2023 - 2024 Major Map

Data Science, BS

School/College: The College of Liberal Arts and Sciences
LADATSCIBS

Term 1 0 - 15 Credit Hours Critical course signified by	Hours	Minimum Grade	Notes
CSE 110: Principles of Programming (CS)	3	C	• ASU 101 or college-specific equivalent First-Year Seminar is required for all first-year students. • Students who complete MAT 270 must also complete MAT 271 in Term 2. Students who complete MAT 265 must also complete MAT 266 in Term 2. • It is highly recommended that students work with both an academic advisor from the School of Mathematical and Statistical Sciences and an assigned advisor affiliated with their chosen track. • Select your career interest area and play me3@ASU.
LIA 101: Student Success in The College of Liberal Arts and Sciences	1		
MAT 270: Calculus with Analytic Geometry I (MA) OR MAT 265: Calculus for Engineers I (MA)	4-3	C	
ENG 101 or ENG 102: First-Year Composition OR ENG 105: Advanced First-Year Composition OR ENG 107 or ENG 108: First-Year Composition	3	C	
Natural Science - Quantitative (SQ)	4		
Term hours subtotal:	15-14		

Term 2 15 - 31 Credit Hours Critical course signified by	Hours	Minimum Grade	Notes
CSE 205: Object-Oriented Programming and Data Structures (CS)	3	C	• Students who complete MAT 270 must also complete MAT 271. Students who complete MAT 265 must also complete MAT 266. • Some upper-division track courses require prerequisites. It is recommended that students consult with their advisors and use electives to complete appropriate course prerequisites. • Create a first draft resume.
MAT 271: Calculus with Analytic Geometry II (MA) OR MAT 266: Calculus for Engineers II (MA)	4-3	C	
ENG 101 or ENG 102: First-Year Composition OR ENG 105: Advanced First-Year Composition OR ENG 107 or ENG 108: First-Year Composition	3	C	
Humanities, Arts and Design (HU) AND Cultural Diversity in the U.S. (C)	3		
Elective	3-4		
Complete ENG 101 OR ENG 105 OR ENG 107 course(s).			
Term hours subtotal:	16		

Term 3 31 - 46 Credit Hours Critical course signified by	Hours	Minimum Grade	Notes
DAT 250: Data Science and Society	3	C	• Students must choose and complete a minimum of 21 credit hours in their selected track. Track options are Behavioral Sciences, Biosciences, Business Analytics, Computer Science, Mathematics, Social Sciences, or Spatial Sciences. • Some track courses may require additional prerequisites, so students will work with an assigned academic advisor in their track as well as the School of Mathematical and Statistical Sciences to select electives to satisfy necessary prerequisites.
MAT 343: Applied Linear Algebra	3	C	
Natural Science - Quantitative (SQ) OR Natural Science - General (SG)	4		
Complete 2 courses: Elective	5		
Complete First-Year Composition requirement.			
Complete Mathematics (MA) requirement.			
Term hours subtotal:	15		

Term 4 46 - 61 Credit Hours Critical course signified by	Hours	Minimum Grade	Notes
DAT 300: Mathematical Tools for Data Science	3	C	• Students pursuing the Computer Science track are advised to take CSE 220 this term due to prerequisite requirements in future terms. • Explore an internship.
Required Track Courses	3-4	C	
Complete 3 courses: Elective	9		
Term hours subtotal:	15-16		

Term 5 61 - 76 Credit Hours Necessary course signified by	Hours	Minimum Grade	Notes
DAT 301: Exploring Data in R and Python	4	C	• Students pursuing the Computer Science track are advised to take CSE 310 in this term due to prerequisite requirements in future terms. • Develop your professional online presence .
Upper Division Required Track Courses	3-4	C	
Required Track Courses	3	C	
Humanities, Arts and Design (HU) AND Historical Awareness (H)	3		
Elective	2-3		
Term hours subtotal:	15-17		

Term 6 76 - 91 Credit Hours Necessary course signified by	Hours	Minimum Grade	Notes
DAT 401: Statistical Modeling and Inference for Data Science	3	C	
Complete 2 courses: Upper Division Required Track Courses	6	C	
Social-Behavioral Sciences (SB) AND Global Awareness (G)	3		
Upper Division Elective OR DAT 484: Internship	3		
Complete Cultural Diversity in the U.S. (C) AND Global Awareness (G) AND Historical Awareness (H) course(s).			
Term hours subtotal:	15		

Term 7 91 - 106 Credit Hours Necessary course signified by	Hours	Minimum Grade	Notes
DAT 402: Machine Learning for Data Science OR CSE 475: Foundations of Machine Learning	3	C	• Students pursuing the Computer Science track are advised to enroll in CSE 475 rather than DAT 402. Students pursuing all other tracks are advised to enroll in DAT 402 in this term. • Gather professional references.
Upper Division Required Track Courses	3	C	
Upper Division Science and Society Elective	3	C	
Upper Division Humanities, Arts and Design (HU) OR Upper Division Social-Behavioral Sciences (SB)	3		
Literacy and Critical Inquiry (L)	3		
Term hours subtotal:	15		

Term 8 106 - 120 Credit Hours Necessary course signified by	Hours	Minimum Grade	Notes
DAT 490: Data Science Capstone (L) OR Disciplinary Capstone from selected track	3-2	C	• Students pursuing the Spatial Sciences track will complete a two credit hour capstone course; all other tracks require three credits of capstone coursework. • Meet with your academic advisor for final degree check and apply for graduation through your My ASU.
Upper Division Literacy and Critical Inquiry (L)	3		
Social-Behavioral Sciences (SB)	3		
Complete 2 courses: Upper Division Elective	5		
Term hours subtotal:	14-13		

- All students pursuing a BS or BSP degree in The College of Liberal Arts and Sciences must complete two courses from the Science and Society list found at https://thecollege.asu.edu/resources/science-society. At least one of the two courses must be upper-division and students must earn a C or better in the courses. Both Science and Society courses (i.e., all six credits) may count towards any major, minor, related fields, and ASU General Studies requirements.
- Behavioral Sciences Track: In cooperation with an assigned academic advisor, students must complete five required courses from the initial group of courses displayed in the track and one additional required course from the remaining list. Students must also complete three credit hours in DAT 490 or a 400-level disciplinary capstone course drawn from the CDE, FAS, or PSY subject areas.
- Biosciences Track: Students are required to complete BIO 439, BIO 440, a Bioethics related course from the provided list and three credit hours of DAT 490 Data Science Capstone. An additional three courses (minimum of nine credit hours) are chosen from the remaining track electives.
- Business Analytics Track: Students are to complete all courses in the track plus three credit hours of DAT 490 Data Science Capstone.
- Computer Science Track: In consultation with advisor, students must complete four required courses (12 credit hours) and pick two related courses (six credit hours). In addition, they must complete three credit hours of DAT 490 Data Science Capstone.
- Mathematics Track: Students are to complete MAT 267 and MAT 275. In cooperation with an academic advisor, students must also select four courses from the remaining courses in the track list below. In addition, students need to complete three credit hours in DAT 490 Data Science Capstone.
- Social Sciences Track: In consultation with an assigned academic advisor, students will select six courses for a minimum of 18 credit hours from the track list below, at least 12 credit hours of which must be upper division. In addition, students must complete three credit hours in DAT 490 Data Science Capstone or a disciplinary-specific capstone course.
- Spatial Sciences Track: Students must complete six courses listed in the track. In addition, they will complete two credit hours of DAT 490 Data Science Capstone or a 400-level GIS capstone course chosen in consultation with an assigned academic advisor.

Hide Course List(s)/Track Group(s)

Behavioral Sciences Track
Complete five courses from list below:
CDE 232: Human Development (SB) or FAS 101: Personal Growth and Relationships (SB) or PSY 101: Introduction to Psychology (SB)
FAS 498: Advanced Statistics for Social Sciences or SOC 469: Multivariate Statistics for Social Sciences or PSY 330: Statistical Methods (CS)
PSY 290: Research Methods (L or SG) or FAS 361: Applied Research Methods (L or SB)
PSY 498: Data Mining in the Behavioral Sciences or STP 450: Nonparametric Statistics or STP 452: Multivariate Statistics
SOC 390: Social Statistics I (CS)
Choose one elective course from list below:
CDE 312: Adolescence (SB)
CDE 337: Early Childhood Intervention
CDE 418: Aging and the Life Course (SB & H)

Biosciences Track
Complete three courses from list below:
BIO 312: Bioethics (HU) or PHI 320: Bioethics (HU) or BIO 316: History of Biology: Conflicts and Controversies (H) or HPS 330: History of Biology: Conflicts and Controversies (H) or BIO 317: History of Science II (HU & H) or HPS 323: History of Science II (HU & H) or BIO 318: History of Medicine (HU & H) or HPS 331: History of Medicine (HU & H) or BIO 416: Biomedical Research Ethics (L) or HPS 410: Biomedical Research Ethics (L)
BIO 439: Computing for Research
BIO 440: Functional Genomics or MBB 440: Functional Genomics
Choose three elective courses from list below:
BIO 355: Introduction to Computational Molecular Biology (CS)
BIO 411: Quantitative Methods in Conservation and Ecology
BIO 415: Statistical Models for Biology (CS)

Business Analytics Track
Complete all courses below:
CIS 235: Introduction to Information Systems
CIS 407: Business Database Systems Development
CIS 409: Business Data Warehouses and Dimensional Modeling
CIS 412: Business Data Mining
CIS 415: Big Data Analytics in Business
WPC 300: Problem Solving and Actionable Analytics

CDE 430: Infant and Toddler Development in the Family (SB)

CDE 450: Childhood Disorders and Family Functioning (L)

FAS 301: Introduction to Parenting

FAS 331: Modern Family Relationships (SB)

FAS 332: Human Sexuality (SB)

FAS 440: Fundamentals of Marriage and Family Therapy

LSC 325: Physiological Psychology or PSY 325: Physiological Psychology or PTX 325: Physiological Psychology

PSY 315: Personality Theory and Research (SB)

PSY 320: Learning and Motivation

PSY 324: Memory and Cognition

PSY 341: Developmental Psychology (SB)

PSY 350: Social Psychology (SB)

BIO 494: Data Analysis in Neuroscience

BIO 494: Microbiome Data Science

BIO 498: Genomics Research Experience

BIO 498: Programming for biologists

Computer Science Track

Complete four courses from list below:

CSE 220: Programming for Computer Engineering or CSE 240: Introduction to Programming Languages

CSE 310: Data Structures and Algorithms

CSE 365: Information Assurance

MAT 243: Discrete Mathematical Structures

Choose two elective courses from list below:

CSE 450: Design and Analysis of Algorithms

CSE 467: Data and Information Security

CSE 471: Introduction to Artificial Intelligence

CSE 476: Introduction to Natural Language Processing

Mathematics Track

Complete both courses below:

MAT 267: Calculus for Engineers III (MA)

MAT 275: Modern Differential Equations (MA)

Choose four elective courses from list below:

ACT 370: Software Tools for Business Analytics

ACT 435: Statistics for Risk Modeling

DAT 494: Bayesian Statistics

DAT 494: Exploration and Analysis of Environmental Data

DAT 494: Industry Tools for Data Science

MAT 300: Mathematical Structures (L)

MAT 353: Mathematics and Cancer

MAT 419: Introduction to Linear Optimization (CS)

MAT 420: Scientific Computing

MAT 421: Applied Computational Methods (CS)

MAT 423: Numerical Analysis I (CS)

MAT 425: Numerical Analysis II (CS)

MAT 429: Optimization

Social Sciences Track

Complete one course from list below:

ECN 425: Introduction to Econometrics

POS 401: Political Statistics (CS) or SGS 401: Political Statistics (CS)

Choose five elective courses from list below:

ACO 100: All About Data: Design, Query, and Visualization (CS)

ALA 235: Introduction to Computer Modeling (CS)

AML 253: Introduction to Mathematical Tools and Modeling for the Life and Social Sciences

AML 441: Mathematical Concepts and Tools in Sustainability

ASB 230: Beginning Social Research (SB)

ASB 363: From Cells to Society: Understanding Complexity or BIO 363: From Cells to Society: Understanding Complexity

ASM 201: Epidemics and Outbreaks

ASM 494: Models in Social Evolution

BME 301: Numerical Methods in Biomedical Engineering

BMI 211: Modeling Biomedical Decisions

- MAT 451: Mathematical Modeling (CS)
- MAT 452: Introduction to Chaos and Nonlinear Dynamics
- STP 310: Design and Analysis of Experiments
- STP 311: Regression and Time Series Analyses
- STP 420: Introductory Applied Statistics (CS) or STP 427: Mathematical Statistics
- STP 421: Probability
- STP 429: Applied Regression (CS)

- BMI 461: Advanced Topics in Biomedical Informatics I
- BMI 462: Advanced Topics In Biomedical Informatics II
- COM 308: Advanced Research Methods in Communication (L)
- COM 407: Advanced Critical Methods in Communication
- CRJ 303: Statistical Analysis (CS)
- ECN 410: Applied Regression Analysis and Forecasting
- ECN 416: Game Theory and Economic Behavior
- ECN 441: Public Economics (SB)
- ECN 445: Environmental Economics
- ECN 470: Mathematical Economics
- FAS 361: Applied Research Methods (L or SB)
- FAS 498: Advanced Statistics for Social Sciences
- FIS 335: Designing Knowledge (SB)
- FIS 403: Governing Emerging Technologies (SB)
- GCU 325: Geography of Europe (SB & G)
- GCU 351: Population Geography (SB & G)
- GCU 357: Social Geography (SB)
- GCU 361: Urban Geography (SB)
- GCU 364: Energy in the Global Arena (SB & G)
- GCU 426: Geography of Russia and Surroundings (SB & G)
- ISS 415: Knowledge Management (SB)
- MKT 352: Marketing Research (L)
- PAF 471: Public Policy Analysis
- POS 331: Public Opinion (SB)
- POS 434: Media and Politics (SB)
- PUP 424: Planning Methods
- PUP 481: Fundamentals of Spatial Optimization
- SBS 302: Qualitative Methods
- SBS 304: Social Statistics I (CS)
- SBS 389: Ethnographic Field Lab

SBS 404: Social Statistics II: Multivariate Analysis (CS)

SGS 305: Empirical Political Inquiry (SB) or POS 301: Empirical Political Inquiry (SB)

SOS 212: Systems, Dynamics and Sustainability

SOS 424: Dynamic Modeling in Social and Ecological Systems

SOS 441: Mathematical Concepts and Tools in Sustainability or AML 441: Mathematical Concepts and Tools in Sustainability

STP 310: Design and Analysis of Experiments

STP 311: Regression and Time Series Analyses

STP 452: Multivariate Statistics

TWC 411: Principles of Visual Communication (L)

Spatial Sciences Track

Complete all four courses below:

GIS 205: Geographic Information Science I (CS)

GIS 211: Geographic Information Science II (CS)

GIS 311: Geographic Information Science III (CS)

GIS 322: Programming Principles in GIS II

Complete one course below:

GIS 469: Multivariate Statistics for Social Sciences

GIS 470: Advanced Statistics for Geography and Planning (CS)

GIS 471: Spatial Statistics for Geography and Planning

Complete one course below:

GIS 202: Drones to Satellites: Observing Earth from Above (CS)

GIS 451: Geodesign and Urban Planning

GIS 494: GIS and Public Health

GIS 494: GIS for Climate Change Science

GIS 494: Landscape Analysis Using GIS

Notes:

- First-Year Composition: All students are placed in ENG 101 unless submission of SAT, ACT, Accuplacer, IELTS, or TOEFL score, or college-level transfer credit or test credit equivalent to ASU's first-year composition course(s), determine otherwise. Students on Polytechnic, Downtown Phoenix and West Campuses are encouraged to complete

the Directed Self-Placement survey to choose the first-year composition option they believe best suits their needs. Visit: https://cisa.asu.edu/DSP
- Mathematics Placement Assessment score determines placement in first mathematics course.

Please keep in mind that the applicability of a specific transfer course toward an ASU degree program depends on the requirements of the department, division, college or school in which you are enrolled at ASU. Transfer agreements that guarantee the completion of university level requirements do not necessarily meet college and major requirements. Please consult with an advisor for more information.

Total Hours: 120
Upper Division Hours: 45 minimum
Major GPA: 2.00 minimum
Cumulative GPA: 2.00 minimum
Total hrs at ASU: 30 minimum
Hrs Resident Credit for
Academic Recognition: 56 minimum
Total Community College Hrs: 64 maximum
Total College Residency Hrs: 12 minimum

General University Requirements Legend

General Studies Core Requirements:

- Literacy and Critical Inquiry (L)
- Mathematical Studies (MA)
- Computer/Statistics/Quantitative Applications (CS)
- Humanities, Arts and Design (HU)
- Social-Behavioral Sciences (SB)
- Natural Science - Quantitative (SQ)
- Natural Science - General (SG)

General Studies Awareness Requirements:

- Cultural Diversity in the U.S. (C)
- Global Awareness (G)
- Historical Awareness (H)

First-Year Composition

General Studies designations listed next to courses on the major map were valid for the 2023 - 2024 academic year. Please refer to the course catalog for current General Studies designations at time of class registration. General Studies credit is applied according to the designation the course carries at the time the class is taken.