



DEPARTMENT OF
HIGHER EDUCATION &
WORKFORCE DEVELOPMENT

New Program Report

Date Submitted:

01/27/2023

Institution

University of Central Missouri

Site Information

Implementation Date:

8/1/2023 12:00:00 AM

Added Site(s):

Selected Site(s):

University of Central Missouri-Lee's Summit, 1101 Innovation Way, Lee's Summit, MO, 64086

University of Central Missouri, Administration 202, Warrensburg, MO, 64093

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 and Artificial Intelligence

Degree Level/Type

Degree Level:

Master Degree

Degree Type:

Master of Science

Options Added:

Collaborative Program:

N

Mode of Delivery

Current Mode of Delivery

Classroom

Hybrid

Online



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Student Preparation

Special Admissions Procedure or Student Qualifications required:

Admission is granted on the basis of the applicant's aptitude and potential, which will be evaluated through academic records, test scores, and/or work experience. To be admitted to the program, a student must have a minimum undergraduate grade point average (GPA) of 2.8. Candidates must complete the Graduate Record Examination (GRE) with a minimum combined score of 291.

Specific Population Characteristics to be served:

n/a

Faculty Characteristics

Special Requirements for Assignment of Teaching for this Degree/Certificate:
Ph.D. in Computer Science or a closely related area is required.

Estimate Percentage of Credit Hours that will be assigned to full time faculty:
100%

Expectations for professional activities, special student contact, teaching/learning innovation:
Faculty teaching in this program will be expected to be professionally active, as evidenced by peer-reviewed publications and/or externally funded grants. Faculty will also be expected to attend and/or present at professional meetings, participate in workshops/seminars in areas related to their specialties, and be involved in other related professional activities. Faculty are expected to continue improving their teaching by keeping up to date on material or pedagogy.

Student Enrollment Projections Year One-Five

Year 1	Full Time: 20	Part Time: 0	
Year 2	Full Time: 30	Part Time: 0	
Year 3	Full Time: 40	Part Time: 5	Number of Graduates: 20
Year 4	Full Time: 50	Part Time: 5	
Year 1	Full Time: 20	Part Time: 0	
Year 2	Full Time: 30	Part Time: 0	
Year 3	Full Time: 40	Part Time: 5	Number of Graduates: 20
Year 4	Full Time: 50	Part Time: 5	
Year 5	Full Time: 60	Part Time: 5	Number of Graduates: 30

Percentage Statement:

n/a

Program Accreditation

Institutional Plans for Accreditation:

No accreditation available for the proposed program.



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Program Structure

Total Credits:

30

Residency Requirements:

15

General Education Total Credits:

0

Major Requirements Total Credits:

30

Course(s) Added

COURSE NUMBER	CREDITS	COURSE TITLE
CS 5200	3	Database Theory and Applications
DSA 5400	3	Statistical Foundations for Data Science and AI
DSA 5100	3	Programming Foundations for Data Science and AI
CS/DSA	18	Data Science or AI Option
CS 5300	3	Advanced Algorithms

Free Elective Credits:

0

Internship or other Capstone Experience:

Students are expected to take DSA 5020 (3 credits - Internship in Data Science and Applied Artificial Intelligence). If the student is unable to secure an internship, any other graduate level CS/CYBR/SE course approved by the advisor may be taken.

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



DEPARTMENT OF
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New Program Report

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MS in Data Science and Applied Artificial Intelligence

Student Learning Outcomes - The graduate with a Master of Science degree in Data Science and Applied Artificial Intelligence will use the knowledge and skills obtained in the program to:

- Demonstrate proficiency in applying mathematical and statistical principles to data science and artificial intelligence applications.
- Demonstrate an ability to obtain, clean, process and transform large data sets with professional software, packages, and tools to create solutions for real-world applications and help businesses and organizations make informed decisions.
- Apply analytics and artificial intelligence techniques to satisfy the business needs of a wide range of stakeholders.
- Communicate effectively with a range of audiences, work effectively in a team environment, and demonstrate an understanding of ethical concerns related to data science and artificial intelligence.
- Recognize the need for and engage in continuing professional development.

This program is designed to prepare graduates with advanced skills in Data Science and Artificial Intelligence. The graduates from the program can apply these skills to identify, collect, analyze, manage and transform complex data sets to make informed decisions. Besides acquiring experience in top programming languages, you will also gain hands-on practice with leading data analytics software and platforms.

Admission Requirements - Admission is granted on the basis of applicant's aptitude and potential which will be evaluated through academic records, test scores and/or work experience. To be admitted to the program, a student must have a minimum undergraduate grade point average (GPA) of 2.8. Candidates must complete the Graduate Record Examination (GRE) with a minimum combined score of 291 in Verbal and Quantitative reasoning Applicants must submit official GRE test scores by Educational Testing Services (ETS) directly to the University of Central Missouri. The ETS institution code for sending GRE scores to UCM is 6090, program code is 0402. Applicants with exceptional undergraduate performance may be considered with a lower GRE score. The GRE test requirement can be waived if any one of the following conditions is satisfied.

- The student is a graduate of a regionally accredited college or university with a degree in Computer Science/Information Technology/Information Systems/Data Science/Mathematics/Statistics and a GPA of 3.50 or higher.
- The student has earned an M.S. or more advanced degree in a closely related discipline.
- the student has a minimum 3 years of relevant work experience in a US based corporation or a reputed multinational organization.

International students whose native language is not English and do not have a US degree are required to take the Test of English as a Foreign Language (TOEFL). A minimum TOEFL score of 79 is required. IELTS scores are also accepted at UCM. Regular graduate students should have a band score of 6.0 in IELTS. The English requirement is waived for applicants who have completed a minimum of 60 semester credit hours or have earned a bachelor or graduate degree

from an accredited college or university in the USA. Submission of a statement of purpose and three letters of recommendation is OPTIONAL for admission. They may however be required if the student applies for graduate assistantship or student worker positions. Applicants who have degrees in some non-computing fields will also be considered for admission. Students may make up their deficiencies in computer science by completing the required undergraduate background courses.

Full time students without deficiencies can expect to complete this program in two academic years.

Required Undergraduate Background Course: 0-6 Semester Hours

The following undergraduate courses (or equivalent) are required for students who did not have Python programming and data analytics knowledge in their undergraduate study.

CS 2030 Python Programming II, 3
DSA 1000 Intro. To Data Analytics, 3

Required Graduate Courses: 12 Semester Hours

CS 5200 Database, 3
CS 5300 Advanced Algorithms, 3
DSA 5100 Programming Foundations for Data Science and AI, 3
DSA 5400 Statistical Foundations for Data Science and AI, 3

Elect one of the two options: 18 Semester Hours

Option 1: Data Science and Analytics

Required Option courses: 9 Semester Hours

DSA 5200 Advanced Data Visualization, 3
DSA 5600 NoSQL Database Systems, 3
DSA 5620 Big Data Analytics, 3

Electives from the following: 9 Semester Hours

ACST 5351 Principles of Data Mining, 3
ACST 5361 SAS Programming for Statistical Analysis, 3
CS 5040 Master Project, 3
CS 5110 Advanced Applications Programming in C# and .NET, 3
CS 5130 Advanced Web Applications and Services Development, 3
CS 5220 Advanced Applications Programming in Java, 3
CS 5600 Advanced Databases, 3
CS 5610 Introduction to Cloud Computing, 3
CS 5700 Artificial Intelligence, 3

CS 5710 Machine Learning, 3
CS 5720 Neural Network and Deep Learning, 3
CS 5730 Image processing and Computer Vision, 3
CS 6010 Thesis, 6
CYBR 5140 Introduction to Malware, 3
CYBR 5240 Web Application Security, 3
CYBR 5610 Cloud Security, 3
CYBR 5720 Cybersecurity Policies and Risk Management, 3
CYBR 5800 Advanced Computer Networking and Security, 3
CYBR 5820 Introduction to Information Assurance, 3
CYBR 5840 Ethical Hacking, 3
CYBR 5920 Software Security, 3
CYBR 5940 Threat Intelligence and Incident Response, 3
DSA 5020 Internship in Data Science and Applied Artificial Intelligence, 3
SE 5910 Advanced Software Engineering, 3
SE 5930 Software Testing and Quality Assurance, 3
SE 5940 Software Design and Architecture, 3
SE 5950 Secure Software Engineering, 3

Option 2: Applied Artificial Intelligence

Required Option courses: 9 Semester Hours

CS 5700 Artificial Intelligence, 3
CS 5710 Machine Learning, 3
CS 5720 Neural Network and Deep Learning, 3

Electives from the following: 9 Semester Hours

ACST 5351 Principles of Data Mining, 3
ACST 5361 SAS Programming for Statistical Analysis, 3
CS 5040 Master Project, 3
CS 5110 Advanced Applications Programming in C# and .NET, 3
CS 5130 Advanced Web Applications and Services Development, 3
CS 5220 Advanced Applications Programming in Java, 3
CS 5600 Advanced Databases, 3
CS 5610 Introduction to Cloud Computing, 3
CS 5730 Image processing and Computer Vision, 3
CS 6010 Thesis, 6
CYBR 5140 Introduction to Malware, 3
CYBR 5240 Web Application Security, 3
CYBR 5610 Cloud Security, 3
CYBR 5720 Cybersecurity Policies and Risk Management, 3

CYBR 5800 Advanced Computer Networking and Security, 3
CYBR 5820 Introduction to Information Assurance, 3
CYBR 5840 Ethical Hacking, 3
CYBR 5920 Software Security, 3
CYBR 5940 Threat Intelligence and Incident Response, 3
DSA 5020 Internship in Data Science and Applied Artificial Intelligence, 3
DSA 5200 Advanced Data Visualization, 3
DSA 5600 NoSQL Database Systems, 3
DSA 5620 Big Data Analytics, 3
SE 5910 Advanced Software Engineering, 3
SE 5930 Software Testing and Quality Assurance, 3
SE 5940 Software Design and Architecture, 3
SE 5950 Secure Software Engineering, 3

Only up to 3 credit hours of DSA 5020 can be applied to a student's degree program. Students are expected to take DSA 5020 (3 credits - Internship in Data Science and Applied Artificial Intelligence). If the student is unable to secure an internship, any other graduate level CS/CYBR/SE course approved by the advisor, may be taken.

Students cannot take both CS 5040 and CS 6010.

CS 6010 may only be used as a program elective for students completing a thesis. Students who complete this course and do not complete a thesis will be required to complete the additional required credit hours to meet the minimum hours requirements.