Data Science (DTSC)

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Data scientists make sense of huge sets of data to help businesses, governments, nonprofits and other organizations make smarter decisions. The university's interdisciplinary Bachelor of Science in Data Science will prepare students for a successful career in data science with a strategic skill set, including the ability to:

- Use and apply state-of-the-art technologies for data representation, retrieval, manipulation, storage, governance, understanding, analysis, privacy, and security.
- Develop descriptive, predictive and prescriptive models to abstract complex systems and organizational problems, and to use computational methods to draw data-supported conclusions.
- Use foundational knowledge and apply critical thinking skills to identify and solve problems, make decisions, and visualize data, all with an awareness of societal and ethical impacts.
- Adapt analytics concepts to interpret and communicate findings and implications to senior decision-makers.
- Work effectively in an interdisciplinary team and transfer findings between knowledge domains and to others with no domain experience.
- Communicate using technical and non-technical language in writing and verbally.

Three colleges at the university — the College of Engineering, the Fulbright College of Arts and Sciences, and the Sam M. Walton College of Business — contribute expertise to the overall major while providing deeper insight into the concentrations they offer, including:

- Accounting Analytics
- Bioinformatics
- Biomedical and Healthcare Informatics
- Business Data Analytics
- Computational Analytics
- Cybersecurity Analytics
- Data Science Statistics
- Economic Analytics
- Financial Data Analytics
- Geospatial Data Analytics
- Music Industry Data Analytics
- Operations Analytics
- Social Data Analytics
- Supply Chain Analytics

Requirements for B.S. in Data Science with Accounting Analytics Concentration

Below are the general requirements for a Bachelor of Science degree with a major in Data Science, followed by specific requirements for the Accounting Analytics Concentration. Below those is a recommended eight-semester plan to achieve those requirements in a timely fashion.

Requirements for B.S. in Data Science

Each student in Data Science is required to complete 120 hours of coursework including the state minimum core (http://catalog.uark.edu/undergraduatecatalog/gened/stateminimum/). To be eligible for graduation, all students must complete at least 60 hours of Data Science (DTSC) Core required classes at the University of Arkansas. Each student in Data Science is also required to complete an additional 20-21 hours (depending on the student's chosen concentration) of required and elective concentration courses to meet the requirements for a concentration.

Additional opportunities are available to enhance the educational experience of students in these areas. Students should consult their academic adviser for recommendations.

State Minimum Core and General Education (36 hours)		
ENGL 10103	Composition I (ACTS Equivalency = ENGL 1013)	3
ENGL 10303	Technical Composition II (ACTS Equivalency = ENGL 1023)	3
MATH 24004	Calculus I (ACTS Equivalency = MATH 2405)	4
Science state minimum electives (two courses with labs)		8
Fine Arts state minimum core		3
Humanities state minimum core		
DASC 21303	Data Privacy & Ethics	3
U.S. History and Government state minimum core		3
HIST 20003	History of the American People to 1877 (ACTS Equivalency = HIST 2113)	
or HIST 201(	History of the American People, 1877 to Present (ACTS Equivalency = HIST 2123)	
or PLSC 200	American National Government (ACTS Equivalency = PLSC 2003)	
Social Science state minimum core electives		6
ECON 21403	Basic Economics: Theory and Practice (represents 3 of the 9 required credit hours for Social Science elective))	3
Data Science Required Core (47 hours)		
DASC 10003	Introduction to Data Science	3
DASC 11004	Programming Languages for Data Science (R, Python)	4
DASC 12004	Introduction to Object Oriented Programming for Data Science (JAVA)	4
DASC 25904	Multivariable Math for Data Scientists	4
DASC 12203	Role of Data Science in Today's World	3
DASC 21103	Principles and Techniques of Data Science	3
DASC 22003	Data Management and Data Base	3
DASC 22103	Data Visualization and Communication (Tableau)	3

DASC 31003	Big Data Analytics with Cloud Computing	3
DASC 32003	Optimization Methods in Data Science	3
DASC 32103	Statistical Learning	3
DASC 48902	Data Science Practicum I	2
DASC 41103	Machine Learning	3
DASC 41203	Social Problems in Data Science and Analytics	3
DASC 49903	Data Science Practicum II	3
Data Science Required Additional Courses		
MATH 25004	Calculus II	4
SEVI 20503	Business Foundations	3
Choose from one of these two-course sequences		6-7
STAT 30133 & STAT 30043	Introduction to Probability and Statistical Methods (Statistical Methods)	
Or		
INEG 23203 & INEG 23104	Probability and Stochastic Processes for Industrial Engineers and Statistics for Industrial Engineers I	
Data Science Concentration Courses		**20-21**
General Electives		**2-4**
Total Hours		**120**

Required Accounting Analytics Concentration Courses

ACCT 20103	Accounting Principles	3
ACCT 20203	Accounting Principles II	3
ACCT 35303	Accounting Technology	3
ACCT 35403	Accounting Analytics	3
ISYS 41903	Business Analytics and Visualization	3
ISYS 42903	Business Intelligence	3
Elective Accounting Analytics Concentration Courses (Select 3 hours)		3
FINN 30103	Financial Analysis	
ECON 30303	Intermediate Microeconomics	
ECON 47403	Introduction to Econometrics	
ECON 47503	Forecasting	
ISYS 42103	ERP Fundamentals	
MKTG 34303	Introduction to Marketing	
Total Hours		**21**

Data Science B.S. with Accounting Analytics Concentration
Eight-Semester Program

First Year	Fall	Spring
MATH 24004 Calculus I (ACTS Equivalency = MATH 2405) (Satisfies General Education Outcome 2.1)[1]	4	
ENGL 10103 Composition I (ACTS Equivalency = ENGL 1013) (Satisfies General Education Outcome 1.1)	3	
DASC 10003 Introduction to Data Science	3	
DASC 11004 Programming Languages for Data Science	4	
MATH 25004 Calculus II		4
ECON 21403 Basic Economics: Theory and Practice (Satisfies General Education Outcome 3.3)		3
ENGL 10303 Technical Composition II (ACTS Equivalency = ENGL 1023) (Satisfies General Education Outcome 1.2)		3
DASC 12004 Introduction to Object Oriented Programming for Data Science		4
DASC 12203 Role of Data Science in Today's World		3
Year Total:	14	17

Second Year	Fall	Spring
DASC 25904 Multivariable Math for Data Scientists	4	
DASC 21103 Principles and Techniques of Data Science	3	
DASC 22103 Data Visualization and Communication	3	
STAT 30133 Introduction to Probability[4] or INEG 23203 Probability and Stochastic Processes for Industrial Engineers	3	
State Minimum Core U.S. History or Government Elective (Satisfies General Education Outcome 4.2)[2]	3	
SEVI 20503 Business Foundations (Data Science Majors-only section)		3
STAT 30043 Statistical Methods[4] or INEG 23104 Statistics for Industrial Engineers I		3-4
State Minimum Core Natural Science with Lab Elective (Satisfies General Education Outcome 3.4)[2]		4
DASC 22003 Data Management and Data Base[2]		3
ACCT 20103 Accounting Principles (This is a Concentration pre-req and uses the General Elective credit hours)		3
Year Total:	16	16

Third Year	Fall	Spring
DASC 21303 Data Privacy & Ethics (Satisfies General Education Outcome 5.1)	3	
DASC 31003 Big Data Analytics with Cloud Computing	3	
State Minimum Core Social Sciences Elective (Satisfies General Education Outcomes 3.2 and 3.3)[2]	3	
State Minimum Core Natural Science with Lab Elective (Satisfies General Education Outcome 3.4) [2]	4	
ACCT 20203 Accounting Principles II	3	
DASC 32003 Optimization Methods in Data Science		3
DASC 32103 Statistical Learning		3
ACCT 35303 Accounting Technology		3

State Minimum Core Fine Arts Elective (Satisfies General Education Outcome 3.1)[2]		3
State Minimum Core Social Sciences Elective (Satisfies General Education Outcomes 3.3 and 4.1)[2]		3
Year Total:	16	15

Fourth Year	Units	
	Fall	Spring
DASC 48902 Data Science Practicum I	2	
DASC 41103 Machine Learning	3	
DASC 41203 Social Problems in Data Science and Analytics	3	
ACCT 35403 Accounting Analytics	3	
ISYS 41903 Business Analytics and Visualization	3	
DASC 49903 Data Science Practicum II (Satisfies General Education Outcome 6.1)		3
ISYS 42903 Business Intelligence		3
Accounting Analytics Concentration Elective		3
General Education Elective[3]		2-3
Year Total:	14	12

Total Units in Sequence:	**120**

1 Students have demonstrated successful completion of the learning indicators identified for learning outcome 2.1, by meeting the prerequisites for MATH 24004.

2 Students must complete the State Minimum Core requirements (https://nam03.safelinks.protection.outlook.com/?url=https%3A%2F%2Fnextcatalog.uark.edu%2Fundergraduatecatalog%2Fgened%2Fstateminimum%2F&data=02%7C01%7Cagriffin%40uark.edu%7Ce4e632415f9b49eda9bf08d7f5c20b91%7C79c742c4e61c4fa5be89a3cb566a80d1%7C0%7C0%7C637248086069621479&sdata=QptR3u0pvU0ZXfTkGD%2F1XG8924jwOx8pTlw8lWNAGp0s%3D&reserved=0) as outlined in the Catalog of Studies. The courses that meet the state minimum core also fulfill many of the university's General Education requirements (https://nam03.safelinks.protection.outlook.com/?url=https%3A%2F%2Fnextcatalog.uark.edu%2Fundergraduatecatalog%2Fgened%2Fgeneraleducation%2F&data=02%7C01%7Cagriffin%40uark.edu%7Ce4e632415f9b49eda9bf08d7f5c20b91%7C79c742c4e61c4fa5be89a3cb566a80d1%7C0%7C0%7C637248086069621479&sdata=QptR3u0pvU0ZBDWRVEfAqIMsYNX4KXEgX2JdEJJY7Go%3D&reserved=0), although there are additional considerations to satisfy the general education learning outcomes. Students are encouraged to consult with their academic adviser when making course selections.

3 **Students are required to complete 40 hours of upper-division courses (3000-4000 level). It is recommended that students consult with their adviser when making course selections.**

4 Data Science Statistics and Computational Analytics Concentration students are advised to select STAT 30133/STAT 30043 to meet the prerequisites required in the concentration.

Requirements for B.S. in Data Science with Bioinformatics Concentration

Below are the general requirements for a Bachelor of Science degree with a major in Data Science, followed by specific requirements for the Bioinformatics Concentration. Below those is a recommended eight-semester plan to achieve those requirements in a timely fashion.

Requirements for B.S. in Data Science

Each student in Data Science is required to complete 120 hours of coursework including the state minimum core (http://catalog.uark.edu/undergraduatecatalog/gened/stateminimum/). To be eligible for graduation, all students must complete at least 60 hours of Data Science (DTSC) Core required classes at the University of Arkansas. Each student in Data Science is also required to complete an additional 20-21 hours (depending on the student's chosen concentration) of required and elective concentration courses to meet the requirements for a concentration.

Additional opportunities are available to enhance the educational experience of students in these areas. Students should consult their academic adviser for recommendations.

State Minimum Core and General Education (36 hours)		
ENGL 10103	Composition I (ACTS Equivalency = ENGL 1013)	3
ENGL 10303	Technical Composition II (ACTS Equivalency = ENGL 1023)	3
MATH 24004	Calculus I (ACTS Equivalency = MATH 2405)	4
Science state minimum electives (two courses with labs)		8
Fine Arts state minimum core		3
Humanities state minimum core		
DASC 21303	Data Privacy & Ethics	3
U.S. History and Government state minimum core		3
HIST 20003	History of the American People to 1877 (ACTS Equivalency = HIST 2113)	
or HIST 201(	History of the American People, 1877 to Present (ACTS Equivalency = HIST 2123)	
or PLSC 200	American National Government (ACTS Equivalency = PLSC 2003)	
Social Science state minimum core electives		6
ECON 21403	Basic Economics: Theory and Practice (represents 3 of the 9 required credit hours for Social Science elective))	3
Data Science Required Core (47 hours)		
DASC 10003	Introduction to Data Science	3
DASC 11004	Programming Languages for Data Science (R, Python)	4
DASC 12004	Introduction to Object Oriented Programming for Data Science (JAVA)	4
DASC 25904	Multivariable Math for Data Scientists	4
DASC 12203	Role of Data Science in Today's World	3
DASC 21103	Principles and Techniques of Data Science	3
DASC 22003	Data Management and Data Base	3
DASC 22103	Data Visualization and Communication (Tableau)	3
DASC 31003	Big Data Analytics with Cloud Computing	3
DASC 32003	Optimization Methods in Data Science	3
DASC 32103	Statistical Learning	3
DASC 48902	Data Science Practicum I	2
DASC 41103	Machine Learning	3
DASC 41203	Social Problems in Data Science and Analytics	3
DASC 49903	Data Science Practicum II	3
Data Science Required Additional Courses		
MATH 25004	Calculus II	4
SEVI 20503	Business Foundations	3

Choose from one of these two-course sequences		6-7
STAT 30133 & STAT 30043	Introduction to Probability and Statistical Methods (Statistical Methods)	
Or		
INEG 23203 & INEG 23104	Probability and Stochastic Processes for Industrial Engineers and Statistics for Industrial Engineers I	
Data Science Concentration Courses		**20-21**
General Electives		**2-4**
Total Hours		**120**

Required Bioinformatics Concentration Courses

BIOL 25473	Cell Biology	3
BIOL 23373	General Genetics	3
Choose one of the following courses:		3
BIOL 30473	Evolutionary Biology	
BIOL 38773	General Ecology	
Elective Bioinformatics Concentration Courses (Select 12 hours)		12
Note: May not fulfill concentration electives with all GIS courses		
BIOL 41774	Conservation Genetics	
BIOL 4807V	Special Topics in Biological Sciences	
BIOL 51573	Practical Programming for Biologists	
BIOL 5800V	Special Topics in Biological Sciences	
GEOS 35403	Geospatial Applications and Information Science	
GEOS 35503	Spatial Analysis Using ArcGIS	
GEOS 35603	Geospatial Data Mining	
GEOS 45503	Introduction to Raster GIS	
Total Hours		**21**

Data Science B.S. with Bioinformatics Concentration Eight-Semester Program

First Year	**Fall**	**Spring**
MATH 24004 Calculus I (ACTS Equivalency = MATH 2405) (Satisfies General Education Outcome 2.1)[1]	4	
DASC 10003 Introduction to Data Science	3	
ENGL 10103 Composition I (ACTS Equivalency = ENGL 1013) (Satisfies General Education Outcome 1.1)	3	
DASC 11004 Programming Languages for Data Science	4	
MATH 25004 Calculus II		4
Satisfies General Education Outcome 3.4:		
BIOL 10103 Principles of Biology (ACTS Equivalency = BIOL 1014 Lecture) & BIOL 10101 Principles of Biology Laboratory (ACTS Equivalency = BIOL 1014 Lab)		4
ENGL 10303 Technical Composition II (ACTS Equivalency = ENGL 1023) (Satisfies General Education Outcome 1.2)		3
DASC 12004 Introduction to Object Oriented Programming for Data Science		4
DASC 12203 Role of Data Science in Today's World		3
Year Total:	14	18

Second Year	**Fall**	**Spring**
DASC 25904 Multivariable Math for Data Scientists	4	
Satisfies General Education Outcome 3.4:		
CHEM 14103 University Chemistry I (ACTS Equivalency = CHEM 1414 Lecture) & CHEM 14101 University Chemistry I Laboratory (ACTS Equivalency = CHEM 1414 Lab)	4	
STAT 30133 Introduction to Probability[4] or INEG 23203 Probability and Stochastic Processes for Industrial Engineers	3	
DASC 22103 Data Visualization and Communication	3	
DASC 21103 Principles and Techniques of Data Science	3	
SEVI 20503 Business Foundations (Data Science Majors-only section)		3
STAT 30043 Statistical Methods[4] or INEG 23104 Statistics for Industrial Engineers I		3-4
DASC 22003 Data Management and Data Base		3
BIOL 23373 General Genetics		3
Year Total:	17	12

Third Year	**Fall**	**Spring**
DASC 21303 Data Privacy & Ethics (Satisfies General Education Outcome 5.1)	3	
DASC 31003 Big Data Analytics with Cloud Computing	3	
ECON 21403 Basic Economics: Theory and Practice (Satisfies General Education Outcome 3.3)	3	
BIOL 25473 Cell Biology	3	
State Minimum Core U.S. History or Government Elective (Satisfies General Education Outcome 4.2)[2]	3	
DASC 32003 Optimization Methods in Data Science		3
DASC 32103 Statistical Learning		3
State Minimum Core Fine Arts Elective (Satisfies General Education Outcome 3.1)		3
State Minimum Core Social Sciences Elective (Satisfies General Education Outcomes 3.2 and 3.3)[2]		3
State Minimum Core Social Sciences Elective (Satisfies General Education Outcomes 3.3 and 4.1)[2]		3
Year Total:	15	15

Fourth Year	Units	
	Fall	Spring
DASC 48902 Data Science Practicum I	2	
DASC 41103 Machine Learning	3	
DASC 41203 Social Problems in Data Science and Analytics	3	
BIOL 30473 Evolutionary Biology or BIOL 38773 General Ecology	3	
Bioinformatics Elective	3	
DASC 49903 Data Science Practicum II (Satisfies General Education Outcome 6.1)		3
Bioinformatics Elective		3
Bioinformatics Elective		3
Bioinformatics Elective		3
General Education Elective[3]		2-3
Year Total:	14	15
Total Units in Sequence:		**120**

[1] Students have demonstrated successful completion of the learning indicators identified for learning outcome 2.1, by meeting the prerequisites for MATH 24004.

[2] Students must complete the State Minimum Core requirements (http://catalog.uark.edu/undergraduatecatalog/gened/stateminimum/) as outlined in the Catalog of Studies. The courses that meet the state minimum core also fulfill many of the university's General Education requirements (http://catalog.uark.edu/undergraduatecatalog/gened/generaleducation/), although there are additional considerations to satisfy the general education learning outcomes. Students are encouraged to consult with their academic adviser when making course selections.

[3] Students are required to complete 40 hours of upper-division courses (3000-4000 level). It is recommended that students consult with their adviser when making course selections.

[4] Data Science Statistics and Computational Analytics Concentration students are advised to select STAT 30133/STAT 30043 to meet the prerequisites required in the concentration.

Requirements for B.S. in Data Science with Biomedical and Healthcare Concentration

Below are the general requirements for a Bachelor of Science degree with a major in Data Science, followed by specific requirements for the Biomedical and Healthcare Concentration. Below those is a recommended eight-semester plan to achieve those requirements in a timely fashion.

Requirements for B.S. in Data Science

Each student in Data Science is required to complete 120 hours of coursework including the state minimum core (http://catalog.uark.edu/undergraduatecatalog/gened/stateminimum/). To be eligible for graduation, all students must complete at least 60 hours of Data Science (DTSC) Core required classes at the University of Arkansas. Each student in Data Science is also required to complete an additional 20-21 hours (depending on the student's chosen concentration) of required and elective concentration courses to meet the requirements for a concentration.

Additional opportunities are available to enhance the educational experience of students in these areas. Students should consult their academic adviser for recommendations.

State Minimum Core and General Education (36 hours)		
ENGL 10103	Composition I (ACTS Equivalency = ENGL 1013)	3
ENGL 10303	Technical Composition II (ACTS Equivalency = ENGL 1023)	3
MATH 24004	Calculus I (ACTS Equivalency = MATH 2405)	4
Science state minimum electives (two courses with labs)		8
Fine Arts state minimum core		3
Humanities state minimum core		
DASC 21303	Data Privacy & Ethics	3
U.S. History and Government state minimum core		3
HIST 20003	History of the American People to 1877 (ACTS Equivalency = HIST 2113)	
or HIST 201(	History of the American People, 1877 to Present (ACTS Equivalency = HIST 2123)	
or PLSC 200	American National Government (ACTS Equivalency = PLSC 2003)	
Social Science state minimum core electives		6
ECON 21403	Basic Economics: Theory and Practice (represents 3 of the 9 required credit hours for Social Science elective))	3
Data Science Required Core (47 hours)		
DASC 10003	Introduction to Data Science	3
DASC 11004	Programming Languages for Data Science (R, Python)	4
DASC 12004	Introduction to Object Oriented Programming for Data Science (JAVA)	4
DASC 25904	Multivariable Math for Data Scientists	4
DASC 12203	Role of Data Science in Today's World	3
DASC 21103	Principles and Techniques of Data Science	3
DASC 22003	Data Management and Data Base	3
DASC 22103	Data Visualization and Communication (Tableau)	3
DASC 31003	Big Data Analytics with Cloud Computing	3
DASC 32003	Optimization Methods in Data Science	3
DASC 32103	Statistical Learning	3
DASC 48902	Data Science Practicum I	2
DASC 41103	Machine Learning	3
DASC 41203	Social Problems in Data Science and Analytics	3
DASC 49903	Data Science Practicum II	3
Data Science Required Additional Courses		
MATH 25004	Calculus II	4
SEVI 20503	Business Foundations	3
Choose from one of these two-course sequences		6-7
STAT 30133 & STAT 30043	Introduction to Probability and Statistical Methods (Statistical Methods)	
Or		
INEG 23203 & INEG 23104	Probability and Stochastic Processes for Industrial Engineers and Statistics for Industrial Engineers I	
Data Science Concentration Courses		**20-21**

General Electives	**2-4**
Total Hours	**120**

Required Biomedical and Healthcare Informatics Concentration Courses

Students completing the Biomedical and Healthcare Informatics Concentration must select CHEM 14103 and PHYS 20304 for the State Minimum Core Science Electives.

BMEG 26104	Introduction to Biomedical Engineering	4
CHEM 14203	University Chemistry II (ACTS Equivalency = CHEM 1424 Lecture)	3
BIOL 24103	Human Physiology (ACTS Equivalency = BIOL 2414 Lecture)	3
BMEG 38001	Clinical Observations and Needs Finding	1
Elective Biomedical and Healthcare Informatics Concentration (Select 10 credit hours)		10
BMEG 47103	Cardiovascular Physiology and Devices	
BMEG 49703	Regenerative Medicine	
BMEG 44103	Tissue Engineering	
BMEG 44003	Biomedical Microscopy	
BMEG 45103	Biomedical Optics and Imaging	
BMEG 45203	Biomedical Data and Image Analysis	
BMEG 49803	Genome Engineering and Synthetic Biology	
BIOL 24101	Human Physiology Laboratory (ACTS Equivalency = BIOL 2414 Lab)	
CHEM 14201	University Chemistry II Laboratory (ACTS Equivalency = CHEM 1424 Lab)	
Total Hours		**21**

Data Science B.S. with Biomedical and Healthcare Informatics Concentration Eight-Semester Program

First Year	**Fall**	**Spring**
MATH 24004 Calculus I (ACTS Equivalency = MATH 2405) (Satisfies General Education Outcome 2.1)[1]	4	
Satisfies General Education Outcome 3.4:		
CHEM 14103 University Chemistry I (ACTS Equivalency = CHEM 1414 Lecture) & CHEM 14101 University Chemistry I Laboratory (ACTS Equivalency = CHEM 1414 Lab)	4	
ENGL 10103 Composition I (ACTS Equivalency = ENGL 1013) (Satisfies General Education Outcome 1.1)	3	
DASC 10003 Introduction to Data Science	3	
DASC 11004 Programming Languages for Data Science	4	
MATH 25004 Calculus II		4
Satisfies General Education Outcome 3.4:		
PHYS 20304 University Physics I (ACTS Equivalency = PHYS 2034) (Satisfies General Education Outcome 3.4)		4
ENGL 10303 Technical Composition II (ACTS Equivalency = ENGL 1023) (Satisfies General Education Outcome 1.2)		3
DASC 12004 Introduction to Object Oriented Programming for Data Science		4
DASC 12203 Role of Data Science in Today's World		3
Year Total:	18	18

Second Year	**Fall**	**Spring**
DASC 25904 Multivariable Math for Data Scientists	4	
STAT 30133 Introduction to Probability[4] or INEG 23203 Probability and Stochastic Processes for Industrial Engineers	3	
DASC 22103 Data Visualization and Communication	3	
DASC 21103 Principles and Techniques of Data Science	3	
BMEG 26104 Introduction to Biomedical Engineering	4	
SEVI 20503 Business Foundations (Data Science Majors-only section)		3
STAT 30043 Statistical Methods[4] or INEG 23104 Statistics for Industrial Engineers I		3-4
DASC 22003 Data Management and Data Base		3
CHEM 14203 University Chemistry II (ACTS Equivalency = CHEM 1424 Lecture)		3
Year Total:	17	12

Third Year	**Fall**	**Spring**
DASC 21303 Data Privacy & Ethics (Satisfies General Education Outcome 5.1)	3	
DASC 31003 Big Data Analytics with Cloud Computing	3	
BIOL 24103 Human Physiology (ACTS Equivalency = BIOL 2414 Lecture)	3	
ECON 21403 Basic Economics: Theory and Practice (Satisfies General Education Outcome 3.3)	3	
State Minimum Core Social Sciences Elective (Satisfies General Education Outcomes 3.2 and 3.3)[2]	3	
DASC 32003 Optimization Methods in Data Science		3
DASC 32103 Statistical Learning		3
BMEG 38001 Clinical Observations and Needs Finding		1
State Minimum Core Fine Arts Elective (Satisfies General Outcome 3.1)[2]		3
State Minimum Core Social Sciences Elective (Satisfies General Education Outcomes 3.3 and 4.1) [2]		3
Year Total:	15	13

Fourth Year	Units	
	Fall	Spring
DASC 48902 Data Science Practicum I	2	
DASC 41103 Machine Learning	3	
DASC 41203 Social Problems in Data Science and Analytics	3	
Concentration Elective Course	1	
Concentration Elective Course	3	
DASC 49903 Data Science Practicum II (Satisfies General Education Outcome 6.1)		3
Concentration Elective Course		3
Concentration Elective Course		3
State Minimum Core U.S. History or Government Elective (Satisfies General Education Outcome 4.2)[2]		3
General Elective Course[3]		2-3
Year Total:	12	15
Total Units in Sequence:		**120**

[1] Students have demonstrated successful completion of the learning indicators identified for learning outcome 2.1, by meeting the prerequisites for MATH 24004.

[2] Students must complete the State Minimum Core requirements (http://catalog.uark.edu/undergraduatecatalog/gened/stateminimum/) as outlined in the Catalog of Studies. The courses that meet the state minimum core also fulfill many of the university's General Education requirements (http://catalog.uark.edu/undergraduatecatalog/gened/generaleducation/), although there are additional considerations to satisfy the general education learning outcomes. Students are encouraged to consult with their academic adviser when making course selections.

[3] Students are required to complete 40 hours of upper-division courses (3000-4000 level). It is recommended that students consult with their adviser when making course selections.

[4] Data Science Statistics and Computational Analytics Concentration students are advised to select STAT 30133/STAT 30043 to meet the prerequisites required in the concentration.

Requirements for B.S. in Data Science with Business Data Analytics Concentration

Below are the general requirements for a Bachelor of Science degree with a major in Data Science, followed by specific requirements for the Business Data Analytics Concentration. Below those is a recommended eight-semester plan to achieve those requirements in a timely fashion.

Requirements for B.S. in Data Science

Each student in Data Science is required to complete 120 hours of coursework including the state minimum core (http://catalog.uark.edu/undergraduatecatalog/gened/stateminimum/). To be eligible for graduation, all students must complete at least 60 hours of Data Science (DTSC) Core required classes at the University of Arkansas. Each student in Data Science is also required to complete an additional 20-21 hours (depending on the student's chosen concentration) of required and elective concentration courses to meet the requirements for a concentration.

Additional opportunities are available to enhance the educational experience of students in these areas. Students should consult their academic adviser for recommendations.

State Minimum Core and General Education (36 hours)		
ENGL 10103	Composition I (ACTS Equivalency = ENGL 1013)	3
ENGL 10303	Technical Composition II (ACTS Equivalency = ENGL 1023)	3
MATH 24004	Calculus I (ACTS Equivalency = MATH 2405)	4
Science state minimum electives (two courses with labs)		8
Fine Arts state minimum core		3
Humanities state minimum core		
DASC 21303	Data Privacy & Ethics	3
U.S. History and Government state minimum core		3
HIST 20003	History of the American People to 1877 (ACTS Equivalency = HIST 2113)	
or HIST 201(	History of the American People, 1877 to Present (ACTS Equivalency = HIST 2123)	
or PLSC 200	American National Government (ACTS Equivalency = PLSC 2003)	
Social Science state minimum core electives		6
ECON 21403	Basic Economics: Theory and Practice (represents 3 of the 9 required credit hours for Social Science elective))	3
Data Science Required Core (47 hours)		
DASC 10003	Introduction to Data Science	3
DASC 11004	Programming Languages for Data Science (R, Python)	4
DASC 12004	Introduction to Object Oriented Programming for Data Science (JAVA)	4
DASC 25904	Multivariable Math for Data Scientists	4
DASC 12203	Role of Data Science in Today's World	3
DASC 21103	Principles and Techniques of Data Science	3
DASC 22003	Data Management and Data Base	3
DASC 22103	Data Visualization and Communication (Tableau)	3
DASC 31003	Big Data Analytics with Cloud Computing	3
DASC 32003	Optimization Methods in Data Science	3
DASC 32103	Statistical Learning	3
DASC 48902	Data Science Practicum I	2
DASC 41103	Machine Learning	3
DASC 41203	Social Problems in Data Science and Analytics	3
DASC 49903	Data Science Practicum II	3
Data Science Required Additional Courses		
MATH 25004	Calculus II	4
SEVI 20503	Business Foundations	3
Choose from one of these two-course sequences		6-7
STAT 30133 & STAT 30043	Introduction to Probability and Statistical Methods (Statistical Methods)	
Or		
INEG 23203 & INEG 23104	Probability and Stochastic Processes for Industrial Engineers and Statistics for Industrial Engineers I	
Data Science Concentration Courses		**20-21**

General Electives	**2-4**
Total Hours	**120**

Required Business Data Analytics Concentration Courses

ACCT 20103	Accounting Principles	3
ACCT 20203	Accounting Principles II	3
ISYS 41903	Business Analytics and Visualization	3
ISYS 42903	Business Intelligence	3
Elective Business Data Analytics Concentration Courses (Select 9 hours)		9
ECON 47403	Introduction to Econometrics	
ECON 47503	Forecasting	
FINN 30103	Financial Analysis	
FINN 20403	Principles of Finance	
ISYS 42103	ERP Fundamentals	
MKTG 34303	Introduction to Marketing	
MKTG 36303	Marketing Research	
Total Hours		**21**

Data Science B.S. with Business Data Analytics Concentration Eight-Semester Program

First Year	**Fall**	**Spring**
MATH 24004 Calculus I (ACTS Equivalency = MATH 2405) (Satisfies General Education Outcome 2.1)[1]	4	
ENGL 10103 Composition I (ACTS Equivalency = ENGL 1013) (Satisfies General Education Outcome 1.1)	3	
DASC 10003 Introduction to Data Science	3	
DASC 11004 Programming Languages for Data Science	4	
MATH 25004 Calculus II		4
ECON 21403 Basic Economics: Theory and Practice (Satisfies General Education Outcome 3.3)		3
ENGL 10303 Technical Composition II (ACTS Equivalency = ENGL 1023) (Satisfies General Education Outcome 1.2)		3
DASC 12004 Introduction to Object Oriented Programming for Data Science		4
DASC 12203 Role of Data Science in Today's World		3
Year Total:	14	17

Second Year	**Fall**	**Spring**
DASC 25904 Multivariable Math for Data Scientists	4	
STAT 30133 Introduction to Probability[4] or INEG 23203 Probability and Stochastic Processes for Industrial Engineers	3	
DASC 21103 Principles and Techniques of Data Science	3	
DASC 22103 Data Visualization and Communication	3	
State Minimum Core U.S. History or Government Elective (Satisfies General Education Outcome 4.2)[2]	3	
SEVI 20503 Business Foundations (Data Science Majors-only section)		3
STAT 30043 Statistical Methods[4] or INEG 23104 Statistics for Industrial Engineers I		3-4
DASC 22003 Data Management and Data Base		3
State Minimum Core Natural Science Elective with Lab (Satisfies General Education Outcome 3.4)[2]		4
ACCT 20103 Accounting Principles		3
Year Total:	16	16

Third Year	**Fall**	**Spring**
DASC 21303 Data Privacy & Ethics (Satisfies General Education Outcome 5.1)	3	
DASC 31003 Big Data Analytics with Cloud Computing	3	
ISYS 41903 Business Analytics and Visualization	3	
State Minimum Core Social Sciences Elective (Satisfies General Education Outcomes 3.2 and 3.3)[2]	3	
State Minimum Core Natural Science Elective with Lab (Satisfies General Education Outcome 3.4)[2]	4	
DASC 32003 Optimization Methods in Data Science		3
DASC 32103 Statistical Learning		3
ACCT 20203 Accounting Principles II		3
State Minimum Core Fine Arts Elective (Satisfies General Education Outcome 3.1)[2]		3
State Minimum Core Social Sciences Elective (Satisfies General Education Outcomes 3.3 and 4.1)[2]		3
Year Total:	16	15

Fourth Year	**Fall**	**Spring**
DASC 48902 Data Science Practicum I	2	
DASC 41103 Machine Learning	3	
DASC 41203 Social Problems in Data Science and Analytics	3	
Business Data Analytics Electives	6	
DASC 49903 Data Science Practicum II (Satisfies General Education Outcome 6.1)		3
ISYS 42903 Business Intelligence		3
Business Data Analytics Elective		3
General Education Elective[3]		2-3
Year Total:	14	12

Total Units in Sequence:	**120**

1. Students have demonstrated successful completion of the learning indicators identified for learning outcome 2.1, by meeting the prerequisites for MATH 24004.
2. Students must complete the State Minimum Core requirements (http://catalog.uark.edu/undergraduatecatalog/gened/stateminimum/) as outlined in the Catalog of Studies. The courses that meet the state minimum core also fulfill many of the university's General Education requirements (http://catalog.uark.edu/undergraduatecatalog/gened/generaleducation/), although there are additional considerations to satisfy the general education learning outcomes. Students are encouraged to consult with their academic adviser when making course selections.
3. Students are required to complete 40 hours of upper-division courses (3000-4000 level). It is recommended that students consult with their adviser when making course selections.
4. Data Science Statistics and Computational Analytics Concentration students are advised to select STAT 30133/STAT 30043 to meet the prerequisites required in the concentration.

Requirements for B.S. in Data Science with Computational Analytics Concentration

Below are the general requirements for a Bachelor of Science degree with a major in Data Science, followed by specific requirements for the Computational Analytics Concentration. Below those is a recommended eight-semester plan to achieve those requirements in a timely fashion.

Requirements for B.S. in Data Science

Each student in Data Science is required to complete 120 hours of coursework including the state minimum core (http://catalog.uark.edu/undergraduatecatalog/gened/stateminimum/). To be eligible for graduation, all students must complete at least 60 hours of Data Science (DTSC) Core required classes at the University of Arkansas. Each student in Data Science is also required to complete an additional 20-21 hours (depending on the student's chosen concentration) of required and elective concentration courses to meet the requirements for a concentration.

Additional opportunities are available to enhance the educational experience of students in these areas. Students should consult their academic adviser for recommendations.

State Minimum Core and General Education (36 hours)		
ENGL 10103	Composition I (ACTS Equivalency = ENGL 1013)	3
ENGL 10303	Technical Composition II (ACTS Equivalency = ENGL 1023)	3
MATH 24004	Calculus I (ACTS Equivalency = MATH 2405)	4
Science state minimum electives (two courses with labs)		8
Fine Arts state minimum core		3
Humanities state minimum core		
DASC 21303	Data Privacy & Ethics	3
U.S. History and Government state minimum core		3
HIST 20003	History of the American People to 1877 (ACTS Equivalency = HIST 2113)	
or HIST 201(	History of the American People, 1877 to Present (ACTS Equivalency = HIST 2123)	
or PLSC 200	American National Government (ACTS Equivalency = PLSC 2003)	
Social Science state minimum core electives		6
ECON 21403	Basic Economics: Theory and Practice (represents 3 of the 9 required credit hours for Social Science elective))	3
Data Science Required Core (47 hours)		
DASC 10003	Introduction to Data Science	3
DASC 11004	Programming Languages for Data Science (R, Python)	4
DASC 12004	Introduction to Object Oriented Programming for Data Science (JAVA)	4
DASC 25904	Multivariable Math for Data Scientists	4
DASC 12203	Role of Data Science in Today's World	3
DASC 21103	Principles and Techniques of Data Science	3
DASC 22003	Data Management and Data Base	3
DASC 22103	Data Visualization and Communication (Tableau)	3
DASC 31003	Big Data Analytics with Cloud Computing	3
DASC 32003	Optimization Methods in Data Science	3
DASC 32103	Statistical Learning	3
DASC 48902	Data Science Practicum I	2
DASC 41103	Machine Learning	3
DASC 41203	Social Problems in Data Science and Analytics	3
DASC 49903	Data Science Practicum II	3
Data Science Required Additional Courses		
MATH 25004	Calculus II	4
SEVI 20503	Business Foundations	3
Choose from one of these two-course sequences		6-7
STAT 30133 & STAT 30043	Introduction to Probability and Statistical Methods (Statistical Methods)	
Or		
INEG 23203 & INEG 23104	Probability and Stochastic Processes for Industrial Engineers and Statistics for Industrial Engineers I	
Data Science Concentration Courses		**20-21**
General Electives		**2-4**
Total Hours		**120**

Required Computational Analytics Concentration Courses

DASC 21003	Data Structures & Algorithms	3
CSCE 41403	Data Mining	3
CSCE 46103	Artificial Intelligence	3
Elective Computational Analytics Concentration Courses (Select 12 hours) [1]		12
DASC 45303	Information Retrieval	
CSCE 31903	Programming Paradigms [6]	
CSCE 35103	Software Engineering	
CSCE 40103	Special Topics	
MATH 26103	Discrete Mathematics (Pre-req for CSCE 41303)	
or MATH 2803	Transition to Advanced Mathematics	
CSCE 41303	Algorithms [1]	
CSCE 41203	Programming Challenges [7]	
CSCE 43203	Formal Languages and Computability [1,7]	

CSCE 42503	Concurrent Computing	
CSCE 45203	Database Management Systems [2]	
CSCE 47503	Computer Networks [7]	
CSCE 48103	Computer Graphics [7]	
CSCE 48503	Information Security [7]	
Note: Other courses from CSCE and/or other concentrations of DASC can also be added to the concentration electives.		
Total Hours		**21**

Data Science B.S. with Computational Analytics Concentration Eight-Semester Program

First Year	Fall	Spring
MATH 24004 Calculus I (ACTS Equivalency = MATH 2405) (Satisfies General Education Outcome 2.1)[2]	4	
ENGL 10103 Composition I (ACTS Equivalency = ENGL 1013) (Satisfies General Education Outcome 1.1)	3	
DASC 10003 Introduction to Data Science	3	
DASC 11004 Programming Languages for Data Science	4	
MATH 25004 Calculus II		4
ECON 21403 Basic Economics: Theory and Practice (Satisfies General Education Outcome 3.3)		3
ENGL 10303 Technical Composition II (ACTS Equivalency = ENGL 1023) (Satisfies General Education Outcome 1.2)		3
DASC 12004 Introduction to Object Oriented Programming for Data Science		4
DASC 12203 Role of Data Science in Today's World		3
Year Total:	14	17

Second Year	Fall	Spring
DASC 25904 Multivariable Math for Data Scientists	4	
STAT 30133 Introduction to Probability[4] or INEG 23203 Probability and Stochastic Processes for Industrial Engineers	3	
DASC 22103 Data Visualization and Communication	3	
DASC 21103 Principles and Techniques of Data Science	3	
State Minimum Core U.S. History or Government Elective (Satisfies General Education Outcome 4.2)[2]	3	
SEVI 20503 Business Foundations (Data Science Majors-only section)		3
STAT 30043 Statistical Methods[5] or INEG 23104 Statistics for Industrial Engineers I		3-4
DASC 22003 Data Management and Data Base		3
DASC 21003 Data Structures & Algorithms		3
State Minimum Core Natural Science Elective with Lab (Satisfies General Education Outcome 3.4)		4
Year Total:	16	16

Third Year	Fall	Spring
DASC 21303 Data Privacy & Ethics (Satisfies General Education Outcome 5.1)	3	
DASC 31003 Big Data Analytics with Cloud Computing	3	
CSCE 41403 Data Mining	3	
State Minimum Core Natural Science Elective with Lab (Satisfies General Education Outcome 3.4)	4	
State Minimum Core Social Sciences Elective (Satisfies General Education Outcomes 3.2 and 3.3)[3]	3	
DASC 32003 Optimization Methods in Data Science		3
DASC 32103 Statistical Learning		3
CSCE 46103 Artificial Intelligence		3
State Minimum Core Fine Arts Elective (Satisfies General Education Outcome 3.1)[3]		3
State Minimum Core Social Sciences Elective (Satisfies General Education Outcomes 3.3 and 4.1)[3]		3
Year Total:	16	15

Fourth Year	Fall	Spring
DASC 48902 Data Science Practicum I	2	
DASC 41103 Machine Learning	3	
DASC 41203 Social Problems in Data Science and Analytics	3	
Computational Analytics Elective	3	
Computational Analytics Elective	3	
DASC 49903 Data Science Practicum II (Satisfies General Education Outcome 6.1)		3
Computational Analytics Elective		3
Computational Analytics Elective		3
General Education Elective[4]		2-3
Year Total:	14	12

Total Units in Sequence:	**120**

1 MATH 26103 or MATH 28003 is a pre-req for CSCE 41303 and CSCE 43203.

2 Students have demonstrated successful completion of the learning indicators identified for learning outcome 2.1, by meeting the prerequisites for MATH 24004.

3 Students must complete the State Minimum Core requirements (http://catalog.uark.edu/undergraduatecatalog/gened/stateminimum/) as outlined in the Catalog of Studies. The courses that meet the state minimum core also fulfill many of the university's General Education requirements (http://catalog.uark.edu/undergraduatecatalog/gened/generaleducation/), although there are additional considerations to satisfy the general education learning outcomes. Students are

encouraged to consult with their academic adviser when making course selections.

[4] Students are required to complete 40 hours of upper-division courses (3000-4000 level). It is recommended that students consult with their adviser when making course selections.

[5] Data Science Statistics and Computational Analytics Concentration students are advised to select STAT 30133/STAT 30043 to meet the prerequisites required in the concentration.

[6] CSCE 31903 is a pre-req for CSCE 41203, CSCE 43203, CSCE 45203, CSCE 47503, CSCE 48103.

[7] Pre-req for CSCE 41203 is CSCE 31903 or CSCE 319H3 with a grade of C or better.

Requirements for B.S. with Cybersecurity Data Analytics Concentration

Below are the general requirements for a Bachelor of Science degree with a major in Data Science, followed by specific requirements for the Cybersecurity Data Analytics Concentration. Below those is a recommended eight-semester plan to achieve those requirements in a timely fashion.

Requirements for B.S. in Data Science

Each student in Data Science is required to complete 120 hours of coursework including the state minimum core (http://catalog.uark.edu/undergraduatecatalog/gened/stateminimum/). To be eligible for graduation, all students must complete at least 60 hours of Data Science (DTSC) Core required classes at the University of Arkansas. Each student in Data Science is also required to complete an additional 20-21 hours (depending on the student's chosen concentration) of required and elective concentration courses to meet the requirements for a concentration.

Additional opportunities are available to enhance the educational experience of students in these areas. Students should consult their academic adviser for recommendations.

State Minimum Core and General Education (36 hours)		
ENGL 10103	Composition I (ACTS Equivalency = ENGL 1013)	3
ENGL 10303	Technical Composition II (ACTS Equivalency = ENGL 1023)	3
MATH 24004	Calculus I (ACTS Equivalency = MATH 2405)	4
Science state minimum electives (two courses with labs)		8
Fine Arts state minimum core		3
Humanities state minimum core		
DASC 21303	Data Privacy & Ethics	3
U.S. History and Government state minimum core		3
HIST 20003	History of the American People to 1877 (ACTS Equivalency = HIST 2113)	
or HIST 201(	History of the American People, 1877 to Present (ACTS Equivalency = HIST 2123)	
or PLSC 200	American National Government (ACTS Equivalency = PLSC 2003)	
Social Science state minimum core electives		6
ECON 21403	Basic Economics: Theory and Practice (represents 3 of the 9 required credit hours for Social Science elective))	3
Data Science Required Core (47 hours)		
DASC 10003	Introduction to Data Science	3
DASC 11004	Programming Languages for Data Science (R, Python)	4
DASC 12004	Introduction to Object Oriented Programming for Data Science (JAVA)	4
DASC 25904	Multivariable Math for Data Scientists	4
DASC 12203	Role of Data Science in Today's World	3
DASC 21103	Principles and Techniques of Data Science	3
DASC 22003	Data Management and Data Base	3
DASC 22103	Data Visualization and Communication (Tableau)	3
DASC 31003	Big Data Analytics with Cloud Computing	3
DASC 32003	Optimization Methods in Data Science	3
DASC 32103	Statistical Learning	3
DASC 48902	Data Science Practicum I	2
DASC 41103	Machine Learning	3
DASC 41203	Social Problems in Data Science and Analytics	3
DASC 49903	Data Science Practicum II	3
Data Science Required Additional Courses		
MATH 25004	Calculus II	4
SEVI 20503	Business Foundations	3
Choose from one of these two-course sequences		6-7
STAT 30133 & STAT 30043	Introduction to Probability and Statistical Methods (Statistical Methods)	
Or		
INEG 23203 & INEG 23104	Probability and Stochastic Processes for Industrial Engineers and Statistics for Industrial Engineers I	
Data Science Concentration Courses		**20-21**
General Electives		**2-4**
Total Hours		**120**

Required Cybersecurity Data Analytics Concentration Courses

Required Courses:		15
ACCT 20103	Accounting Principles	
or ACCT 20	Accounting Principles II	
DASC 32203	Cyber Crime and Cyber Terrorism (Cyber Crime and Cyber Terrorism)	
ISYS 40103	Principles of Data and Cybersecurity	
ISYS 40203	Network and Data Security in a Changing World	
ISYS 40403	Cybersecurity, Crime and Data Privacy Law Fundamentals	
Elective Cybersecurity and Data Concentration Courses (Choose 2 of the following):		6
ISYS 40303	Advanced Information Security Management	
ISYS 40503	Advanced Cybersecurity, Crime and Privacy Law	
ISYS 41703	Blockchain Fundamentals	
Total Hours		**21**

Data Science B.S. with Cybersecurity Data Analytics Concentration Eight-Semester Plan

First Year	**Units**	
	Fall	**Spring**
MATH 24004 Calculus I (ACTS Equivalency = MATH 2405) (Satisfies General Education Outcome 2.1)[1]	4	

ENGL 10103 Composition I (ACTS Equivalency = ENGL 1013) (Satisfies General Education Outcome 1.1)	3	
DASC 10003 Introduction to Data Science	3	
DASC 11004 Programming Languages for Data Science	4	
MATH 25004 Calculus II		4
ECON 21403 Basic Economics: Theory and Practice (Satisfies General Education Outcome 3.3)		3
ENGL 10303 Technical Composition II (ACTS Equivalency = ENGL 1023) (Satisfies General Education Outcome 1.2)		3
DASC 12004 Introduction to Object Oriented Programming for Data Science		4
DASC 12203 Role of Data Science in Today's World		3
Year Total:	14	17

Second Year	**Fall**	**Spring**
DASC 25904 Multivariable Math for Data Scientists	4	
STAT 30133 Introduction to Probability[4] or INEG 23203 Probability and Stochastic Processes for Industrial Engineers	3	
DASC 22103 Data Visualization and Communication	3	
DASC 21103 Principles and Techniques of Data Science	3	
State Minimum Core U.S. History or Government Elective (Satisfies General Education Outcome 4.2)[2]	3	
SEVI 20503 Business Foundations (Data Science Majors-only section)		3
STAT 30043 Statistical Methods[4] or INEG 23104 Statistics for Industrial Engineers I		3-4
State Minimum Core Natural Science Elective with Lab (Satisfies General Education Outcome 3.4)[2]		4
DASC 22003 Data Management and Data Base		3
ACCT 20103 Accounting Principles or ACCT 20203 Accounting Principles II		3
Year Total:	16	16

Third Year	**Fall**	**Spring**
DASC 21303 Data Privacy & Ethics (Satisfies General Education Outcome 5.1)	3	
DASC 31003 Big Data Analytics with Cloud Computing	3	
DASC 32203 Cyber Crime and Cyber Terrorism (Cyber Crime and Cyber Terrorism)	3	
State Minimum Core Social Sciences Elective (General Education Outcomes 3.2 and 3.3)[2]	3	
State Minimum Core Natural Science Elective with Lab (Satisfies General Education Outcome 3.4)[2]	4	
DASC 32003 Optimization Methods in Data Science		3
DASC 32103 Statistical Learning		3
ISYS 40103 Principles of Data and Cybersecurity		3
State Minimum Core Social Sciences Elective (Satisfied General Education Outcomes 3.3 and 4.1)[2]		3
State Minimum Core Fine Arts Elective (Satisfies General Education Outcome 3.1)[2]		3
Year Total:	16	15

Fourth Year	**Fall**	**Spring**
DASC 48902 Data Science Practicum I	2	
DASC 41103 Machine Learning	3	
DASC 41203 Social Problems in Data Science and Analytics	3	
ISYS 40203 Network and Data Security in a Changing World	3	
ISYS 40403 Cybersecurity, Crime and Data Privacy Law Fundamentals	3	
DASC 49903 Data Science Practicum II (Satisfies General Education Outcome 6.1)		3
Concentration Elective		3
Concentration Elective		3
General Education Elective[3]		2-3
Year Total:	14	12

Total Units in Sequence:	**120**

1 Students have demonstrated successful completion of the learning indicators identified for learning outcome 2.1 by meeting the prerequisites for MATH 24004 (https://catalog.uark.edu/search/?P=MATH%202554).

2 Students must complete the State Minimum Core requirements (http://catalog.uark.edu/undergraduatecatalog/gened/stateminimum/) as outlined in the Catalog of Studies. The courses that meet the state minimum core also fulfill many of the university's General Education requirements (http://catalog.uark.edu/undergraduatecatalog/gened/generaleducation/), although there are additional considerations to satisfy the general education learning outcomes. Students are encouraged to consult with their academic adviser when making course selections.

3 Students are required to complete 40 hours of upper-division courses (3000-4000 level). It is recommended that students consult with their adviser when making course selections.

4 Data Science Statistics and Computational Analytics Concentration students are advised to select STAT 30133/STAT 30043 to meet the prerequisites required in the concentration.

Requirements for B.S. in Data Science with Data Science Statistics Concentration

Below are the general requirements for a Bachelor of Science degree with a major in Data Science, followed by specific requirements for the Data

Science Statistics Concentration. Below those is a recommended eight-semester plan to achieve those requirements in a timely fashion.

Requirements for B.S. in Data Science

Each student in Data Science is required to complete 120 hours of coursework including the state minimum core (http://catalog.uark.edu/undergraduatecatalog/gened/stateminimum/). To be eligible for graduation, all students must complete at least 60 hours of Data Science (DTSC) Core required classes at the University of Arkansas. Each student in Data Science is also required to complete an additional 20-21 hours (depending on the student's chosen concentration) of required and elective concentration courses to meet the requirements for a concentration.

Additional opportunities are available to enhance the educational experience of students in these areas. Students should consult their academic adviser for recommendations.

State Minimum Core and General Education (36 hours)		
ENGL 10103	Composition I (ACTS Equivalency = ENGL 1013)	3
ENGL 10303	Technical Composition II (ACTS Equivalency = ENGL 1023)	3
MATH 24004	Calculus I (ACTS Equivalency = MATH 2405)	4
Science state minimum electives (two courses with labs)		8
Fine Arts state minimum core		3
Humanities state minimum core		
DASC 21303	Data Privacy & Ethics	3
U.S. History and Government state minimum core		3
HIST 20003	History of the American People to 1877 (ACTS Equivalency = HIST 2113)	
or HIST 201(	History of the American People, 1877 to Present (ACTS Equivalency = HIST 2123)	
or PLSC 200	American National Government (ACTS Equivalency = PLSC 2003)	
Social Science state minimum core electives		6
ECON 21403	Basic Economics: Theory and Practice (represents 3 of the 9 required credit hours for Social Science elective))	3
Data Science Required Core (47 hours)		
DASC 10003	Introduction to Data Science	3
DASC 11004	Programming Languages for Data Science (R, Python)	4
DASC 12004	Introduction to Object Oriented Programming for Data Science (JAVA)	4
DASC 25904	Multivariable Math for Data Scientists	4
DASC 12203	Role of Data Science in Today's World	3
DASC 21103	Principles and Techniques of Data Science	3
DASC 22003	Data Management and Data Base	3
DASC 22103	Data Visualization and Communication (Tableau)	3
DASC 31003	Big Data Analytics with Cloud Computing	3
DASC 32003	Optimization Methods in Data Science	3
DASC 32103	Statistical Learning	3
DASC 48902	Data Science Practicum I	2
DASC 41103	Machine Learning	3
DASC 41203	Social Problems in Data Science and Analytics	3
DASC 49903	Data Science Practicum II	3
Data Science Required Additional Courses		
MATH 25004	Calculus II	4
SEVI 20503	Business Foundations	3
Choose from one of these two-course sequences		6-7
STAT 30133 & STAT 30043	Introduction to Probability and Statistical Methods (Statistical Methods)	
Or		
INEG 23203 & INEG 23104	Probability and Stochastic Processes for Industrial Engineers and Statistics for Industrial Engineers I	
Data Science Concentration Courses		**20-21**
General Electives		**2-4**
Total Hours		**120**

Required Data Science Statistics Concentration Courses

STAT 31133	Introduction to Mathematical Statistics	3
STAT 43733	Experimental Design	3
STAT 40133	Statistical Forecasting and Prediction (Statistical Forecasting and Prediction)	3
STAT 43333	Analysis of Categorical Responses	3
Elective Data Science Statistics Concentration (Select 9 hours)		9
STAT 40233	Bayesian Methods (Bayesian Methods)	
STAT 40333	Nonparametric Statistical Methods	
CSCE 46103	Artificial Intelligence	
GEOS 30103	Foundations of Geospatial Data Analysis	
GEOS 35403	Geospatial Applications and Information Science	
GEOS 35603	Geospatial Data Mining	
Total Hours		**21**

Data Science B.S. with Data Science Statistics Concentration Eight-Semester Program

First Year	**Units**	
	Fall	**Spring**
MATH 24004 Calculus I (ACTS Equivalency = MATH 2405) (Satisfies General Education Outcome 2.1)[1]	4	
ENGL 10103 Composition I (ACTS Equivalency = ENGL 1013) (Satisfies General Education Outcome 1.1)	3	
DASC 10003 Introduction to Data Science	3	
DASC 11004 Programming Languages for Data Science	4	
MATH 25004 Calculus II		4
ECON 21403 Basic Economics: Theory and Practice (Satisfies General Education Outcome 3.3)		3
ENGL 10303 Technical Composition II (ACTS Equivalency = ENGL 1023) (Satisfies General Education Outcome 1.2)		3
DASC 12004 Introduction to Object Oriented Programming for Data Science		4

DASC 12203 Role of Data Science in Today's World		3
Year Total:	14	17

Second Year	Units	
	Fall	Spring
DASC 25904 Multivariable Math for Data Scientists	4	
STAT 30133 Introduction to Probability[4] or INEG 23203 Probability and Stochastic Processes for Industrial Engineers	3	
DASC 22103 Data Visualization and Communication	3	
DASC 21103 Principles and Techniques of Data Science	3	
State Minimum Core U.S. History or Government Elective (Satisfies General Education Outcome 4.2)[2]	3	
SEVI 20503 Business Foundations (Data Science Majors-only section)		3
STAT 30043 Statistical Methods[4] or INEG 23104 Statistics for Industrial Engineers I		3-4
State Minimum Core Natural Science Elective with Lab (Satisfies General Education Outcome 3.4)[2]		4
DASC 22003 Data Management and Data Base		3
STAT 31133 Introduction to Mathematical Statistics		3
Year Total:	16	16

Third Year	Units	
	Fall	Spring
DASC 21303 Data Privacy & Ethics (Satisfies General Education Outcome 5.1)	3	
DASC 31003 Big Data Analytics with Cloud Computing	3	
State Minimum Core Social Sciences Elective (Satisfies General Education Outcomes 3.2 and 3.3)[2]	3	
State Minimum Core Natural Science Elective with Lab (Satisfies General Education Outcome 3.4) [2]	4	
STAT 43733 Experimental Design	3	
DASC 32003 Optimization Methods in Data Science		3
DASC 32103 Statistical Learning		3
STAT 43333 Analysis of Categorical Responses		3
State Minimum Core Social Sciences Elective (Satisfies General Education Outcomes 3.3 and 4.1)[2]		3
State Minimum Core Fine Arts Elective (Satisfies General Education Outcome 3.1)[2]		3
Year Total:	16	15

Fourth Year	Units	
	Fall	Spring
DASC 48902 Data Science Practicum I	2	
DASC 41103 Machine Learning	3	
DASC 41203 Social Problems in Data Science and Analytics	3	
STAT 40133 Statistical Forecasting and Prediction (Statistical Forecasting and Prediction)	3	
Data Science Statistics Concentration Elective	3	
DASC 49903 Data Science Practicum II (Satisfies General Education Outcome 6.1)		3
Data Science Statistics Concentration Elective		3
Data Science Statistics Concentration Elective		3
General Elective[3]		2-3
Year Total:	14	12

Total Units in Sequence:	**120**

1 Students have demonstrated successful completion of the learning indicators identified for learning outcome 2.1, by meeting the prerequisites for MATH 24004.

2 Students must complete the State Minimum Core requirements (http://catalog.uark.edu/undergraduatecatalog/gened/stateminimum/) as outlined in the Catalog of Studies. The courses that meet the state minimum core also fulfill many of the university's General Education requirements (http://catalog.uark.edu/undergraduatecatalog/gened/generaleducation/), although there are additional considerations to satisfy the general education learning outcomes. Students are encouraged to consult with their academic adviser when making course selections.

3 Students are required to complete 40 hours of upper-division courses (3000-4000 level). It is recommended that students consult with their adviser when making course selections.

4 Data Science Statistics and Computational Analytics Concentration students are advised to select STAT 30133/STAT 30043 to meet the prerequisites required in the concentration.

Requirements for B.S. with Economics Analytics Concentration

Requirements for B.S. in Data Science

Each student in Data Science is required to complete 120 hours of coursework including the state minimum core (http://catalog.uark.edu/undergraduatecatalog/gened/stateminimum/). To be eligible for graduation, all students must complete at least 60 hours of Data Science (DTSC) Core required classes at the University of Arkansas. Each student in Data Science is also required to complete an additional 20-21 hours (depending on the student's chosen concentration) of required and elective concentration courses to meet the requirements for a concentration.

Additional opportunities are available to enhance the educational experience of students in these areas. Students should consult their academic adviser for recommendations.

State Minimum Core and General Education (36 hours)		
ENGL 10103	Composition I (ACTS Equivalency = ENGL 1013)	3
ENGL 10303	Technical Composition II (ACTS Equivalency = ENGL 1023)	3
MATH 24004	Calculus I (ACTS Equivalency = MATH 2405)	4
Science state minimum electives (two courses with labs)		8
Fine Arts state minimum core		3

Humanities state minimum core		
DASC 21303	Data Privacy & Ethics	3
U.S. History and Government state minimum core		3
HIST 20003	History of the American People to 1877 (ACTS Equivalency = HIST 2113)	
or HIST 201(	History of the American People, 1877 to Present (ACTS Equivalency = HIST 2123)	
or PLSC 200	American National Government (ACTS Equivalency = PLSC 2003)	
Social Science state minimum core electives		6
ECON 21403	Basic Economics: Theory and Practice (represents 3 of the 9 required credit hours for Social Science elective))	3
Data Science Required Core (47 hours)		
DASC 10003	Introduction to Data Science	3
DASC 11004	Programming Languages for Data Science (R, Python)	4
DASC 12004	Introduction to Object Oriented Programming for Data Science (JAVA)	4
DASC 25904	Multivariable Math for Data Scientists	4
DASC 12203	Role of Data Science in Today's World	3
DASC 21103	Principles and Techniques of Data Science	3
DASC 22003	Data Management and Data Base	3
DASC 22103	Data Visualization and Communication (Tableau)	3
DASC 31003	Big Data Analytics with Cloud Computing	3
DASC 32003	Optimization Methods in Data Science	3
DASC 32103	Statistical Learning	3
DASC 48902	Data Science Practicum I	2
DASC 41103	Machine Learning	3
DASC 41203	Social Problems in Data Science and Analytics	3
DASC 49903	Data Science Practicum II	3
Data Science Required Additional Courses		
MATH 25004	Calculus II	4
SEVI 20503	Business Foundations	3
Choose from one of these two-course sequences		6-7
STAT 30133 & STAT 30043	Introduction to Probability and Statistical Methods (Statistical Methods)	
Or		
INEG 23203 & INEG 23104	Probability and Stochastic Processes for Industrial Engineers and Statistics for Industrial Engineers I	
Data Science Concentration Courses		**20-21**
General Electives		**2-4**
Total Hours		**120**

Required Economic Analytics Concentration Courses

ECON 30303	Intermediate Microeconomics	3
ECON 31303	Intermediate Macroeconomics	3
ECON 47403	Introduction to Econometrics	3
ECON 47503	Forecasting	3
ECON 47603	Economic Analytics	3
Elective Economic Analytics Concentration Courses (Select 6 hours)		6
ECON 31403	Economics of Poverty and Inequality	
ECON 33303	Public Economics	
ECON 34303	Money and Banking	
ECON 35303	Labor Economics	
ECON 38403	Economics of the Developing World	
ECON 38503	Emerging Markets	
ECON 43303	Economics of Organizations	
ECON 44203	Behavioral Economics	
ECON 44303	Experimental Economics	
ECON 46303	International Trade	
ECON 46403	International Macroeconomics and Finance	
Total Hours		**21**

Eight-Semester Plan
Data Science B.S. with Economic Analytics Concentration
Eight-Semester Program

First Year		**Units**
	Fall	**Spring**
MATH 24004 Calculus I (ACTS Equivalency = MATH 2405) (Satisifies General Education Outcome 2.1)[1]	4	
ENGL 10103 Composition I (ACTS Equivalency = ENGL 1013) (Satisifies General Education Outcome 1.1)	3	
DASC 10003 Introduction to Data Science	3	
DASC 11004 Programming Languages for Data Science	4	
General Elective	3	
MATH 25004 Calculus II		4
ECON 21403 Basic Economics: Theory and Practice (Satisfies General Education Outcome 3.3)		3
ENGL 10303 Technical Composition II (ACTS Equivalency = ENGL 1023) (Satisifies General Education Outcome 1.2)		3
DASC 12004 Introduction to Object Oriented Programming for Data Science		4
DASC 12203 Role of Data Science in Today's World		3
Year Total:	17	17

Second Year		**Units**
	Fall	**Spring**
DASC 25904 Multivariable Math for Data Scientists	4	
STAT 30133 Introduction to Probability[4] or INEG 23203 Probability and Stochastic Processes for Industrial Engineers	3	
DASC 22103 Data Visualization and Communication	3	
DASC 21103 Principles and Techniques of Data Science	3	
State Minimum Core U.S. History or Government Elective (Satisfies General Education Outcome 4.2)[2]	3	

SEVI 20503 Business Foundations (DASC-only section required)		3
STAT 30043 Statistical Methods[4] or INEG 23104 Statistics for Industrial Engineers I		3-4
State Minimum Core Natural Science Elective with Lab (Satisfies General Education Outcome 3.4)[2]		4
DASC 22003 Data Management and Data Base		3
ECON 30303 Intermediate Microeconomics		3
Year Total:	16	16

Third Year	Fall	Spring
DASC 21303 Data Privacy & Ethics (Satisfies General Education Outcome 5.1)	3	
DASC 31003 Big Data Analytics with Cloud Computing	3	
State Minimum Core Social Sciences Elective (Satisfies General Education Outcomes 3.2 and 3.3)[2]	3	
State Minimum Core Natural Science Elective with Lab (Satisfies General Education Outcome 3.4)[2]	4	
ECON 31303 Intermediate Macroeconomics	3	
DASC 32003 Optimization Methods in Data Science		3
DASC 32103 Statistical Learning		3
ECON 47403 Introduction to Econometrics		3
State Minimum Core Fine Arts Elective (Satisfies General Education Outcome 3.1)[2]		3
State Minimum Core Social Sciences Elective (Satisfies General Education Outcomes 3.3 and 4.1)[2]		3
Year Total:	16	15

Fourth Year	Fall	Spring
DASC 48902 Data Science Practicum I	2	
DASC 41103 Machine Learning	3	
DASC 41203 Social Problems in Data Science and Analytics	3	
ECON 47503 Forecasting	3	
ECON 47603 Economic Analytics	3	
DASC 49903 Data Science Practicum II (Satisifies General Education Outcome 6.1)		3
Economic Analytics Concentration Elective		3
Economic Analytics Concentration Elective		3
Year Total:	14	9

Total Units in Sequence:	**120**

1 Students have demonstrated successful completion of the learning indicators identified for learning outcome 2.1, by meeting the prerequisites for MATH 24004.

2 Students must complete the State Minimum Core requirements (http://catalog.uark.edu/undergraduatecatalog/gened/stateminimum/) as outlined in the Catalog of Studies. The courses that meet the state minimum core also fulfill many of the university's General Education requirements (http://catalog.uark.edu/undergraduatecatalog/gened/generaleducation/), although there are additional considerations to satisfy the general education learning outcomes. Students are encouraged to consult with their academic adviser when making course selections.

3 Students are required to complete 40 hours of upper-division courses (3000-4000 level). It is recommended that students consult with their adviser when making course selections.

4 Data Science Statistics and Computational Analytics Concentration students are advised to select STAT 30133/STAT 30043 to meet the prerequisites required in the concentration.

Requirements for B.S. with Financial Data Analytics Concentration

Requirements for B.S. in Data Science

Each student in Data Science is required to complete 120 hours of coursework including the state minimum core (http://catalog.uark.edu/undergraduatecatalog/gened/stateminimum/). To be eligible for graduation, all students must complete at least 60 hours of Data Science (DTSC) Core required classes at the University of Arkansas. Each student in Data Science is also required to complete an additional 20-21 hours (depending on the student's chosen concentration) of required and elective concentration courses to meet the requirements for a concentration.

Additional opportunities are available to enhance the educational experience of students in these areas. Students should consult their academic adviser for recommendations.

State Minimum Core and General Education (36 hours)		
ENGL 10103	Composition I (ACTS Equivalency = ENGL 1013)	3
ENGL 10303	Technical Composition II (ACTS Equivalency = ENGL 1023)	3
MATH 24004	Calculus I (ACTS Equivalency = MATH 2405)	4
Science state minimum electives (two courses with labs)		8
Fine Arts state minimum core		3
Humanities state minimum core		
DASC 21303	Data Privacy & Ethics	3
U.S. History and Government state minimum core		3
HIST 20003	History of the American People to 1877 (ACTS Equivalency = HIST 2113)	
or HIST 201(	History of the American People, 1877 to Present (ACTS Equivalency = HIST 2123)	
or PLSC 200	American National Government (ACTS Equivalency = PLSC 2003)	
Social Science state minimum core electives		6
ECON 21403	Basic Economics: Theory and Practice (represents 3 of the 9 required credit hours for Social Science elective))	3
Data Science Required Core (47 hours)		
DASC 10003	Introduction to Data Science	3
DASC 11004	Programming Languages for Data Science (R, Python)	4
DASC 12004	Introduction to Object Oriented Programming for Data Science (JAVA)	4
DASC 25904	Multivariable Math for Data Scientists	4
DASC 12203	Role of Data Science in Today's World	3

DASC 21103	Principles and Techniques of Data Science	3
DASC 22003	Data Management and Data Base	3
DASC 22103	Data Visualization and Communication (Tableau)	3
DASC 31003	Big Data Analytics with Cloud Computing	3
DASC 32003	Optimization Methods in Data Science	3
DASC 32103	Statistical Learning	3
DASC 48902	Data Science Practicum I	2
DASC 41103	Machine Learning	3
DASC 41203	Social Problems in Data Science and Analytics	3
DASC 49903	Data Science Practicum II	3
Data Science Required Additional Courses		
MATH 25004	Calculus II	4
SEVI 20503	Business Foundations	3
Choose from one of these two-course sequences		6-7
STAT 30133 & STAT 30043	Introduction to Probability and Statistical Methods (Statistical Methods)	
Or		
INEG 23203 & INEG 23104	Probability and Stochastic Processes for Industrial Engineers and Statistics for Industrial Engineers I	
Data Science Concentration Courses		**20-21**
General Electives		**2-4**
Total Hours		**120**

Required Financial Data Analytics Concentration Courses

ACCT 20103	Accounting Principles	3
FINN 20403	Principles of Finance [5]	3
FINN 31003	Financial Modeling [6]	3
FINN 43203	Financial Data Analytics I [13]	3
Elective Financial Data Analytics Courses (Select 9 hours)		9
FINN 30003	Personal Financial Management	
FINN 30103	Financial Analysis [6]	
FINN 30503	Financial Markets and Institutions [11]	
FINN 30603	Investments [6,12]	
FINN 31303	Commercial Banking [6]	
FINN 36003	Corporate Finance [6,7]	
FINN 36203	Risk Management	
FINN 37003	International Finance	
FINN 39303	Real Estate Principles	
FINN 41603	Advanced Financial Modeling [8]	
FINN 42403	New Venture Finance [9]	
FINN 43303	Financial Data Analytics II [10]	
Total Hours		**21**

Data Science B.S. with Financial Data Analytics Concentration Eight-Semester Program

First Year		Units
	Fall	Spring
MATH 24004 Calculus I (ACTS Equivalency = MATH 2405) (Satisifies General Education Outcome 2.1)[1]	4	
ENGL 10103 Composition I (ACTS Equivalency = ENGL 1013) (Satisifies General Education Outcome 1.1)	3	
DASC 10003 Introduction to Data Science	3	
DASC 11004 Programming Languages for Data Science	4	
General Elective	3	
MATH 25004 Calculus II		4
ECON 21403 Basic Economics: Theory and Practice (Satisfies General Education Outcome 3.3)		3
ENGL 10303 Technical Composition II (ACTS Equivalency = ENGL 1023) (Satisifies General Education Outcome 1.2)		3
DASC 12004 Introduction to Object Oriented Programming for Data Science		4
DASC 12203 Role of Data Science in Today's World		3
Year Total:	17	17

Second Year		Units
	Fall	Spring
DASC 25904 Multivariable Math for Data Scientists	4	
STAT 30133 Introduction to Probability[4] or INEG 23203 Probability and Stochastic Processes for Industrial Engineers	3	
DASC 22103 Data Visualization and Communication	3	
DASC 21103 Principles and Techniques of Data Science	3	
State Minimum Core U.S. History or Government Elective (Satisfies General Education Outcome 4.2)[2]	3	
SEVI 20503 Business Foundations (DASC-only section required)		3
STAT 30043 Statistical Methods[4] or INEG 23104 Statistics for Industrial Engineers I		3-4
State Minimum Core Natural Science Elective with Lab (Satisfies General Education Outcome 3.4)[2]		4
DASC 22003 Data Management and Data Base		3
ECON 30303 Intermediate Microeconomics		3
Year Total:	16	16

Third Year		Units
	Fall	Spring
DASC 21303 Data Privacy & Ethics (Satisfies General Education Outcome 5.1)	3	
DASC 31003 Big Data Analytics with Cloud Computing	3	
State Minimum Core Social Sciences Elective (Satisfies General Education Outcomes 3.2 and 3.3)[2]	3	
State Minimum Core Natural Science Elective with Lab (Satisfies General Education Outcome 3.4)[2]	4	
ECON 31303 Intermediate Macroeconomics	3	

DASC 32003 Optimization Methods in Data Science		3
DASC 32103 Statistical Learning		3
ECON 47403 Introduction to Econometrics		3
State Minimum Core Fine Arts Elective (Satisfies General Education Outcome 3.1)[2]		3
State Minimum Core Social Sciences Elective (Satisfies General Education Outcomes 3.3 and 4.1)[2]		3
Year Total:	16	15

Fourth Year	Units	
	Fall	Spring
DASC 48902 Data Science Practicum I	2	
DASC 41103 Machine Learning	3	
DASC 41203 Social Problems in Data Science and Analytics	3	
ECON 47503 Forecasting	3	
ECON 47603 Economic Analytics	3	
DASC 49903 Data Science Practicum II (Satisifies General Education Outcome 6.1)		3
Economic Analytics Concentration Elective		3
Economic Analytics Concentration Elective		3
Year Total:	14	9

Total Units in Sequence:	**120**

1 Students have demonstrated successful completion of the learning indicators identified for learning outcome 2.1, by meeting the prerequisites for MATH 24004.

2 Students must complete the State Minimum Core requirements (http://catalog.uark.edu/undergraduatecatalog/gened/stateminimum/) as outlined in the Catalog of Studies. The courses that meet the state minimum core also fulfill many of the university's General Education requirements (http://catalog.uark.edu/undergraduatecatalog/gened/generaleducation/), although there are additional considerations to satisfy the general education learning outcomes. Students are encouraged to consult with their academic adviser when making course selections.

3 Students are required to complete 40 hours of upper-division courses (3000-4000 level). It is recommended that students consult with their adviser when making course selections.

4 Data Science Statistics and Computational Analytics Concentration students are advised to select STAT 30133/STAT 30043 to meet the prerequisites required in the concentration.

5 Prerequisites: BUSI 10303 or STAT 30043 or INEG 23104 or equivalent and ACCT 20103 and ECON 21403.

6 Prerequisite: FINN 20403.

7 Prerequisites: FINN 30103.

8 Prerequisites: FINN 30103 or FINN 31003.

9 Prerequisite: Junior standing.

10 Prerequisite: FINN 43203.

11 Prerequisite: ECON 21403.

12 Corequisite: FINN 30103.

13 Prerequisite: FINN 41603 or DASC 21103.

Requirements for B.S. in Data Science with Geospatial Data Analytics Concentration

Below are the general requirements for a Bachelor of Science degree with a major in Data Science, followed by specific requirements for the Geospatial Data Analytics Concentration. Below those is a recommended eight-semester plan to achieve those requirements in a timely fashion.

Requirements for B.S. in Data Science

Each student in Data Science is required to complete 120 hours of coursework including the state minimum core (http://catalog.uark.edu/undergraduatecatalog/gened/stateminimum/). To be eligible for graduation, all students must complete at least 60 hours of Data Science (DTSC) Core required classes at the University of Arkansas. Each student in Data Science is also required to complete an additional 20-21 hours (depending on the student's chosen concentration) of required and elective concentration courses to meet the requirements for a concentration.

Additional opportunities are available to enhance the educational experience of students in these areas. Students should consult their academic adviser for recommendations.

State Minimum Core and General Education (36 hours)		
ENGL 10103	Composition I (ACTS Equivalency = ENGL 1013)	3
ENGL 10303	Technical Composition II (ACTS Equivalency = ENGL 1023)	3
MATH 24004	Calculus I (ACTS Equivalency = MATH 2405)	4
Science state minimum electives (two courses with labs)		8
Fine Arts state minimum core		3
Humanities state minimum core		
DASC 21303	Data Privacy & Ethics	3
U.S. History and Government state minimum core		3
HIST 20003	History of the American People to 1877 (ACTS Equivalency = HIST 2113)	
or HIST 201(	History of the American People, 1877 to Present (ACTS Equivalency = HIST 2123)	
or PLSC 200	American National Government (ACTS Equivalency = PLSC 2003)	
Social Science state minimum core electives		6
ECON 21403	Basic Economics: Theory and Practice (represents 3 of the 9 required credit hours for Social Science elective))	3
Data Science Required Core (47 hours)		
DASC 10003	Introduction to Data Science	3
DASC 11004	Programming Languages for Data Science (R, Python)	4
DASC 12004	Introduction to Object Oriented Programming for Data Science (JAVA)	4
DASC 25904	Multivariable Math for Data Scientists	4
DASC 12203	Role of Data Science in Today's World	3
DASC 21103	Principles and Techniques of Data Science	3
DASC 22003	Data Management and Data Base	3
DASC 22103	Data Visualization and Communication (Tableau)	3
DASC 31003	Big Data Analytics with Cloud Computing	3
DASC 32003	Optimization Methods in Data Science	3
DASC 32103	Statistical Learning	3

DASC 48902	Data Science Practicum I	2
DASC 41103	Machine Learning	3
DASC 41203	Social Problems in Data Science and Analytics	3
DASC 49903	Data Science Practicum II	3
Data Science Required Additional Courses		
MATH 25004	Calculus II	4
SEVI 20503	Business Foundations	3
Choose from one of these two-course sequences		6-7
STAT 30133 & STAT 30043	Introduction to Probability and Statistical Methods (Statistical Methods)	
Or		
INEG 23203 & INEG 23104	Probability and Stochastic Processes for Industrial Engineers and Statistics for Industrial Engineers I	
Data Science Concentration Courses		**20-21**
General Electives		**2-4**
Total Hours		**120**

Required Geospatial Data Analytics Concentration Courses

GEOS 35403	Geospatial Applications and Information Science	3
GEOS 35503	Spatial Analysis Using ArcGIS	3
GEOS 35603	Geospatial Data Mining	3
GEOS 35903	Introduction to Geodatabases	3
GEOS 42603	Geospatial Data Science - Sources and Characteristics	3
GEOS 46503	GIS Analysis and Modeling	3
Elective Geospatial Data Analytics Concentration Courses (Select 3 hours)		3
GEOS 30203	Introduction to Cartography	
GEOS 32103	Principles of Remote Sensing	
GEOS 41303	Radar Remote Sensing	
GEOS 45503	Introduction to Raster GIS	
GEOS 45903	Introduction to Global Positioning Systems and Global Navigation Satellite Systems	
Total Hours		**21**

Data Science B.S. with Geospatial Data Analytics Concentration Eight-Semester Program

First Year	Fall	Spring
MATH 24004 Calculus I (ACTS Equivalency = MATH 2405) (Satisfies General Education Outcome 2.1)[1]	4	
ENGL 10103 Composition I (ACTS Equivalency = ENGL 1013) (Satisfies General Education Outcome 1.1)	3	
DASC 10003 Introduction to Data Science	3	
DASC 11004 Programming Languages for Data Science	4	
MATH 25004 Calculus II		4
ECON 21403 Basic Economics: Theory and Practice (Satisfies General Education Outcome 3.3)		3
ENGL 10303 Technical Composition II (ACTS Equivalency = ENGL 1023) (Satisfies General Education Outcome 1.2)		3
DASC 12004 Introduction to Object Oriented Programming for Data Science		4
DASC 12203 Role of Data Science in Today's World		3
Year Total:	14	17

Second Year	Fall	Spring
DASC 25904 Multivariable Math for Data Scientists	4	
STAT 30133 Introduction to Probability[4] or INEG 23203 Probability and Stochastic Processes for Industrial Engineers	3	
DASC 22103 Data Visualization and Communication	3	
DASC 21103 Principles and Techniques of Data Science	3	
State Minimum Core U.S. History or Government Elective (Satisfies General Education Outcome 4.2)[2]	3	
SEVI 20503 Business Foundations (Data Science Majors-only section)		3
STAT 30043 Statistical Methods[4] or INEG 23104 Statistics for Industrial Engineers I		3-4
State Minimum Core Natural Science Elective with Lab (Satisfies General Education Outcome 3.4)[2]		4
DASC 22003 Data Management and Data Base		3
GEOS 35403 Geospatial Applications and Information Science		3
Year Total:	16	16

Third Year	Fall	Spring
DASC 21303 Data Privacy & Ethics (Satisfies General Education Outcome 5.1)	3	
DASC 31003 Big Data Analytics with Cloud Computing	3	
GEOS 35503 Spatial Analysis Using ArcGIS	3	
State Minimum Core Social Sciences Elective (Satisfies General Education Outcomes 3.2 and 3.3)2[2]	3	
State Minimum Core Natural Science Elective with Lab (Satisfies General Education Outcome 3.4)[2]	4	
DASC 32003 Optimization Methods in Data Science		3
DASC 32103 Statistical Learning		3
GEOS 35903 Introduction to Geodatabases		3
State Minimum Core Social Sciences Elective (Satisfies General Education Outcomes 3.3 and 4.1)[2]		3

State Minimum Core Fine Arts Elective (Satisfies General Education Outcome 3.1)[2]		3
Year Total:	16	15

Fourth Year	Units	
	Fall	Spring
DASC 48902 Data Science Practicum I	2	
DASC 41103 Machine Learning	3	
DASC 41203 Social Problems in Data Science and Analytics	3	
GEOS 35603 Geospatial Data Mining	3	
GEOS 42603 Geospatial Data Science - Sources and Characteristics	3	
DASC 49903 Data Science Practicum II (Satisfies General Education Outcome 6.1)		3
GEOS 46503 GIS Analysis and Modeling		3
Geospatial Data Analytics Concentration Elective		3
General Elective[3]		2-3
Year Total:	14	12

Total Units in Sequence:	**120**

1 Students have demonstrated successful completion of the learning indicators identified for learning outcome 2.1, by meeting the prerequisites for MATH 24004.

2 Students must complete the State Minimum Core requirements (http://catalog.uark.edu/undergraduatecatalog/gened/stateminimum/) as outlined in the Catalog of Studies. The courses that meet the state minimum core also fulfill many of the university's General Education requirements (http://catalog.uark.edu/undergraduatecatalog/gened/generaleducation/), although there are additional considerations to satisfy the general education learning outcomes. Students are encouraged to consult with their academic adviser when making course selections.

3 Students are required to complete 40 hours of upper-division courses (3000-4000 level). It is recommended that students consult with their adviser when making course selections.

4 Data Science Statistics and Computational Analytics Concentration students are advised to select STAT 30133/STAT 30043 to meet the prerequisites required in the concentration.

Requirements for B.S. in Data Science with Music Industry Data Analytics Concentration

Requirements for B.S. in Data Science

Each student in Data Science is required to complete 120 hours of coursework including the state minimum core (http://catalog.uark.edu/undergraduatecatalog/gened/stateminimum/). To be eligible for graduation, all students must complete at least 60 hours of Data Science (DTSC) Core required classes at the University of Arkansas. Each student in Data Science is also required to complete an additional 20-21 hours (depending on the student's chosen concentration) of required and elective concentration courses to meet the requirements for a concentration.

Additional opportunities are available to enhance the educational experience of students in these areas. Students should consult their academic adviser for recommendations.

State Minimum Core and General Education (36 hours)		
ENGL 10103	Composition I (ACTS Equivalency = ENGL 1013)	3
ENGL 10303	Technical Composition II (ACTS Equivalency = ENGL 1023)	3
MATH 24004	Calculus I (ACTS Equivalency = MATH 2405)	4
Science state minimum electives (two courses with labs)		8
Fine Arts state minimum core		3
Humanities state minimum core		
DASC 21303	Data Privacy & Ethics	3
U.S. History and Government state minimum core		3
HIST 20003	History of the American People to 1877 (ACTS Equivalency = HIST 2113)	
or HIST 201(	History of the American People, 1877 to Present (ACTS Equivalency = HIST 2123)	
or PLSC 200	American National Government (ACTS Equivalency = PLSC 2003)	
Social Science state minimum core electives		6
ECON 21403	Basic Economics: Theory and Practice (represents 3 of the 9 required credit hours for Social Science elective))	3
Data Science Required Core (47 hours)		
DASC 10003	Introduction to Data Science	3
DASC 11004	Programming Languages for Data Science (R, Python)	4
DASC 12004	Introduction to Object Oriented Programming for Data Science (JAVA)	4
DASC 25904	Multivariable Math for Data Scientists	4
DASC 12203	Role of Data Science in Today's World	3
DASC 21103	Principles and Techniques of Data Science	3
DASC 22003	Data Management and Data Base	3
DASC 22103	Data Visualization and Communication (Tableau)	3
DASC 31003	Big Data Analytics with Cloud Computing	3
DASC 32003	Optimization Methods in Data Science	3
DASC 32103	Statistical Learning	3
DASC 48902	Data Science Practicum I	2
DASC 41103	Machine Learning	3
DASC 41203	Social Problems in Data Science and Analytics	3
DASC 49903	Data Science Practicum II	3
Data Science Required Additional Courses		
MATH 25004	Calculus II	4
SEVI 20503	Business Foundations	3
Choose from one of these two-course sequences		6-7
STAT 30133 & STAT 30043	Introduction to Probability and Statistical Methods (Statistical Methods)	
Or		
INEG 23203 & INEG 23104	Probability and Stochastic Processes for Industrial Engineers and Statistics for Industrial Engineers I	
Data Science Concentration Courses		**20-21**

General Electives	**2-4**
Total Hours	**120**

Music Industry Data Analytics Concentration Courses

Required Courses (15 hours)		
MUSC 13303	Popular Music	3
MUIN 32103	21st Century Music Industry	3
MUIN 41003	Legal Aspects of the Music Industry	3
MUIN 45503	Live Music Business	3
MUIN 45603	Artist Development	3
Elective Music Industry Data Analytics Courses (Choose one of the following two-course sequences):		6
Sequence 1: Business Sequence		
ISYS 42903	Business Intelligence	
MKTG 34303	Introduction to Marketing	
Sequence 2: Technology Sequence		
CSCE 41403	Data Mining	
CSCE 46103	Artificial Intelligence	
Total Hours		**21**

Data Science B.S. with Music Industry Data Analytics Concentration Eight-Semester Plan

First Year	Fall	Spring
MATH 24004 Calculus I (ACTS Equivalency = MATH 2405) (Satisfies General Education Outcome 2.1)[1]	4	
ENGL 10103 Composition I (ACTS Equivalency = ENGL 1013) (Satisfies General Education Outcome 1.1)	3	
DASC 10003 Introduction to Data Science	3	
DASC 11004 Programming Languages for Data Science	4	
MATH 25004 Calculus II		4
ECON 21403 Basic Economics: Theory and Practice (Satisfies General Education Outcome 3.3)		3
ENGL 10303 Technical Composition II (ACTS Equivalency = ENGL 1023) (Satisfies General Education Outcome 1.2)		3
DASC 12004 Introduction to Object Oriented Programming for Data Science		4
DASC 12203 Role of Data Science in Today's World		3
Year Total:	14	17

Second Year	Fall	Spring
DASC 25904 Multivariable Math for Data Scientists	4	
STAT 30133 Introduction to Probability[4] or INEG 23203 Probability and Stochastic Processes for Industrial Engineers	3	
DASC 21103 Principles and Techniques of Data Science	3	
DASC 22103 Data Visualization and Communication	3	
State Minimum Core U.S. History or Government Elective (Satisfies General Education Outcome 4.2)[2]	3	
SEVI 20503 Business Foundations (Data Science Majors-only section)		3
STAT 30043 Statistical Methods[4] or INEG 23104 Statistics for Industrial Engineers I		3-4
State Minimum Core Natural Science Elective with Lab (Satisfies General Education Outcome 3.4)[2]		4
DASC 22003 Data Management and Data Base		3
MUSC 13303 Popular Music		3
Year Total:	16	16

Third Year	Fall	Spring
DASC 21303 Data Privacy & Ethics (Satisfies General Education Outcome 5.1)	3	
DASC 31003 Big Data Analytics with Cloud Computing	3	
State Minimum Core Social Sciences Elective (General Education Outcomes 3.2 and 3.3)[2]	3	
State Minimum Core Natural Science Elective with Lab (Satisfies General Education Outcome 3.4) [2]	4	
MUIN 32103 21st Century Music Industry	3	
DASC 32003 Optimization Methods in Data Science		3
DASC 32103 Statistical Learning		3
MUIN 41003 Legal Aspects of the Music Industry		3
State Minimum Core Fine Arts Elective (Satisfies General Education Outcome 3.1)[2]		3
State Minimum Core Social Sciences Elective (Satisfied General Education Outcomes 3.3 and 4.1)[2]		3
Year Total:	16	15

Fourth Year	Fall	Spring
DASC 48902 Data Science Practicum I	2	
DASC 41103 Machine Learning	3	
DASC 41203 Social Problems in Data Science and Analytics	3	
MUIN 45503 Live Music Business	3	
MUIN 45603 Artist Development	3	
DASC 49903 Data Science Practicum II (Satisfies General Education Outcome 6.1)		3
Concentration Elective		3
Concentration Elective		3
General Education Elective[3]		2-3
Year Total:	14	12

Total Units in Sequence:	**120**

1 Students have demonstrated successful completion of the learning indicators identified for learning outcome 2.1, by meeting the prerequisites for MATH 24004.

2 Students must complete the State Minimum Core requirements (https://nam03.safelinks.protection.outlook.com/?url=https%3A%2F%2Fnextcatalog.uark.edu%2Fundergraduatecatalog%2Fgened%2Fstateminimum%2F&data=02%7C01%7Cagriffin%40uark.edu%7Ce4e632415f9b49eda9bf08d7f5c20b91%7C79c742c4e61c4fa5be89a3cb566a80d1%7C0%7C0%7C637248086069621479&sdata=OptR3u0pvLI0ZkfTkGD%2F1XG8924jwOx8pTlw8lWNAGp0s%3D&reserved=0) as outlined in the Catalog of Studies. The courses that meet the state minimum core also fulfill many of the university's General Education requirements (https://nam03.safelinks.protection.outlook.com/?url=https%3A%2F%2Fnextcatalog.uark.edu%2Fundergraduatecatalog%2Fgened%2Fgeneraleducation%2F&data=02%7C01%7Cagriffin%40uark.edu%7Ce4e632415f9b49eda9bf08d7f5c20b91%7C79c742c4e61c4fa5be89a3cb566a80d1%7C0%7C0%7C637248086069621479&sdata=OptR3u0pvLI0Z%2BDWRVEfAqIMsYNX4KXEgX2JdEJJY7Go%3D&reserved=0), although there are additional considerations to satisfy the general education learning outcomes. Students are encouraged to consult with their academic adviser when making course selections.

3 Students are required to complete 40 hours of upper-division courses (3000-4000 level). It is recommended that students consult with their adviser when making course selections.

4 Data Science Statistics and Computational Analytics Concentration students are advised to select STAT 30133/STAT 30043 to meet the prerequisites required in the concentration.

Requirements for B.S. in Data Science with Operations Analytics Concentration

Below are the general requirements for a Bachelor of Science degree with a major in Data Science, followed by specific requirements for the Operations Analytics Concentration. Below those is a recommended eight-semester plan to achieve those requirements in a timely fashion.

Requirements for B.S. in Data Science

Each student in Data Science is required to complete 120 hours of coursework including the state minimum core (http://catalog.uark.edu/undergraduatecatalog/gened/stateminimum/). To be eligible for graduation, all students must complete at least 60 hours of Data Science (DTSC) Core required classes at the University of Arkansas. Each student in Data Science is also required to complete an additional 20-21 hours (depending on the student's chosen concentration) of required and elective concentration courses to meet the requirements for a concentration.

Additional opportunities are available to enhance the educational experience of students in these areas. Students should consult their academic adviser for recommendations.

State Minimum Core and General Education (36 hours)		
ENGL 10103	Composition I (ACTS Equivalency = ENGL 1013)	3
ENGL 10303	Technical Composition II (ACTS Equivalency = ENGL 1023)	3
MATH 24004	Calculus I (ACTS Equivalency = MATH 2405)	4
Science state minimum electives (two courses with labs)		8
Fine Arts state minimum core		3
Humanities state minimum core		
DASC 21303	Data Privacy & Ethics	3
U.S. History and Government state minimum core		3
HIST 20003	History of the American People to 1877 (ACTS Equivalency = HIST 2113)	
or HIST 201(	History of the American People, 1877 to Present (ACTS Equivalency = HIST 2123)	
or PLSC 200	American National Government (ACTS Equivalency = PLSC 2003)	
Social Science state minimum core electives		6
ECON 21403	Basic Economics: Theory and Practice (represents 3 of the 9 required credit hours for Social Science elective))	3
Data Science Required Core (47 hours)		
DASC 10003	Introduction to Data Science	3
DASC 11004	Programming Languages for Data Science (R, Python)	4
DASC 12004	Introduction to Object Oriented Programming for Data Science (JAVA)	4
DASC 25904	Multivariable Math for Data Scientists	4
DASC 12203	Role of Data Science in Today's World	3
DASC 21103	Principles and Techniques of Data Science	3
DASC 22003	Data Management and Data Base	3
DASC 22103	Data Visualization and Communication (Tableau)	3
DASC 31003	Big Data Analytics with Cloud Computing	3
DASC 32003	Optimization Methods in Data Science	3
DASC 32103	Statistical Learning	3
DASC 48902	Data Science Practicum I	2
DASC 41103	Machine Learning	3
DASC 41203	Social Problems in Data Science and Analytics	3
DASC 49903	Data Science Practicum II	3
Data Science Required Additional Courses		
MATH 25004	Calculus II	4
SEVI 20503	Business Foundations	3
Choose from one of these two-course sequences		6-7
STAT 30133 & STAT 30043	Introduction to Probability and Statistical Methods (Statistical Methods)	
Or		
INEG 23203 & INEG 23104	Probability and Stochastic Processes for Industrial Engineers and Statistics for Industrial Engineers I	
Data Science Concentration Courses		**20-21**
General Electives		**2-4**
Total Hours		**120**

Required Operations Analytics Concentration Courses

INEG 24103	Engineering Economic Analysis	3
INEG 26103	Introduction to Operations Research	3
INEG 35503	Production Planning and Control	3
Elective Operations Analytics Concentration Courses		9
Select 9 hours from the following:		
INEG 44503	Productivity Improvement	
INEG 35403	Facility Logistics	
INEG 35303	Transportation Logistics	

INEG 36204	Simulation	
INEG 46803	Decision Support in Industrial Engineering	
SCMT 21003	Integrated Supply Chain Management	
Select 3 hours from the following:		3
INEG 41203	Global Engineering and Innovation	
INEG 44303	Systems Engineering and Management	
INEG 34403	Project Management	
Total Hours		**21**

Data Science B.S. with Operations Analytics Concentration
Eight-Semester Program

First Year	Fall	Spring
MATH 24004 Calculus I (ACTS Equivalency = MATH 2405) (Satisfies General Education Outcome 2.1)[1]	4	
ENGL 10103 Composition I (ACTS Equivalency = ENGL 1013) (Satisfies General Education Outcome 1.1)	3	
DASC 10003 Introduction to Data Science	3	
DASC 11004 Programming Languages for Data Science	4	
MATH 25004 Calculus II		4
ECON 21403 Basic Economics: Theory and Practice (Satisfies General Education Outcome 3.3)		3
ENGL 10303 Technical Composition II (ACTS Equivalency = ENGL 1023) (Satisfies General Education Outcome 1.2)		3
DASC 12004 Introduction to Object Oriented Programming for Data Science		4
DASC 12203 Role of Data Science in Today's World		3
Year Total:	14	17

Second Year	Fall	Spring
DASC 25904 Multivariable Math for Data Scientists	4	
STAT 30133 Introduction to Probability[4] or INEG 23203 Probability and Stochastic Processes for Industrial Engineers	3	
DASC 22103 Data Visualization and Communication	3	
DASC 21103 Principles and Techniques of Data Science	3	
State Minimum Core U.S. History or Government Elective (Satisfies General Education Outcome 4.2)[2]	3	
SEVI 20503 Business Foundations (Data Science Majors-only section)		3
INEG 23104 Statistics for Industrial Engineers I or STAT 30043 Statistical Methods		3-4
State Minimum Core Natural Science Elective with Lab (Satisfies General Education Outcome 3.4)[2]		4
DASC 22003 Data Management and Data Base		3
INEG 24103 Engineering Economic Analysis		3
Year Total:	16	17

Third Year	Fall	Spring
DASC 21303 Data Privacy & Ethics (Satisfies General Education Outcome 5.1)	3	
DASC 31003 Big Data Analytics with Cloud Computing	3	
INEG 26103 Introduction to Operations Research	3	
State Minimum Core Social Sciences Elective (Satisfies General Education Outcomes 3.2 and 3.3)[2]	3	
State Minimum Core Natural Science Elective with Lab (Satisfies General Education Outcome 3.4)[2]	4	
DASC 32003 Optimization Methods in Data Science		3
DASC 32103 Statistical Learning		3
State Minimum Core Social Sciences Elective (Satisfies General Education Outcomes 3.3 and 4.1)[2]		3
Operations Data Analytics Concentration Elective		3
Year Total:	16	12

Fourth Year	Fall	Spring
DASC 48902 Data Science Practicum I	2	
DASC 41103 Machine Learning	3	
DASC 41203 Social Problems in Data Science and Analytics	3	
INEG 35503 Production Planning and Control	3	
Operations Data Analytics Concentration Elective	3	
DASC 49903 Data Science Practicum II (Satisfies General Education Outcome 6.1)		3
Operations Data Analytics Concentration Elective		3
Operations Data Analytics Concentration Elective		3
State Minimum Core Fine Arts Elective (Satisfies General Education Outcome 3.1)[2]		3
General Education Elective[3]		1-2
Year Total:	14	14

Total Units in Sequence:	**120**

[1] Students have demonstrated successful completion of the learning indicators identified for learning outcome 2.1, by meeting the prerequisites for MATH 24004.

[2] Students must complete the State Minimum Core requirements (http://catalog.uark.edu/undergraduatecatalog/gened/stateminimum/) as outlined in the Catalog of Studies. The courses that meet the state minimum core also fulfill many of the university's General Education requirements (http://catalog.uark.edu/undergraduatecatalog/gened/generaleducation/), although there are additional considerations to satisfy the general education learning outcomes. Students are encouraged to consult with their academic adviser when making course selections.

[3] Students are required to complete 40 hours of upper-division courses (3000-4000 level). It is recommended that students consult with their adviser when making course selections.

[4] Data Science Statistics and Computational Analytics Concentration students are advised to select STAT 30133/STAT 30043 to meet the prerequisites required in the concentration.

Requirements for B.S. in Data Science with Social Data Analytics Concentration

Below are the general requirements for a Bachelor of Science degree with a major in Data Science, followed by specific requirements for the Social Data Analytics Concentration. Below those is a recommended eight-semester plan to achieve those requirements in a timely fashion.

Requirements for B.S. in Data Science

Each student in Data Science is required to complete 120 hours of coursework including the state minimum core (http://catalog.uark.edu/undergraduatecatalog/gened/stateminimum/). To be eligible for graduation, all students must complete at least 60 hours of Data Science (DTSC) Core required classes at the University of Arkansas. Each student in Data Science is also required to complete an additional 20-21 hours (depending on the student's chosen concentration) of required and elective concentration courses to meet the requirements for a concentration.

Additional opportunities are available to enhance the educational experience of students in these areas. Students should consult their academic adviser for recommendations.

State Minimum Core and General Education (36 hours)		
ENGL 10103	Composition I (ACTS Equivalency = ENGL 1013)	3
ENGL 10303	Technical Composition II (ACTS Equivalency = ENGL 1023)	3
MATH 24004	Calculus I (ACTS Equivalency = MATH 2405)	4
Science state minimum electives (two courses with labs)		8
Fine Arts state minimum core		3
Humanities state minimum core		
DASC 21303	Data Privacy & Ethics	3
U.S. History and Government state minimum core		3
HIST 20003	History of the American People to 1877 (ACTS Equivalency = HIST 2113)	
or HIST 201(	History of the American People, 1877 to Present (ACTS Equivalency = HIST 2123)	
or PLSC 200	American National Government (ACTS Equivalency = PLSC 2003)	
Social Science state minimum core electives		6
ECON 21403	Basic Economics: Theory and Practice (represents 3 of the 9 required credit hours for Social Science elective))	3
Data Science Required Core (47 hours)		
DASC 10003	Introduction to Data Science	3
DASC 11004	Programming Languages for Data Science (R, Python)	4
DASC 12004	Introduction to Object Oriented Programming for Data Science (JAVA)	4
DASC 25904	Multivariable Math for Data Scientists	4
DASC 12203	Role of Data Science in Today's World	3
DASC 21103	Principles and Techniques of Data Science	3
DASC 22003	Data Management and Data Base	3
DASC 22103	Data Visualization and Communication (Tableau)	3
DASC 31003	Big Data Analytics with Cloud Computing	3
DASC 32003	Optimization Methods in Data Science	3
DASC 32103	Statistical Learning	3
DASC 48902	Data Science Practicum I	2
DASC 41103	Machine Learning	3
DASC 41203	Social Problems in Data Science and Analytics	3
DASC 49903	Data Science Practicum II	3
Data Science Required Additional Courses		
MATH 25004	Calculus II	4
SEVI 20503	Business Foundations	3
Choose from one of these two-course sequences		6-7
STAT 30133 & STAT 30043	Introduction to Probability and Statistical Methods (Statistical Methods)	
Or		
INEG 23203 & INEG 23104	Probability and Stochastic Processes for Industrial Engineers and Statistics for Industrial Engineers I	
Data Science Concentration Courses		**20-21**
General Electives		**2-4**
Total Hours		**120**

Required Social Data Analytics Concentration Courses

SOCI 10103	General Sociology (ACTS Equivalency = SOCI 1013)	3
SOCI 33004	Social Data and Analysis	4
SOCI 33103	Social Research	3
Elective Social Data Analytics Concentration Courses (Select 10 hours)		10
GEOS 30103	Foundations of Geospatial Data Analysis	
GEOS 35403	Geospatial Applications and Information Science	
GEOS 35603	Geospatial Data Mining	
GEOS 45503	Introduction to Raster GIS	
PLSC 36003	Scope and Methods of Political Science	
PLSC 42103	Campaigns and Elections	
SCWK 40703	Social Work Research and Technology I	
SOCI 40103	Special Topics in Sociology	
SOCI 41803	Social Network Analysis	
Total Hours		**20**

Data Science B.S. with Social Data Analytics Concentration Eight-Semester Program

First Year	**Units**	
	Fall	**Spring**
MATH 24004 Calculus I (ACTS Equivalency = MATH 2405) (Satisfies General Education Outcome 2.1)[1]	4	
ENGL 10103 Composition I (ACTS Equivalency = ENGL 1013) (Satisfies General Education Outcome 1.1)	3	

DASC 10003 Introduction to Data Science	3	
DASC 11004 Programming Languages for Data Science	4	
MATH 25004 Calculus II		4
ECON 21403 Basic Economics: Theory and Practice (Satisfies General Education Outcome 3.3)		3
ENGL 10303 Technical Composition II (ACTS Equivalency = ENGL 1023) (Satisfies General Education Outcome 1.2)		3
DASC 12004 Introduction to Object Oriented Programming for Data Science		4
DASC 12203 Role of Data Science in Today's World		3
Year Total:	14	17

Second Year		**Units**
	Fall	**Spring**
DASC 25904 Multivariable Math for Data Scientists	4	
STAT 30133 Introduction to Probability[4] or INEG 23203 Probability and Stochastic Processes for Industrial Engineers	3	
DASC 22103 Data Visualization and Communication	3	
DASC 21103 Principles and Techniques of Data Science	3	
State Minimum Core U.S. History or Government Elective (Satisfies General Education Outcome 4.2)[2]	3	
SEVI 20503 Business Foundations (Data Science Majors-only section)		3
STAT 30043 Statistical Methods[4] or INEG 23104 Statistics for Industrial Engineers I		3-4
State Minimum Core Natural Science Elective with Lab (Satisfies General Education Outcome 3.4)[2]		4
DASC 22003 Data Management and Data Base		3
SOCI 10103 General Sociology (ACTS Equivalency = SOCI 1013) (Satisfies General Education Outcomes 3.3, 4.1, and 4.2)[5]		3
Year Total:	16	16

Third Year		**Units**
	Fall	**Spring**
DASC 21303 Data Privacy & Ethics (Satisfies General Education Outcome 5.1)	3	
DASC 31003 Big Data Analytics with Cloud Computing	3	
State Minimum Core Natural Science Elective with Lab (Satisfies General Education Outcome 3.4)[2]	4	
SOCI 33004 Social Data and Analysis	4	
SOCI 33103 Social Research	3	
DASC 32003 Optimization Methods in Data Science		3
DASC 32103 Statistical Learning		3
SOCI 42503 Social Impact of Data Analytics		3
State Minimum Core Social Sciences Elective (Satisfies General Education Outcomes 3.2 and 3.3)[2]		3
Year Total:	17	12

Fourth Year		**Units**
	Fall	**Spring**
DASC 48902 Data Science Practicum I	2	
DASC 41103 Machine Learning	3	
DASC 41203 Social Problems in Data Science and Analytics	3	
Social Data Analytics Elective	3	
Social Data Analytics Elective	3	
DASC 49903 Data Science Practicum II (Satisfies General Education Outcome 6.1)		3
General Education Electives[3]		4
State Minimum Core Fine Arts Elective (Satisfies General Education Outcome 3.1) [2]		3
Social Data Analytics Elective		4
Year Total:	14	14

Total Units in Sequence:	**120**

1 Students have demonstrated successful completion of the learning indicators identified for learning outcome 2.1, by meeting the prerequisites for MATH 24004.

2 Students must complete the State Minimum Core requirements (http://catalog.uark.edu/undergraduatecatalog/gened/stateminimum/) as outlined in the Catalog of Studies. The courses that meet the state minimum core also fulfill many of the university's General Education requirements (http://catalog.uark.edu/undergraduatecatalog/gened/stateminimum/), although there are additional considerations to satisfy the general education learning outcomes. Students are encouraged to consult with their academic adviser when making course selections.

3 Students are required to complete 40 hours of upper-division courses (3000-4000 level). It is recommended that students consult with their adviser when making course selections.

4 Data Science Statistics and Computational Analytics Concentration students are advised to select STAT 30133/STAT 30043 to meet the prerequisites required in the concentration.

5 SOCI 10103 General Sociology is a required course for the Social Data Analytics Concentration. The course may also be used to meet three hours toward the State Minimum Core Social Science requirements. As such, students may complete three hours of general education electives in lieu of an additional State Minimum Core Social Science requirement for a total of 7 hours of general education electives.

Requirements for B.S. in Data Science with Supply Chain Analytics Concentration

Below are the general requirements for a Bachelor of Science degree with a major in Data Science, followed by specific requirements for the Supply Chain Analytics Concentration. Below those is a recommended eight-semester plan to achieve those requirements in a timely fashion.

Requirements for B.S. in Data Science

Each student in Data Science is required to complete 120 hours of coursework including the state minimum core (http://catalog.uark.edu/

undergraduatecatalog/gened/stateminimum/). To be eligible for graduation, all students must complete at least 60 hours of Data Science (DTSC) Core required classes at the University of Arkansas. Each student in Data Science is also required to complete an additional 20-21 hours (depending on the student's chosen concentration) of required and elective concentration courses to meet the requirements for a concentration.

Additional opportunities are available to enhance the educational experience of students in these areas. Students should consult their academic adviser for recommendations.

State Minimum Core and General Education (36 hours)		
ENGL 10103	Composition I (ACTS Equivalency = ENGL 1013)	3
ENGL 10303	Technical Composition II (ACTS Equivalency = ENGL 1023)	3
MATH 24004	Calculus I (ACTS Equivalency = MATH 2405)	4
Science state minimum electives (two courses with labs)		8
Fine Arts state minimum core		3
Humanities state minimum core		
DASC 21303	Data Privacy & Ethics	3
U.S. History and Government state minimum core		3
HIST 20003	History of the American People to 1877 (ACTS Equivalency = HIST 2113)	
or HIST 201(	History of the American People, 1877 to Present (ACTS Equivalency = HIST 2123)	
or PLSC 200	American National Government (ACTS Equivalency = PLSC 2003)	
Social Science state minimum core electives		6
ECON 21403	Basic Economics: Theory and Practice (represents 3 of the 9 required credit hours for Social Science elective))	3
Data Science Required Core (47 hours)		
DASC 10003	Introduction to Data Science	3
DASC 11004	Programming Languages for Data Science (R, Python)	4
DASC 12004	Introduction to Object Oriented Programming for Data Science (JAVA)	4
DASC 25904	Multivariable Math for Data Scientists	4
DASC 12203	Role of Data Science in Today's World	3
DASC 21103	Principles and Techniques of Data Science	3
DASC 22003	Data Management and Data Base	3
DASC 22103	Data Visualization and Communication (Tableau)	3
DASC 31003	Big Data Analytics with Cloud Computing	3
DASC 32003	Optimization Methods in Data Science	3
DASC 32103	Statistical Learning	3
DASC 48902	Data Science Practicum I	2
DASC 41103	Machine Learning	3
DASC 41203	Social Problems in Data Science and Analytics	3
DASC 49903	Data Science Practicum II	3
Data Science Required Additional Courses		
MATH 25004	Calculus II	4
SEVI 20503	Business Foundations	3
Choose from one of these two-course sequences		6-7
STAT 30133 & STAT 30043	Introduction to Probability and Statistical Methods (Statistical Methods)	
Or		
INEG 23203 & INEG 23104	Probability and Stochastic Processes for Industrial Engineers and Statistics for Industrial Engineers I	
Data Science Concentration Courses		**20-21**
General Electives		**2-4**
Total Hours		**120**

Required Supply Chain Analytics Concentration Courses

SCMT 21003	Integrated Supply Chain Management	3
SCMT 34403	DELIVER: Transportation and Distribution Management	3
SCMT 36103	SOURCE: Procurement and Supply Management	3
SCMT 36203	PLAN: Inventory and Forecasting Analytics	3
SCMT 36603	MAKE: Supply Chain Process Improvement	3
SCMT 46503	Supply Chain Strategy and Change Management	3
Elective Supply Chain Analytics Concentration (Select 3 hours)		3
Any Supply Chain Management (SCMT) course at the 30000 level or above.		
Any Industrial Engineering (INEG) course at the 30000 level or above from the Operations Analytics Concentration		
Total Hours		**21**

Data Science B.S. with Supply Chain Analytics Concentration Eight-Semester Program

First Year	**Fall**	**Spring**
MATH 24004 Calculus I (ACTS Equivalency = MATH 2405) (Satisifies General Education Outcome 2.1)[1]	4	
ENGL 10103 Composition I (ACTS Equivalency = ENGL 1013) (Satisifies General Education Outcome 1.1)	3	
DASC 10003 Introduction to Data Science	3	
DASC 11004 Programming Languages for Data Science	4	
MATH 25004 Calculus II		4
ECON 21403 Basic Economics: Theory and Practice (Satisfies General Education Outcome 3.3)		3
ENGL 10303 Technical Composition II (ACTS Equivalency = ENGL 1023) (Satisifies General Education Outcome 1.2)		3
DASC 12004 Introduction to Object Oriented Programming for Data Science		4
DASC 12203 Role of Data Science in Today's World		3
Year Total:	14	17

Second Year	**Fall**	**Spring**
DASC 25904 Multivariable Math for Data Scientists	4	

STAT 30133 Introduction to Probability[4] or INEG 23203 Probability and Stochastic Processes for Industrial Engineers	3	
DASC 22103 Data Visualization and Communication	3	
DASC 21103 Principles and Techniques of Data Science	3	
State Minimum Core U.S. History or Government Elective (Satisfies General Education Outcome 4.2)[2]	3	
SEVI 20503 Business Foundations (Data Science Majors-only section)		3
STAT 30043 Statistical Methods[4] or INEG 23104 Statistics for Industrial Engineers I		3-4
State Minimum Core Natural Science Elective with Lab (Satisfies General Education Outcome 3.4)[2]		4
DASC 22003 Data Management and Data Base		3
ACCT 20103 Accounting Principles (This pre-req to SYDA Concentration courses uses the "General Elective" to allow a full 21 hours for Concentration courses)		3
Year Total:	16	16

Third Year	Units	
	Fall	Spring
DASC 21303 Data Privacy & Ethics (Satisfies General Education Outcome 5.1)	3	
DASC 31003 Big Data Analytics with Cloud Computing	3	
State Minimum Core Social Sciences Elective (Satisfies General Education Outcomes 3.2 and 3.3)[2]	3	
State Minimum Core Natural Science Elective with Lab (Satisfies General Education Outcome 3.4)[2]	4	
SCMT 21003 Integrated Supply Chain Management	3	
DASC 32003 Optimization Methods in Data Science		3
DASC 32103 Statistical Learning		3
SCMT 34403 DELIVER: Transportation and Distribution Management		3
State Minimum Core Fine Arts Elective (Satisfies General Education Outcome 3.1)[2]		3
State Minimum Core Social Sciences Elective (Satisfies General Education Outcomes 3.3 and 4.1)[2]		3
Year Total:	16	15

Fourth Year	Units	
	Fall	Spring
DASC 48902 Data Science Practicum I	2	
DASC 41103 Machine Learning	3	
DASC 41203 Social Problems in Data Science and Analytics	3	
SCMT 36103 SOURCE: Procurement and Supply Management	3	
SCMT 36203 PLAN: Inventory and Forecasting Analytics	3	
DASC 49903 Data Science Practicum II (Satisifies General Education Outcome 6.1)		3
SCMT 36603 MAKE: Supply Chain Process Improvement		3
SCMT 46503 Supply Chain Strategy and Change Management		3
Supply Chain Analytics Concentration Elective[3]		3
Year Total:	14	12

Total Units in Sequence:	**120**

1 Students have demonstrated successful completion of the learning indicators identified for learning outcome 2.1, by meeting the prerequisites for MATH 24004.

2 Students must complete the State Minimum Core requirements (http://catalog.uark.edu/undergraduatecatalog/gened/stateminimum/) as outlined in the Catalog of Studies. The courses that meet the state minimum core also fulfill many of the university's General Education requirements (http://catalog.uark.edu/undergraduatecatalog/gened/generaleducation/), although there are additional considerations to satisfy the general education learning outcomes. Students are encouraged to consult with their academic adviser when making course selections.

3 Students are required to complete 40 hours of upper-division courses (30000-40000 level). It is recommended that students consult with their adviser when making course selections.

4 Data Science Statistics and Computational Analytics Concentration students are advised to select STAT 30133/STAT 30043 to meet the prerequisites required in the concentration.

Faculty

Alverson, Andrew James, Ph.D. (University of Texas at Austin), M.S. (Iowa State University), B.S. (Grand Valley State University), Associate Professor, Department of Biological Sciences, 2012, 2018.

Barrett, David A., Ph.D., M.A. (University of Arkansas), B.A. (Hendrix College), Instructor, Department of Philosophy, 2014.

Cothren, Jackson David, Ph.D., M.S. (The Ohio State University), B.S. (United States Air Force Academy), Professor, Department of Geosciences, Leica Geosystems Chair in Geospatial Imaging, 2004, 2017.

Cronan, Timothy P., Ph.D. (Louisiana Tech University), M.S. (South Dakota State University), B.S. (University of Southwestern Louisiana), Professor, Department of Information Systems, M.D. Matthews Endowed Chair in Information Systems, 1979.

Cummings, Michael, Ph.D. (University of Minnesota), J.D. and M.P.A. (Brigham Young University), B.S. (Utah Valley), Assistant Professor, Department of Strategic, Entrepreneurship and Venture Innovation, 2017.

Fugate, Brian, Ph.D., M.B.A., B.S. (University of Tennessee), Professor, J.B. Hunt Transport Department of Supply Chain Management, Oren Harris Chair in Transportation, 2015, 2018.

Gauch, John Michael, Ph.D. (University of North Carolina at Chapel Hill), M.Sc., B.Sc. (Queen’s University, Canada), Professor, Department of Electrical Engineering and Computer Science, 2008.

Gruenewald, Jeffrey A., Ph.D. (Michigan State University), Professor, Department of Sociology and Criminology, 2019, 2022.

Harris, Casey Taggart, Ph.D., M.A. (Pennsylvania State University), B.S. (Texas A&M University), Professor, Department of Sociology and Criminology, 2011, 2023.

Keiffer, Elizabeth, Ph.D., M.A. (University of Arkansas), B.S. (East Central University), Teaching Assistant Professor, Department of Information Systems, 2016, 2019.
Liu, Xiao, Ph.D. (National University of Singapore), B.S.M.E. (Harbin Institute of Technology, China), Assistant Professor, Department of Industrial Engineering, 2017.
Nakarmi, Ukash, Ph.D. (University at Buffalo), M.S. (Oklahoma State University), Assistant Professor, Department of Electrical Engineering and Computer Science, 2020.
Pohl, Edward A., Ph.D., M.S.R.E. (University of Arizona), M.S.S.E. (Air Force Institute of Technology), M.S.E.M. (University of Dayton), B.S.E.E. (Boston University), Professor, Department of Industrial Engineering, Twenty-First Century Professorship in Engineering, 2004, 2013.
Rao, Raj R., Ph.D. (University of Georgia), M.S. (University of Texas), M.Sc., B.E. (Birla Institute of Technology and Sciences, India), Professor, Department of Biomedical Engineering, 2016.
Richardson, Vernon J., Ph.D. (University of Illinois-Urbana-Champaign), M.B.A., B.S. (Brigham Young University), Distinguished Professor, William Dillard Department of Accounting, G. William Glezen Jr. Endowed Chair in Accounting, 2005, 2016.
Ridge, Jason, Ph.D., M.A., B.A. (Oklahoma State University), Associate Professor, Department of Strategic, Entrepreneurship and Venture Innovation, 2015, 2017.
Rosales, Claudia, Ph.D., M.S. (University of Cincinnati), B.S. (Universidad Rafael Landivar), Assistant Professor, J.B. Hunt Transport Department of Supply Chain Management, 2021.
Rossetti, Manuel D., Ph.D., P.E., M.S.I.E. (The Ohio State University), B.S.I.E. (University of Cincinnati), University Professor, Department of Industrial Engineering, 1999, 2022.
Schubert, Karl, Ph.D. (University of Arkansas), M.S.Ch.E. (University of Kentucky), B.S.Ch.E (University of Arkansas), Professor of Practice, Department of Industrial Engineering, 2016.
Sullivan, Kelly M., Ph.D. (University of Florida), M.S.I.E., B.S.I.E. (University of Arkansas), Associate Professor, Department of Industrial Engineering, 2012, 2019.
Wu, Xintao, Ph.D. (George Mason University), M.E. (Chinese Academy of Space Technology), B.S. (University of Science and Technology of China), Professor, Department of Electrical Engineering and Computer Science, Charles D. Morgan/Acxiom Graduate Research Chair, 2014, 2019.

Courses

DASC 10003. Introduction to Data Science. 3 Hours.
Introduction to Data Science is a course providing an overview of Data Science and preparation of Data Science First Year students for the Data Science program and for choosing one of the Data Science program concentrations. Corequisite: MATH 24004 or MATH 24005. Prerequisite: Students must be a DTSCBS or DTSCFR major. (Typically offered: Fall)

DASC 100H3. Honors Introduction to Data Science. 3 Hours.
Introduction to Data Science is a course providing an overview of Data Science and preparation of Data Science First Year students for the Data Science program and for choosing one of the Data Science program concentrations. Corequisite: MATH 24004 or MATH 24005. Prerequisite: Students must have honors standing and be a DTSCBS or DTSCFR major. (Typically offered: Fall)
This course is equivalent to DASC 10003.

DASC 10103. Success in Data Science Studies. 3 Hours.
This course provides preparation for Data Science First Year students for the Data Science program and for learning about University campus resources for students. This course is focused on students who are not MATH 24004 Calculus I or MATH 24005 Calculus I with Review ready. Prerequisite: Students must be a First Year Data Science Major. (Typically offered: Fall)

DASC 10201. R Programming for Data Science. 1 Hour.
R Programming for Data Science (RPDS) provides a semester-long introduction to basic concepts, tools, and languages for computer programming using R, a powerful programming language used by data scientists. This class will introduce students to computer programming and provide them with the basic skills and tools necessary to efficiently collect, process, analyze, and visualize datasets. Students will gain hands-on experience with de novo programming in R, finding and utilizing packages, and working in an interactive (RStudio) environment. (Typically offered: Spring and Summer)

DASC 11004. Programming Languages for Data Science. 4 Hours.
Programming Languages for Data Science provides a semester-long introduction to basic concepts, tools, and languages for computer programming using Python and R, two powerful programming languages used by data scientists. This class will introduce students to computer programming and provide them with the basic skills and tools necessary to efficiently collect, process, analyze, and visualize datasets. Students will gain hands-on experience with de novo programming in R and Python, finding and utilizing packages, and working in both interactive (Jupyter and RStudio) and non-interactive (Unix) environments. Corequisite: Lab component. Prerequisite: Students must be a DTSCBS or DTSCFR major. (Typically offered: Fall)

DASC 12004. Introduction to Object Oriented Programming for Data Science. 4 Hours.
Introduction to Object Oriented Programming for Data Science, introduces object-oriented programming in Python. It covers object-oriented programming elements and techniques in Python, such as primitive types and expressions, basic I/O, basic programming structures, abstract data type, object class and instance, Methods, Python File I/O, object inheritance, collections and composite objects, advanced input /output: streams and files, and exception handling. Students will gain hands-on programming experience using Python. Corequisite: Lab component. Prerequisite: DASC 11004 and must be a DTSCBS or DTSCFR major. (Typically offered: Spring)

DASC 12203. Role of Data Science in Today's World. 3 Hours.
Role of Data Science in Today's World is a survey course providing an overview of the Data Science Curriculum and an introduction to the essential elements of data science: data collection and management; summarizing and visualizing data; basic ideas of statistical inference; predictive analytics and machine learning. Students will continue their hands-on experience using the Python and R programming languages and Jupyter notebooks.Prerequisite: DASC 10003 and DASC 11004 and must be a DTSCBS or DTSCFR major. (Typically offered: Spring)

DASC 122H3. Honors Role of Data Science in Today's World. 3 Hours.
Role of Data Science in Today's World is a survey course providing an overview of the Data Science Curriculum and an introduction to the essential elements of data science: data collection and management; summarizing and visualizing data; basic ideas of statistical inference; predictive analytics and machine learning. Students will continue their hands-on experience using the Python and R programming languages and Jupyter notebooks. Prerequisite: DASC 10003, DASC 11004, honors standing and must be a DTSCBS or DTSCFR major. (Typically offered: Spring)
This course is equivalent to DASC 12203.

DASC 1880V. Special Topics in Data Science. 1-6 Hour.
Special Topics in Data Science is a course for data science topics not covered in other courses. Corequisite: Lab component. Prerequisite: Students must be a DTSCBS or DTSCFR major and Instructor Permission Only. (Typically offered: Fall, Spring and Summer) May be repeated for up to 9 hours of degree credit.

DASC 188HV. Honors Special Topics in Data Science. 1-6 Hour.
Special Topics in Data Science is a course for data science topics not covered in other courses. Corequisite: Lab component. Prerequisite: Students must be a DTSCBS or DTSCFR major, have honors standing and by instructor permission only. (Typically offered: Fall, Spring and Summer) May be repeated for up to 9 hours of degree credit.
This course is equivalent to DASC 1880V.

DASC 21003. Data Structures & Algorithms. 3 Hours.
Data Structures & Algorithms focuses on fundamental data structures and associated algorithms for computing and data analytics. Topics include the study of data structures such as linked lists, stacks, queues, hash tables, trees, and graphs, recursion, their applications to algorithms such as searching, sorting, tree and graph traversals, divide-and-conquer, greedy algorithms, and dynamic programming, and the theory of NP-completeness. Students will gain hands-on experience using Python or Java. Prerequisite: (DASC 12004 or CSCE 20004) and must be a DTSCBS major. (Typically offered: Spring)

DASC 21103. Principles and Techniques of Data Science. 3 Hours.
Principles and Techniques in Data Science is an intermediate semester-long data science course that follows an overview of data science in today's world. This class bridges between introduction to data science and upper division data science courses as well as methods courses in other concentrations. This class equips students with essential basic elements of data science, ranging from database systems, data acquisition, storage and query, data cleansing, data wrangling, basic data summarization and visualization, and data estimation and modeling. Students will gain hands-on experience using Python and various packages in Python. Corequisite: Lab component. Prerequisite: MATH 25004 and student must be a DTSCBS major. (Typically offered: Fall)

DASC 21303. Data Privacy & Ethics. 3 Hours.
Data Privacy and Ethics (DASC 21303) explores the intersection of ethics and contemporary (big) data analytics. In particular, we will discuss how data analytics impacts ethical issues like privacy, autonomy, transparency, discrimination, data ownership, and justice, while also investigating its impact on the cohesiveness of society and democracy. Pre- or Corequisite: (DASC 10003 and must be a DTSCFR or DTSCBS major) or (must be a PHILBA major). (Typically offered: Fall and Spring)

DASC 22003. Data Management and Data Base. 3 Hours.
Data Management and Data Base focuses on the investigation and application of data science database concepts including DBMS fundamentals, database technology and administration, data modeling, SQL, data warehousing, and current topics in modern database management. Prerequisite: MATH 25004, (DASC 12004 or CSCE 20004) and students must be a DTSCBS major. (Typically offered: Spring)

DASC 22103. Data Visualization and Communication. 3 Hours.
Data Visualization and Communication is a seminar providing an essential element of data science: the ability to effectively communicate data analytics findings using visual, written, and oral forms. Students will gain hands-on experience using data visualization software and preparing multiple formats of written reports (technical, social media, policy) that build a data literacy and communication toolkit for interdisciplinary work. In essence, this is a course emphasizing finding and telling stories from data, including the fundamental principles of data analysis and visual presentation conjoined with traditional written formats. Prerequisite: DASC 11004 and DASC 12203 and students must be a DTSCBS major. (Typically offered: Fall)

DASC 25904. Multivariable Math for Data Scientists. 4 Hours.
Multivariable Mathematics for Data Scientists provides an in depth look at the multivariate calculus and linear algebra necessary for a successful understanding of modeling for data science. Students will gain an understanding of the mathematical and geometric concepts used in optimization and scientific computation using mathematical and computational techniques. At the end of the course, students will be equipped with the calculus and linear algebra skills and knowledge to be successful in courses in optimization and advanced data science methods. Corequisite: Lab component. Prerequisite: MATH 25004 and DASC 11004 and the student must be a DTSCFR or DTSCBS major. (Typically offered: Fall)

DASC 2900V. Special Topics in Data Science. 1-6 Hour.
Special Topics in Data Science is a course for data science topics not covered in other courses. Prerequisite: Students must be a DTSCBS or DTSCFR major and Instructor Permission Only. (Typically offered: Fall, Spring and Summer) May be repeated for up to 9 hours of degree credit.

DASC 290HV. Honors Special Topics in Data Science. 1-6 Hour.
Special Topics in Data Science is a course for data science topics not covered in other courses. Prerequisite: Honors standing and students must be a DTSCBS or DTSCFR major and Instructor Permission Only. (Typically offered: Fall, Spring and Summer) May be repeated for up to 9 hours of degree credit.
This course is equivalent to DASC 2900V.

DASC 31003. Big Data Analytics with Cloud Computing. 3 Hours.
Big Data Analytics with Cloud Computing provides an in-depth exploration of big data analytics with cloud computing platforms, focusing on the tools, techniques, and methodologies used to extract valuable insights from large and complex datasets. Students will learn the fundamentals of cloud computing, explore different cloud-based big data tools and technologies, and create scalable and efficient solutions with large amounts of data. The course emphasizes hands-on experience with real-world datasets and practical applications of big data analytics in various domains. It provides insights into the challenges and considerations of using cloud computing solutions. Technologies used include Hadoop, Spark, Hive, and AWS. Prerequisite: DASC 25904 and DASC 22003 and student must be a DTSCBS major. (Typically offered: Fall)

DASC 310H3. Honors Cloud Computing and Big Data. 3 Hours.
Cloud Computing and Big Data covers: introduction to distributed data computing and management, MapReduce, Hadoop, cloud computing, NoSQL and NewSQL systems, Big data analytics and scalable machine learning, real-time streaming data analysis. Students will gain hands-on experience using Amazon AWS, MongoDB, Hive, and Spark. Prerequisite: DASC 25904, DASC 22003, honors standing and student must be a DTSCBS major. (Typically offered: Fall)
This course is equivalent to DASC 31003.

DASC 32003. Optimization Methods in Data Science. 3 Hours.
Optimization Methods in Data Science is an advanced mathematical course providing the foundations and concepts of optimization that are essential elements of machine learning algorithms in data science, ranging from mathematical optimization to convex optimization to unconstrained and constrained optimization to nonlinear optimization to stochastic optimization. Students will gain hands-on experience using Python and various optimization packages in Python. Prerequisite: DASC 21103 and DASC 25904 and student must be a DTSCBS major. (Typically offered: Spring)

DASC 32103. Statistical Learning. 3 Hours.
Statistical Learning is a course providing an in depth look at the theory and practice of applied linear modeling for data science: including model building, selection, regularization, classification and prediction. Students will gain hands-on experience using statistical software to learn from data using applied linear models. Prerequisite: DASC 11004 and ((MATH 30103 and STAT 30043) or (INEG 23104 and INEG 23203)) and student must be a DTSCBS major. (Typically offered: Spring)

DASC 32203. Cyber Crime and Cyber Terrorism. 3 Hours.
Cyber Crime and Cyber Terrorism (CCCT) is an overview of the study of cybercrime and cyber terrorism for students of data science, criminology, and law discussing crimes committed via Internet, ranging from various white-collar financial crimes to the spread of viruses, malicious code, stalking, bullying, and web-based exploitation. Criminological, social-psychological explanations will be examined and the investigative and legal strategies employed to combat cyber-crime and cyber terrorism will be discussed. Prerequisite: (DASC 21103 and must be a DTSCBS major) or ((CRIM 20003 or SOCI 10103), have junior or senior standing, and must be a SOCIBA or CRIMBA major). (Typically offered: Fall)

DASC 3900V. Special Topics in Data Science. 1-6 Hour.
Special Topics in Data Science is a course for data science topics not covered in other courses. Prerequisite: Student must be a DTSCBS or DTSCFR major and by Permission Only. (Typically offered: Irregular) May be repeated for up to 9 hours of degree credit.

DASC 390HV. Honors Special Topics in Data Science. 1-6 Hour.
Special Topics in Data Science is a course for data science topics not covered in other courses. Prerequisite: Student must have honors standing, be a DTSCBS or DTSCFR major and by permission only. (Typically offered: Irregular) May be repeated for up to 9 hours of degree credit.
This course is equivalent to DASC 3900V.

DASC 400HV. Honors Thesis in Data Science. 1-3 Hour.
Honors Thesis in Data Science (DASC 400HV) is a course to develop an Honors Thesis in Data Science. The Honors Thesis can be an independent thesis or can be related to the Data Science Practicum I and II Courses Project. Prerequisite: Student must be a DTSCBS major, have honors standing, and by Permission Only. (Typically offered: Fall, Spring and Summer) May be repeated for up to 3 hours of degree credit.

DASC 41103. Machine Learning. 3 Hours.
Machine learning covers: logistic regression, ensemble methods, support vector machines, kernel methods, neural networks, Bayesian inference, reinforcement learning, learning theory, and their applications in text, image, and web data processing. Students will gain hands-on experience of developing machine learning algorithms using Python and scikit-learn. Prerequisite: DASC 21003 and DASC 32003 and student must be a DTSCBS major. (Typically offered: Fall)

DASC 411H3. Honors Machine Learning. 3 Hours.
Machine learning covers: logistic regression, ensemble methods, support vector machines, kernel methods, neural networks, Bayesian inference, reinforcement learning, learning theory, and their applications in text, image, and web data processing. Students will gain hands-on experience of developing machine learning algorithms using Python and scikit-learn. Prerequisite: DASC 21003, DASC 32003, honors standing and student must be a DTSCBS major. (Typically offered: Fall)
This course is equivalent to DASC 41103.

DASC 41203. Social Problems in Data Science and Analytics. 3 Hours.
This course explores the ways data analytics and data science are impacted by or intersect with issues of social justice, poverty and economic inequality, racial and ethnic relations, gender, crime, education, health and healthcare, and other contemporary social problems. Prerequisite: (DASC 12203 and student must be a DTSCBS major) or (SOCI 10103, SOCI 33003, SOCI 33001, SOCI 33103, have senior standing, and must be a SOCIBA major). (Typically offered: Fall)

DASC 45303. Information Retrieval. 3 Hours.
Information Retrieval is a course providing expertise in processing unstructured data as a key component of data science. It covers text processing, file structures, ranking algorithms, query processing, and web search. Students will gain hands-on experience developing their own search engine from scratch, using Python, C, C++, or Java on a Linux server and making their search engine web accessible. Note: Prior user-level knowledge of Linux for file and directory management and remote login is required for this course. Corequisite: Lab component. Prerequisite: DASC 21003 and student must be a DTSCBS major. (Typically offered: Irregular)

DASC 48902. Data Science Practicum I. 2 Hours.
Application of data science, analytics, business intelligence, data mining, machine learning, and data visualization to existing problems. Data Science techniques using current and relevant software and problem-solving methods are applied to current problems for presentation to management. This is the first semester of the required full-year multi-college interdisciplinary practicum using real-world data to solve real-world problems. Prerequisite: DASC 21103, DASC 22103, DASC 32003, ((STAT 30133 and STAT 30043) or (INEG 23104 and INEG 23203)), and student must be a DTSCBS major. Pre- or Corequisite: DASC 32103, DASC 41103, and DASC 41203. (Typically offered: Fall)

DASC 489H2. Honors Data Science Practicum I. 2 Hours.
Application of data science, analytics, business intelligence, data mining, machine learning, and data visualization to existing problems. Data Science techniques using current and relevant software and problem-solving methods are applied to current problems for presentation to management. This is the first semester of the required full-year multi-college interdisciplinary practicum using real-world data to solve real-world problems. Prerequisite: DASC 21103, DASC 22103, DASC 32003, ((STAT 30133 and STAT 30043) or (INEG 23104 and INEG 23203)), honors standing and the student must be a DTSCBS major. Pre- or Corequisite: DASC 32103, DASC 41103, and DASC 41203. (Typically offered: Fall)
This course is equivalent to DASC 48902.

DASC 4900V. Special Topics in Data Science. 1-6 Hour.
Special Topics in Data Science is a course for data science topics not covered in other courses. Prerequisite: Students must be a DTSCBS major and Instructor Permission Only. (Typically offered: Fall, Spring and Summer) May be repeated for up to 9 hours of degree credit.

DASC 490HV. Honors Special Topics in Data Science. 1-6 Hour.
Special Topics in Data Science is a course for data science topics not covered in other courses. Prerequisite: Honors standing and students must be a DTSCBS major and Instructor Permission Only. (Typically offered: Fall, Spring and Summer) May be repeated for up to 9 hours of degree credit.
This course is equivalent to DASC 4900V.

DASC 49903. Data Science Practicum II. 3 Hours.
Application of data science, analytics, business intelligence, data mining, machine learning, and data visualization to existing problems. Data Science techniques using current and relevant software and problem-solving methods are applied to current problems for presentation to management. This is the second semester of the required full-year multi-college interdisciplinary practicum using real-world data to solve real-world problems. Corequisite: Lab component. Prerequisite: DASC 48902 with a grade of C or better and student must be a DTSCBS major. (Typically offered: Spring)

DASC 499H3. Honors Data Science Practicum II. 3 Hours.
Application of data science, analytics, business intelligence, data mining, machine learning, and data visualization to existing problems. Data Science techniques using current and relevant software and problem-solving methods are applied to current problems for presentation to management. This is the second semester of the required full-year multi-college interdisciplinary practicum using real-world data to solve real-world problems. Corequisite: Lab component. Prerequisite: DASC 48902 with a grade of C or better, and student must be a DTSCBS major, and have honors standing. (Typically offered: Spring)
This course is equivalent to DASC 49903.