DEPARTMENT OF HIGHER EDUCATION & WORKFORCE DEVELOPMENT

New Program Report

Date Submitted:
05/03/2024

Institution
Missouri State University

Site Information

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

Added Site(s):

Selected Site(s):

Missouri State University, 901 South National, Springfield, MO, 65897

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

Student Preparation

Special Admissions Procedure or Student Qualifications required:
No special preparation is needed

DEPARTMENT OF HIGHER EDUCATION & WORKFORCE DEVELOPMENT

New Program Report

Specific Population Characteristics to be served:
NA

Faculty Characteristics

Special Requirements for Assignment of Teaching for this Degree/Certificate:
A PhD is required for any course above the junior level (anything above 3-level). A MS or a PhD is required forall other classes offered as part of this degree with focus in Computer Science, Mathematics, Data Science,Statistics, or related fields.

Estimate Percentage of Credit Hours that will be assigned to full time faculty:
The vast majority of our courses will be instructed by full-time faculty members with relevant degrees. While wewelcome the occasional involvement of working professionals with real-world experience in teaching a course,this will be a rare occurrence, limited to no more than 5-10% of a student's total coursework.

Expectations for professional activities, special student contact, teaching/learning innovation:
The departmental promotion and tenure guidelines will apply for the faculty members.

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:** 20	**Part Time:** 20	**Number of Graduates:** 5
Year 4	**Full Time:** 30	**Part Time:** 30	
Year 5	**Full Time:** 40	**Part Time:** 40	**Number of Graduates:** 15

Percentage Statement:
n/a

Program Accreditation

Institutional Plans for Accreditation:
Currently we do not have any plans to seek ABET accreditation as ABET does not have a formal accreditation process for this type of interdisciplinary field.

Program Structure

Total Credits:
120

Residency Requirements:
30 hours are to be in residence, 20 hours of the last 30 hours should be in residence

General Education Total Credits:
45

Major Requirements Total Credits:
72

Course(s) Added

COURSE NUMBER	CREDITS	COURSE TITLE
MTH 302	3	Multivariate Calculus

DEPARTMENT OF HIGHER EDUCATION & WORKFORCE DEVELOPMENT

New Program Report

CSC 535	3	Data Mining
MTH314 OR 315	3	Discrete Mathematics or Algebraic Structures
CSC 232	4	Data Structures
MTH 261	5	Analytic Geometry and Calculus I
MTH 547	3	Applied Regression Analysis
CSC 130	3	The World of Computer Science
CSC 325	3	Algorithms and Advanced Data Structures
CSC 131	4	Computational Thinking
CSC 335	3	Database System Concepts
CSC 537	3	Deep Learning
XXXXX	12	Advanced Courses (Computer Science, Statistics, or Mathematics Focus Areas)
MTH 333	3	Linear Algebra
CSC 330	3	Introduction to Data Science
MTH 345 OR 540	3	Statistics for Scientists and Engineers or Statistical Theory I
COM 315	3	Advanced Speaking in Professional Settings
MTH 280	5	Analytic Geometry and Calculus II
CSC 534	3	Big Data Analytics
PHI 332	3	Data Ethics

Free Elective Credits:
3

Internship or other Capstone Experience:
NA

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.

DEPARTMENT OF HIGHER EDUCATION & WORKFORCE DEVELOPMENT

New Program Report

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

First and Last Name: Carol Green

Email: carolgreen@missouristate.edu

Phone: 418-836-4652

DEPARTMENT OF HIGHER EDUCATION & WORKFORCE DEVELOPMENT

☒**PUBLIC**

☐**INDEPENDENT**

NEW PROGRAM PROPOSAL FOR ROUTINE REVIEW

Please use this form as a worksheet and submit new program information through the Academic Program Actions Portal https://web.dhewd.mo.gov/academicprogramaction/login.faces

Sponsoring Institution: Missouri State University

Program Title: **Data Science**

Degree/Certificate: **BS-Bachelor of Science**

If other, please list: Click here to enter text

Options: Click here to enter text

Delivery Site: Missouri State University, 901 S National Ave, Springfield, MO 65897

CIP Classification: 307001

Implementation Date: 8/19/2024

Is this a new off-site location? ☐ **Yes** ☒ **No**

If yes, is the new location within your institution's current CBHE-approved service region? ☐
**If no, public institutions should consult the comprehensive review process*

Is this a collaborative program? ☐Yes ☒No
**If yes, please complete the collaborative programs form on last page.*

Please list similar or comparable programs at Missouri public institutions of higher education.
**For public institutions only*

University of Central Missouri, University of Missouri – St. Louis, University of Missouri – Kansas City

CERTIFICATIONS:

☒ The program is within the institution's CBHE approved mission. *(public only)*

☒ The program will be offered within the institution's CBHE approved service region. *(public only)*

☒ The program builds upon existing programs and faculty expertise

☒ The program does not unnecessarily duplicate an existing program in the geographically-applicable area.

☒ The program can be launched with minimal expense and falls within the institution's current operating budget. *(public only)*

AUTHORIZATION

John Jasinski, Provost	John Jasinski	5/2/2024
Name/Title of Institutional Officer	Signature	Date

PROGRAM CHARACTERISTICS AND PERFORMANCE GOALS

Although all of the following guidelines may not be applicable to the proposed program, please carefully consider the elements in each area and respond as completely as possible in the format below.

Quantification of performance goals should be included wherever possible.

1. Student Preparation

- Any special admissions procedures or student qualifications required for this program which exceed regular university admissions, standards, e.g., ACT score, completion of core curriculum, portfolio, personal interview, etc. Please note if no special preparation will be required.
  No special preparation is needed

- Characteristics of a specific population to be served, if applicable.
  N/A

2. Faculty Characteristics

- Any special requirements (degree status, training, etc.) for assignment of teaching for this degree/certificate.
  A PhD is required for any course above the junior level (anything above 3-level). A MS or a PhD is required for all other classes offered as part of this degree with focus in Computer Science, Mathematics, Data Science, Statistics, or related fields.

- Estimated percentage of credit hours that will be assigned to full time faculty. Please use the term "full time faculty" (and not FTE) in your descriptions here.
  The vast majority of our courses will be instructed by full-time faculty members with relevant degrees. While we welcome the occasional involvement of working professionals with real-world experience in teaching a course, this will be a rare occurrence, limited to no more than 5-10% of a student's total coursework.

- Expectations for professional activities, special student contact, teaching/learning innovation.
  The departmental promotion and tenure guidelines will apply for the faculty members.

3. Enrollment Projections

- Student FTE majoring in program by the end of five years.
  40

- Percent of full time and part time enrollment by the end of five years.
  100% full time

STUDENT ENROLLMENT PROJECTIONS

YEAR	1	2	3	4	5
Full Time	5	10	20	30	40
Part Time	0	0	0	0	0
Total	5	10	20	30	40

4. Student and Program Outcomes

- Number of graduates per annum at three and five years after implementation.
  5 and 15

- Special skills specific to the program.
  N/A

- Proportion of students who will achieve licensing, certification, or registration.
  N/A

- Performance on national and/or local assessments, e.g., percent of students scoring above the 50th percentile on normed tests; percent of students achieving minimal cut-scores on criterion-referenced tests. Include expected results on assessments of general education and on exit assessments in a particular discipline as well as the name of any nationally recognized assessments used.
  N/A

- Placement rates in related fields, in other fields, unemployed.
  N/A

- Transfer rates, continuous study.
  N/A

5. Program Accreditation

- Institutional plans for accreditation, if applicable, including accrediting agency and timeline. If there are no plans to seek specialized accreditation, please provide rationale.
  Currently we do not have any plans to seek ABET accreditation as ABET does not have a formal accreditation process for this type of interdisciplinary field.

6. Program Structure

A. Total credits required for graduation: 120

B. Residency requirements, if any:
   30 hours are to be in residence, 20 hours of the last 30 hours should be in residence

C. General education: Total credits:
   45

Courses (specific courses OR distribution area and credits)

Distribution Area	Credits	Course Title
Foundations	2	First-Year Seminar
	3	Written Communication & Info Literacy
	3	Oral Communication
	3-5	Quantitative Literacy
	3	Written Comm. & Integrative & Applied Learning
Natural World	3-4	Life Sciences
	3-5	Physical Sciences
Human Cultures	6	Social and Behavioral Sciences
	3	Humanities
	3	The Arts
Public Affairs	6	US & MO Constitutions/American History and Institutions
	3	Cultural Competence
	3	Public Issues

D. Major requirements: Total credits: 72

Course Number	Credits	Course Title
CSC 130	3	The World of Computer Science
CSC 131	4	Computational Thinking
CSC 232	4	Data Structures
MTH 261	5	Analytic Geometry and Calculus I
MTH 280	5	Analytic Geometry and Calculus II
MTH 314 or 315	3	Discrete Mathematics or Algebraic Structures
CSC 330	3	Introduction to Data Science
CSC 325	3	Algorithms and Advanced Data Structures
CSC 335	3	Database System Concepts
CSC 534	3	Big Data Analytics
CSC 535	3	Data Mining
CSC 537	3	Deep Learning
MTH 302	3	Multivariate Calculus
MTH 333	3	Linear Algebra
MTH 345 or 540	3	Statistics for Scientists and Engineers or Statistical Theory I
MTH 547	3	Applied Regression Analysis
PHI 332	3	Data Ethics
COM 315	3	Advanced Speaking in Professional Settings
xxxxx	12	Advanced Courses (Computer Science, Statistics, or Mathematics Focus Areas)

E. Free elective credits: 3
(sum of C, D, and E should equal A)

F. Requirements for thesis, internship or other capstone experience:
N/A

G. Any unique features such as interdepartmental cooperation:
N/A

7. Need/Demand

☒Student demand

☒Market demand

☒Societal demand

☒I hereby certify that the institution has conducted research on the feasibility of the proposal and it is likely the program will be successful.

On July 1, 2011, the Coordinating Board for Higher Education began provisionally approving all new programs with a subsequent review and consideration for full approval after five years.

COLLABORATIVE PROGRAMS

- **Sponsoring Institution One:** Choose an institution
- **Sponsoring Institution Two:** Choose an institution
- **Other Collaborative Institutions**: Click here to enter text
- **Length of Agreement:** Click here to enter text
- **Which institution(s) will have degree-granting authority?** Click here to enter text
- **Which institution(s) will have the authority for faculty hiring, course assignment, evaluation and reappointment decisions?** Click here to enter text
- **What agreements exist to ensure that faculty from all participating institutions will be involved in decisions about the curriculum, admissions standards, exit requirements?**
  Click here to enter text
- **Which institution(s) will be responsible for academic and student-support services, e.g., registration, advising, library, academic assistance, financial aid, etc.?**
  Click here to enter text
- **What agreements exist to ensure that the academic calendars of the participating institutions have been aligned as needed?**
  Click here to enter text

Complete Catalog Description

Data Science (Non-Comprehensive)
Bachelor of Science

Major requirements (72 hours):

1. Major Core (60 credit hours):
    a. Computer Science Courses: CSC 130 (3), CSC 131 (4), CSC 232 (4), CSC 325 (3), CSC 330 (3), CSC 335 (3), CSC 535 (3), CSC 534 (3), CSC 537 (3).
    b. Mathematics Courses: MTH 261 (5), MTH 280 (5), MTH 314 (3) or MTH 315 (3), MTH 333 (3), MTH 302 (3), MTH 345 (3) or MTH 540 (3), MTH 547 (3).
    c. Other Courses: PHI 332 (3), COM 315(3)
2. Optional Program Courses: Any four classes for a total of 12 credit hours from the following:
    a. CSC 399 (3), CSC 450 (4), CSC 526 (3), CSC 538 (3), CSC 540 (3), CSC 545 (3), CSC 587 (3), CSC 596 (3), MTH 541 (3), MTH 543 (3), MTH 545 (3), MTH 546 (3), MTH 548 (3), MTH 580 (3), MTH 596.
3. Public Affairs Capstone Experience will be fulfilled by completion of CSC 330 (3), and CSC 335 (3).

University level requirements:

1. General Education Program and Requirements
2. General Baccalaureate Degree Requirements

Rationale for a B.S. program in Data Science

In today's data-driven world, there is an extensive demand for professionals skilled in data science with demand trends projected to grow as more industries integrate data science methodologies into their operations. Data science has a significant impact on society by enabling better decision-making and innovation based on deep patterns in massive data sets. Data science skills are applicable in numerous fields such as healthcare, finance, technology, government, and retail. This versatility allows for a wide range of career opportunities nationally and locally. Within Springfield alone, the legal firm of Husch-Blackwell, FedEx, Amazon, O'Reilly, Cox and Mercy hospitals have growing data science units. The Bachelor of Science program in Data Science is designed to provide the fundamental computer science, mathematical, and statistical knowledge and skills for graduates to make significant contributions in the workforce as well as lay the groundwork for graduate studies.

BS in Data Science

Estimated Costs for first five years

$0. We have already been offering these classes. The only new classes we are proposing are CSC 537 Deep Learning and CSC 534 Big Data Analytics. We have faculty in the CS and Math departments to cover these classes.