

Date Submitted: 03/09/21 11:24 am

Viewing: **DTSCBS : Data Science, Bachelor of Science**

Last approved: 06/05/20 9:33 am

Last edit: 03/10/21 3:12 pm

Changes proposed by: schubert

Catalog Pages Using
this Program
[Data Science \(DTSC\)](#)

Submitter: User ID: **schubert kuleza** Phone:
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Program Status Active

Academic Level Undergraduate

Type of proposal Major/Field of Study

Select a reason for this modification

Making Minor Changes to an Existing Degree (e.g. changing 15 or fewer hours, changing admission/graduation requirements, adding/changing Focused Study or Track)

Are you adding a concentration?
No

Are you adding or modifying a track?
No

Are you adding or modifying a focused study?
No

Effective Catalog Year Fall 2021

College/School Code
College of Engineering (ENGR)

In Workflow

1. ENGR Dean Initial
2. Director of Program Assessment and Review
3. Registrar Initial
4. Institutional Research
5. ENGD Chair
6. ENGR Curriculum Committee
7. ENGR Faculty
8. ARSC Dean
9. ENGR Dean
10. WCOB Dean
11. Global Campus
12. Provost Review
13. University Course and Program Committee
14. Faculty Senate
15. Provost Final
16. Provost's Office-- Notification of Approval
17. Registrar Final
18. Catalog Editor Final

Approval Path

1. 03/09/21 11:31 am
Norman Dennis (ndennis): Approved for ENGR Dean Initial
2. 03/09/21 11:32 am
Alice Griffin (agriffin): Approved

Department Code

Department of Engineering Dean (ENGD)

Program Code

DTSCBS

Degree

Bachelor of Science

CIP Code

for Director of
ProgramAssessment and
Review

3. 03/10/21 3:03 pm

Lisa Kulczak

(lkulcza): Approved

for Registrar Initial

4. 03/10/21 3:39 pm

Gary Gunderman

(ggunderm):

Approved for

Institutional

Research

5. 03/10/21 3:58 pm

Norman Dennis

(ndennis): Approved

for ENGD Chair

6. 03/10/21 5:06 pm

Manuel Rossetti

(rossetti): Approved

for ENGR

Curriculum

Committee

7. 03/10/21 5:54 pm

Norman Dennis

(ndennis): Approved

for ENGR Faculty

8. 03/10/21 9:14 pm

Jeannie Hulen

(jhulen): Approved

for ARSC Dean

9. 03/10/21 9:21 pm

Norman Dennis

(ndennis): Approved

for ENGR Dean

10. 03/16/21 2:45 pm

Karen Boston

(kboston):

Approved for WCOB
Dean

11. 03/16/21 2:45 pm
Suzanne Kenner
(skenner): Approved
for Global Campus
12. 03/29/21 11:14 am
Terry Martin
(tmartin): Approved
for Provost Review
13. 04/16/21 4:40 pm
Alice Griffin
(agriffin): Approved
for University
Course and Program
Committee

History

1. May 8, 2020 by Karl
Schubert (schubert)
2. May 22, 2020 by
Charlie Alison
(calison)
3. May 22, 2020 by
Charlie Alison
(calison)
4. Jun 5, 2020 by Lisa
Kulczak (lkulcza)

30.3001 - Computational Science.

Program Title

Data Science, Bachelor of Science

Program Delivery

Method

On Campus

Is this program interdisciplinary?

Yes

College(s)/School(s)

College/School Name

College/School Name
College of Engineering (ENGR)
Walton College of Business (WCOB)
Fulbright College of Arts and Sciences (ARSC)

Does this proposal impact any courses from another College/School?

Yes

College(s)/School(s)

College/School Name
Fulbright College of Arts and Sciences (ARSC)
Walton College of Business (WCOB)

What are the total hours needed to complete the program? 120

Program Requirements and Description

Requirements

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](#). 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 1013	Composition I (ACTS Equivalency = ENGL 1013)	3
ENGL 1033	Technical Composition II (ACTS Equivalency = ENGL 1023)	3
MATH 2554	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		
PHIL 3103	Ethics and the Professions	3
U.S. History and Government state minimum core		

<u>HIST 2003</u>	History of the American People to 1877 (ACTS Equivalency = HIST 2113)	3
or <u>HIST 2013</u>	History of the American People, 1877 to Present (ACTS Equivalency = HIST 2123)	
or <u>PLSC 2003</u>	American National Government (ACTS Equivalency = PLSC 2003)	
Social Science state minimum core electives		6
<u>ECON 2143</u>	Basic Economics: Theory and Practice (represents 3 of the 9 required credit hours for Social Science elective)	3
Data Science Required Core (47 hours)		
<u>DASC 1001</u>	Introduction to Data Science (First-Year Program - Introduction to Data Science)	1
<u>DASC 1104</u>	Programming Languages for Data Science (Programming Languages for Data Science (R, Python))	4
<u>DASC 1204</u>	Introduction to Object Oriented Programming for Data Science (Introduction to Object Oriented Programming for Data Science (JAVA))	4
<u>DASC 2594</u>	Multivariable Math for Data Scientists (Multivariable Math for Data Scientists)	4
<u>DASC 1222</u>	Role of Data Science in Today's World (Role of Data Science in Today's World)	2
<u>DASC 2103</u>	Data Structures & Algorithms (Data Structures & Algorithms)	3
<u>DASC 2113</u>	Principles and Techniques of Data Science (Principles & Techniques of Data Science)	3
<u>DASC 2203</u>	Data Management and Data Base (Data Management & Data Base)	3
<u>DASC 2213</u>	Data Visualization and Communication (Data Visualization & Communication (Tableau))	3
<u>DASC 3103</u>	Cloud Computing and Big Data (Cloud Computing & Big Data)	3
<u>DASC 3203</u>	Optimization Methods in Data Science (Optimization Methods in Data Science)	3
<u>DASC 3213</u>	Statistical Learning (Statistical Learning)	3
<u>DASC 4892</u>	Data Science Practicum I (Data Science Practicum I)	2
<u>DASC 4113</u>	Machine Learning (Machine Learning)	3
<u>DASC 4123</u>	Social Problems in Data Science and Analytics (Social Problems (Issues) in DASC & Analytics)	3
<u>DASC 4993</u>	Data Science Practicum II (Data Science Practicum II)	3
Data Science Required Additional Courses		
<u>MATH 2564</u>	Calculus II (ACTS Equivalency = MATH 2505)	4
<u>MGMT 2053</u>	Business Foundations	3
Choose from one of these two-course sequences		6
<u>INEG 2313</u>	Applied Probability and Statistics for Engineers I	
& <u>INEG 2333</u>	and Applied Probability and Statistics for Engineers II (Applied Probability and Statistics for Engineers II)	
Or		
<u>STAT 3013</u>	Introduction to Probability	
& <u>STAT 3003</u>	and Statistical Methods (Statistical Methods)	
Data Science Concentration Courses		20-
		21
General Electives		3-4
Total Hours		120

8-Semester Plan

Are Similar Programs available in the area?

No

Estimated Student Demand for Program 50

Scheduled Program Review Date 2025-2026

Program Goals and Objectives

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The goal for the University of Arkansas B.S. Data Science Program is to have a program to leverage the State of Arkansas' strengths in data science and analytics including integrating real-world industry-based open-ended challenges for workforce development and education by creating a rigorous Data Science curriculum as a partnership of the UAF College of Engineering (COE), the Walton College of Business (WCOB), and the Fulbright College of Arts and Sciences (FCoAS). The objective of the program is to develop graduates who are prepared for a successful career in data science with an amalgamation of capabilities as described in the Learning Outcomes.

The core curriculum is centered around:

- **Computing and Programming Foundation:** Object Oriented Programming, Data Science lingua franca (R, Python), Programming Algorithms and Paradigms, Data Structures and Databases, Data Processing, and Cloud Computing and Big Data.
- **Statistics and Probability Foundation:** Probability and Statistics, Linear Algebra, Statistical Methods for Data Science, Decision Making, Machine Learning, and Optimization.
- **General Education:** Math, Science, Humanities, Fine Arts, and Social Science.
- **Multidisciplinary Environment:** Technical Composition, Role of Data Science in Today's World, Micro and Macro Economics, General Business, Data Visualization and Communications, and Social Issues in Data Science.
- **Multi-College, Interdisciplinary:** Draw on knowledge from different disciplines analyzes, synthesizes and harmonizes links between disciplines into a coordinated and coherent whole through Core courses and the Mandatory Data Science Practicum.
- **Domain Concentrations:** to provide specific domain expertise to the Data Science core.

Learning Outcomes

Learning Outcomes

University of Arkansas B.S. Data Science Program Outcomes

The UAF B.S. Data Science major will prepare students for a successful career in data science with an amalgamation of capabilities:

Learning Outcomes

1. an ability to use information systems, statistics, and computer science principles and apply state-of-the-art technologies for data representation, data retrieval, data manipulation, data storage, data governance, data security, machine learning, computational analytics, and data analysis and visualization;
2. an ability to develop descriptive, predictive, and prescriptive mathematical and statistical models to provide abstractions of complex systems and organizational problems and to apply computational methods to draw conclusions supported by data;
3. an ability to use foundational knowledge and apply critical thinking skills to problem identification, problem solving, decision making, visualization, and an awareness of societal and ethical impacts;
4. an ability to adapt analytics concepts to interpret and communicate findings and implications to senior decision makers;
5. an ability to work effectively in multidisciplinary teams and transfer findings from one knowledge domain to another; and,
6. an ability to communicate in written, verbal, technical, and non-technical forms.

The Outcomes defined for the Core are complemented by specific outcomes for each of the domain concentrations and all outcomes are mapped to the Core and Concentration courses. The Core curriculum is centered around:

- Computing and Programming Foundation: Object Oriented Programming, Data Science lingua franca (R, Python), Programming Algorithms and Paradigms, Data Structures and Databases, Data Processing, and Cloud Computing and Big Data.
- Statistics and Probability Foundation: Probability and Statistics, Linear Algebra, Statistical Methods for Data Science, Decision Making, Machine Learning, and Optimization.
- General Education: Math, Science, Humanities, Fine Arts, and Social Science.
- Multidisciplinary Environment: Technical Composition, Role of Data Science in Today's World, Micro and Macro Economics, General Business, Data Visualization and Communications, and Social Issues in Data Science.
- Multi-College, Interdisciplinary: Draw on knowledge from different disciplines to analyze, synthesize, and harmonize links between disciplines into a coordinated and coherent whole through Core courses and the Mandatory Data Science Practicum. [1,2]

Learning Outcomes

- Domain Concentrations: [as noted, above].

References

1. Crowe C, Higgins ET. 1997. Regulatory Focus and Strategic Inclination: Promotion and Prevention in Decision Making. *Org Behav Hum Decis Process*. 69: 117–132.
2. Fila, N. D., Purzer, S., Rami, C. 2014. Cultures of Innovation Among Chemical, Civil and Mechanical Engineering Students: A Qualitative Study. 2014 IEEE Frontiers in Education Conference (FIE). October 22-25, 2014.

Description and justification of the request

Description of specific change	Justification for this change
Removed ENGL 1023 as an option to satisfy Comp II.	The decision was used to satisfy Learning Outcome 1.2.

Upload attachments

Reviewer Comments