DEPARTMENT OF HIGHER EDUCATION & WORKFORCE DEVELOPMENT

New Program Report

Date Submitted:
12/04/2023

Institution
Truman State University

Site Information

Implementation Date:
8/19/2024 12:00:00 AM

Added Site(s):

Selected Site(s):

Truman State University, 100 East Normal, Kirksville, MO, 63501-9980

CIP Information

CIP Code:
307001

CIP Description:
A program that focuses on the analysis of large scale data sources from the interdisciplinary perspectives of applied statistics, computer science, data storage, data representation, data modeling, mathematics, and statistics. Includes instruction in computer algorithms, computer programming, data management, data mining, information policy, information retrieval, mathematical modeling, quantitative analysis, statistics, trend spotting, and visual analytics.

CIP Program Title:
Data Science, General

Institution Program Title:
Data Science

Degree Level/Type

Degree Level:
Bachelor's Degree

Degree Type:
Bachelor of Science

Options Added:

Collaborative Program:
N

Mode of Delivery

Current Mode of Delivery

Classroom

Hybrid

Online

Student Preparation

New Program Report

Special Admissions Procedure or Student Qualifications required:
N/A

Specific Population Characteristics to be served:
Students will primarily be traditional aged-college students, 18-23.
They typically will have an interest in STEM more broadly, but also interested in the "Big Data Future," and will be looking for an interdisciplinary program that goes beyond our current Truman programs in Statistics and Computer Science.

Faculty Characteristics

Special Requirements for Assignment of Teaching for this Degree/Certificate:
Faculty may come from a variety of backgrounds, but two will be most common, the mathematical sciences or data-rich applied areas. Most faculty candidates will come out of Statistics or Computer Science, but could more broadly have degrees in mathematics, engineering, operations research. or other mathematical sciences. Others will come from an applied area that uses analytical tools on large unstructured data sets, such as economics, biology, health, business, linguistics, sociology, education, among others. Indeed, many will have learned their coding skills through non-traditional methods, such as online boot camps, MOOCs, or self-teaching. A few schools are starting to create PhD programs specifically in Data Science, but we suspect that most of our faculty will be trained more broadly.

Estimate Percentage of Credit Hours that will be assigned to full time faculty:
We expect nearly all coursework to be taught by full-time faculty. We are open to an occasional course being taught by a working professional who has real-world experience, but that will be the exception, and no more than 10% of a students coursework.

Expectations for professional activities, special student contact, teaching/learning innovation:
Similar to other Truman faculty, with expectations for Teaching and Advising, Scholarship, and Service. Tenure-track faculty follow the department tenure and promotion guidelines, and non-tenure-track faculty follow our non-tenure-track expectations document, which is customized with the Dean for each new hire in Data Science.

Student Enrollment Projections Year One-Five

Year 1	Full Time: 5	Part Time: 0	
Year 2	Full Time: 10	Part Time: 0	
Year 3	Full Time: 15	Part Time: 0	Number of Graduates: 5
Year 4	Full Time: 20	Part Time: 0	
Year 5	Full Time: 30	Part Time: 0	Number of Graduates: 10

Percentage Statement:
n/a

Program Accreditation

Institutional Plans for Accreditation:
None. As a new, interdisciplinary field, Data Science does not have a formal accreditation process.

Program Structure

Total Credits:
120

New Program Report

Residency Requirements:
45 credits of the bachelor's degree are required to be in residence.

General Education Total Credits:
42

Major Requirements Total Credits:
60

Course(s) Added

COURSE NUMBER	CREDITS	COURSE TITLE
DATA 497	2	WE/Capstone Experience in Data Science
MATH 197	4	Calculus I with Precalculus Review II
DATA 324	3	WE/Data Visualization
DATA 344	3	WE/Data Ethics
STAT 101	1	New Student Seminar in Statistics and Data Science
MATH 347	3	Discrete Mathematics
MATH 285	3	Matrix Algebra
STAT 190	3	Basic Statistics
DATA 222	3	Fundamentals of Data Science
STAT 290	3	Statistics
STAT 330	3	Introduction to Linear Models
DATA 322	3	Intermediate Data Science
STAT 378	3	Linear Regression
MATH 198	5	Analytic Geometry and Calculus I
MATH 187	4	Calculus I with Precalculus Review I
STAT 250	3	Statistical Computing
STAT 370	3	Probability
CS 170	4	Introduction to Computer Science I
CS 180	4	Foundations of Computer Science I
CS 430	3	Database Systems
STAT 498	1	Senior Seminar in Statistics and Data Science
MATH 263	4	Analytic Geometry and Calculus II
MATH 357	3	Linear Algebra
STAT 260	4	Applied Mathematics for Data Analysis

New Program Report

CS 191	3	Computing Structures
STAT 530	3	Applied Statistical Methods I
STAT 520	3	Data Mining and Multivariate Stats
STAT 398	3	Intermediate Seminar in Statistics and Data Science

Free Elective Credits:
18

Internship or other Capstone Experience:
N/A

Assurances

I certify that the program is clearly within the institution's CBHE-approved mission. The proposed new program must be consistent with the institutional mission, as well as the principal planning priorities of the public institution, as set forth in the public institution's approved plan or plan update.

I certify that the program will be offered within the proposing institution's main campus or CBHE-approved off-site location.

I certify that the program will not unnecessarily duplicate an existing program of another Missouri institution in accordance with 6 CSR 10-4.010, subsection (9)(C) Submission of Academic Information, Data and New Programs.

I certify that the program will build upon existing programs and faculty expertise.

I certify that the program can be launched with minimal expense and falls within the institution's current operating budget.

I certify that the institution has conducted research on the feasibility of the proposal and it is likely the program will be successful. Institutions' decision to implement a program shall be based upon demand and/or need for the program in terms of meeting present and future needs of the locale, state, and nation based upon societal needs, and/or student needs.

Contact Information

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Data Science Major

The Data Science major consists of (3) parts: Required Support, Core Requirements, and Electives. Each student must complete all parts.

Part I Required Support: 14-23 Credits

Courses listed in Required Support may double count for Dialogues, minors, or other campus requirements, but may not double count with requirements listed elsewhere in this major. Students should work with their advisor to pick the right set of courses for their future goals.

- STAT 190 - Basic Statistics Credits: 3 OR
    - STAT 290 - Statistics Credits: 3
- MATH 198 - Analytic Geometry and Calculus I Credits: 5

Choose and Complete one or more of the following Specialization Blocks:

Intermediate Coding Block: 6 credit hours

- CS 260 - Object-Oriented Programming and Design Credit(s): 3 AND
- CS 310 - Data Structures and Algorithms Credit(s): 3 OR
    - CS 480 - Artificial Intelligence Credit(s): 3

Data Consulting Block: 6 credit hours

- STAT 310 - WE/Statistical Communication and Data Collection
- STAT 392 - Statistical Consulting with Practicum Credits: 3

Statistics Block: 6 credit hours

- STAT 478 - Regression Analysis Credits: 3
- One of the following 400-level or higher Statistics Courses:
    - STAT 410 Probability Models Credits: 3
    - STAT 430 Bayesian Statistics Credits: Credits: 3
    - STAT 571 Mathematical Probability and Statistics II: Credits: 3
    - Another 400+ Statistics Course (with approval of the chair)

A minor or second major (15+ hours) in any field other than CS, Statistics, or Data Science.

- Minors in data-driven fields are particularly encouraged, including Astrophysics, Biology, Business, Economics, Health, Linguistics, Physics, Psychology, or Web Design UI/UX.

A learning plan of 15 or more credit hours, approved by the advisor and chair, including at least six hours of STEM, broadly defined, and including at least one course at the 300+ level.

<u>**Note**</u>: The computer science and statistics blocks are sufficient with coursework elsewhere in the major for

students to concurrently earn minors in those areas.

Part II: Major Requirements: 46-48 Credit Hours

- DATA 222 - Fundamentals of Data Science Credits: 3 OR
    - STAT 220 - Fundamentals of Data Science Credits: 3
- DATA 322 - Intermediate Data Science Credits: 3 (formerly STAT 322) OR
    - STAT 322 - Intermediate Data Science Credits: 3
- DATA 324 - /WE Data Visualization Credits: 3 (formerly STAT 320) OR
    - STAT 320 - /WE Data Visualization Credits: 3
- DATA 344 - /WE Data Ethics Credits: 3 OR
    - CS 345 /WE Cyberethics Credits 3
- DATA 520 - Data Mining and Multivariate Statistics Credits: 3 OR
    - STAT 520 - Data Mining and Multivariate Statistics Credits: 3
- CS 180 - Foundations of Computer Science I Credit(s): 4
- CS 181 - Foundations of Computer Science II Credit(s): 4
- CS 430 - Database Systems Credit(s): 3
- STAT 250 - Statistical Computing Credits: 3
- STAT 370 - Probability Credits: 3 OR
    - CS 191 - Computing Structures Credits: 3   OR
    - MATH 347 Discrete Mathematics Credits: 3   OR
    - STAT 570 - Mathematical Probability and Statistics I Credits 3
- STAT 378 - Linear Regression Credits: 3   OR
    - STAT 330 - Statistical Methods Credits: 3   OR
    - STAT 331 - Biostatistics Credits: 3   OR
    - STAT 530 - Applied Statistical Analysis I Credits: 3
- STAT 101 - New Major Seminar for Statistics and Data Science Credits: 1
- STAT 398 - Intermediate Seminar in Statistics and Data Science Credits: 1
- STAT 497 - WE/ Capstone Experience Credits: 2
- STAT 498 - Senior Seminar in Statistics and Data Science Credits: 1

Part III: Major Requirements: 6 More Credit Hours

6 additional credits from STAT, CS, MATH, or DATA not used elsewhere in this major, including at least 3 credits at the 300+ level.

Electives to Total: 120 Credits

Part III: Major Requirements: 6 or Credit Hours

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6 additional credits from STAT, CS, MATH, or DATA not used elsewhere in this major, including at least 3 credits at the 300+ level.

Electives to Total: 120 Credits

Note: High-Impact Experiences and Capstones

Data Science students are encouraged to consider data-intensive High-Impact Experiences, such as internship and practicum experiences, research experiences, data contests (such as ASA Datafest), and consulting experiences (such as CASE).
Students who complete two or more High-Impact Experiences, including at least one that is data-intensive, may request to have a statistically-intensive High-Impact Experience worth two or more credits, such as Independent Research or an Internship, to substitute for STAT 497. Course credits may only be used once in the Data Science major. All Data Science students must complete STAT 498.