
- Develop and evaluate predictive models.
- Perform an independent data science investigation, from data gathering and cleaning to application of data mining algorithms.

Liberal Studies Requirements

Honors program requirements can be found in the individual Colleges & Schools section of the University Catalog. Select the appropriate college or school, followed by Undergraduate Academics and scroll down.

First Year Program		Hours
Chicago Quarter		
LSP 110 or LSP 111	DISCOVER CHICAGO or EXPLORE CHICAGO	4
Focal Point		
LSP 112	FOCAL POINT SEMINAR	4
Writing		
WRD 103	COMPOSITION AND RHETORIC I [1]	4
WRD 104	COMPOSITION AND RHETORIC II [1]	4
Quantitative Reasoning		
Not Required		
Sophomore Year		
Race, Power, and Resistance		
LSP 200	SEMINAR ON RACE, POWER, AND RESISTANCE	4
Junior Year		
Experiential Learning		
Required		4
Senior Year		
Capstone		
Required in major [1]		

[1] Students must earn a C- or better in this course.

Learning Domains

Arts and Literature (AL) (https://catalog.depaul.edu/undergraduate-core/liberal-studies-program/liberal-studies-learning-domains/arts-and-literature/)
- 3 Courses Required

H (https://catalog.depaul.edu/undergraduate-core/liberal-studies-program/liberal-studies-learning-domains/#understanding-past)istorical Inquiry (HI) (https://catalog.depaul.edu/undergraduate-core/liberal-studies-program/liberal-studies-learning-domains/historical-inquiry/)
- 2 Courses Required

Math and Computing (MC) (https://catalog.depaul.edu/undergraduate-core/liberal-studies-program/liberal-studies-learning-domains/math-and-computing/)
- Not Required

Philosophical Inquiry (PI) (https://catalog.depaul.edu/undergraduate-core/liberal-studies-program/liberal-studies-learning-domains/philosophical-inquiry/)
- 2 Courses Required (see note below)

Religious Dimensions (RD) (https://catalog.depaul.edu/undergraduate-core/liberal-studies-program/liberal-studies-learning-domains/religious-dimensions/)
- 2 Courses Required (see note below)

Scientific Inquiry (SI) (https://catalog.depaul.edu/undergraduate-core/liberal-studies-program/liberal-studies-learning-domains/scientific-inquiry/)
- 1 Lab Course Required

Social, Cultural, and Behavioral Inquiry (SCBI) (https://catalog.depaul.edu/undergraduate-core/liberal-studies-program/liberal-studies-learning-domains/social-cultural-and-behavioral-inquiry/)
- 3 Courses Required

Note

Students must take one of the following ethics courses: CSC 208 (https://catalog.depaul.edu/search/?P=CSC%20208) (PI), PHL 248 (https://catalog.depaul.edu/search/?P=PHL%20248)/MGT 248 (https://catalog.depaul.edu/search/?P=MGT%20248) (PI) or REL 228 (https://catalog.depaul.edu/search/?P=REL%20228)/MGT 228 (https://catalog.depaul.edu/search/?P=MGT%20228) (RD).

Specified required courses within Liberal Studies may have grade minimums (e.g. C- or better). Please consult your advisor or your college and major requirements.

Courses offered in the student's primary major cannot be taken to fulfill LSP Domain requirements. If students double major, LSP Domain courses may double count for both LSP credit and the second major. Students who choose to take an experiential learning course offered by

the major may count it either as a general elective or the Experiential Learning requirement.

In meeting learning domain requirements, no more than one course that is outside the student's major and is cross-listed with a course within the student's major, can be applied to count for LSP domain credit. This policy does not apply to those who are pursuing a double major or earning BFA or BM degrees.

Major Requirements

First Year

Course	Title	Quarter Hours
CSC 241	INTRODUCTION TO COMPUTER SCIENCE I [1]	4
CSC 242	INTRODUCTION TO COMPUTER SCIENCE II [1]	4
CSC 300	DATA STRUCTURES I	4
MAT 140	DISCRETE MATHEMATICS I	4
MAT 150	CALCULUS I	4
MAT 151	CALCULUS II	4
MAT 152	CALCULUS III	4

[1] Students with one (1) semester programming experience may take CSC 243 and one (1) additional Major Elective in lieu of CSC 241 and CSC 242.

Second Year

Course	Title	Quarter Hours
CSC 301	DATA STRUCTURES II	4
CSC 321	DESIGN AND ANALYSIS OF ALGORITHMS	4
DSC 323	DATA ANALYSIS AND REGRESSION	4
DSC 324	ADVANCED DATA ANALYSIS	4
IT 223	DATA ANALYSIS	4
MAT 220	APPLIED LINEAR ALGEBRA	4
MAT 349	APPLIED PROBABILITY	4
SE 350	OBJECT-ORIENTED SOFTWARE DEVELOPMENT	4

Third Year

Course	Title	Quarter Hours
CSC 355	DATABASE SYSTEMS	4
DSC 333	INTRODUCTION TO BIG DATA PROCESSING	4
DSC 341	FOUNDATIONS OF DATA SCIENCE	4
DSC 365	DATA VISUALIZATION	4
MAT 360	GENERALIZED LINEAR MODELS	4
CMNS 201	BUSINESS AND PROFESSIONAL COMMUNICATION	4

Fourth Year

Course	Title	Quarter Hours
DSC 345	MACHINE LEARNING	4
DSC 394	DATA SCIENCE PROJECT	4
Eight (8) credit hours of Major Electives		8

Major Electives

Students must earn a grade of C- or higher in all Major Elective courses. Students must select the eight (8) credit hours of Major Electives from the following list of courses, grouped by topic:

Computer Science

Course	Title	Quarter Hours
CSC 331	SCIENTIFIC COMPUTING	
CSC 347	CONCEPTS OF PROGRAMMING LANGUAGES	
CSC 360	WEB APPLICATIONS	
CSC 361	OPTIMIZED C++	
CSC 373	COMPUTER SYSTEMS I	
CSC 374	COMPUTER SYSTEMS II	
CSC 376	DISTRIBUTED SYSTEMS	
SE 325	INTRODUCTION TO SOFTWARE ENGINEERING	

Mathematics

Course	Title	Quarter Hours
MAT 260	MULTIVARIABLE CALCULUS I	
MAT 350	BAYESIAN STATISTICS	
MAT 351	PROBABILITY AND STATISTICS I	
MAT 352	PROBABILITY AND STATISTICS II	
MAT 353	PROBABILITY AND STATISTICS III	
MAT 355	STOCHASTIC PROCESSES	
MAT 358	APPLIED TIME SERIES AND FORECASTING	
MAT 387	OPERATIONS RESEARCH: LINEAR PROGRAMMING	
MAT 388	OPERATIONS RESEARCH: OPTIMIZATION THEORY	

Artificial Intelligence

Course	Title	Quarter Hours
CSC 358	SYMBOLIC PROGRAMMING	
CSC 380	FOUNDATIONS OF ARTIFICIAL INTELLIGENCE	

Image Analytics

Course	Title	Quarter Hours
CSC 381	INTRODUCTION TO DIGITAL IMAGE PROCESSING	
CSC 382	APPLIED IMAGE ANALYSIS	

Geographic Information Systems

Course	Title	Quarter Hours
GEO 241	GEOGRAPHIC INFORMATION SYSTEMS I: DIGITAL MAPPING	
GEO 242	GEOGRAPHIC INFORMATION SYSTEMS II: COMMUNITY GIS	
GEO 243	EARTH OBSERVATION	
GEO 343	EARTH OBSERVATION II	
GEO 344	SPATIAL ANALYSIS FOR SUSTAINABILITY	
GEO 346	GIS ANALYSIS OF ENVIRONMENTAL AND PUBLIC HEALTH	
GEO 347	WEB GIS AND SPATIAL DATA VISUALIZATION ON THE WEB	

Information Technology

Course	Title	Quarter Hours
IT 130	INTRODUCTORY COMPUTING FOR THE WEB	
IT 231	WEB DEVELOPMENT I	
IT 232	WEB DEVELOPMENT II	
IT 251	INTRODUCTION TO MOBILE APPS	

Research

Course	Title	Quarter Hours
CSC 395	RESEARCH COLLOQUIUM	
CSC 399	INDEPENDENT STUDY	
IT 300	RESEARCH EXPERIENCE	

Open Electives

Open elective credit also is required to meet the minimum graduation requirement of 192 hours.

Degree Requirements

Students in this degree must meet the following requirements:

- Complete a minimum of 192 credit hours (generally 48 courses)
- Earn a grade of C- or higher in WRD 103, WRD 104, and all Major and Minor courses
- Earn a grade of D or higher in all other Liberal Studies and Open Elective courses
- Maintain a cumulative GPA of 2.0 or higher

Program Combination Restrictions

Students pursuing the BS in Data Science are forbidden from pursuing the BA in Data Science through the College of Science and Health. Students pursuing the BS in Data Science are also forbidden from pursuing the Minor in Data Science.