Master of Science in Computer Science

Program Description

The Master of Science in Computer Science program is designed to advance students' knowledge and expertise in the field, building on foundational undergraduate studies and equivalent professional experience. Courses in the program lead to advanced skills in technology, programming, and managing complex systems, enabling individuals to navigate and leverage technology effectively. Content includes software engineering, data management, data analytics, cybersecurity, artificial intelligence, and technology leadership. This program enhances students' practical skills, knowledge, and communication, preparing graduates for leadership roles and specialized professional practice in various areas of computer science.

Coursework in this program provides a foundation for select industry certifications. These certifications enhance employment opportunities but are not a state specific requirement.

Program Outcomes

Upon completion of this program, the student should be able to:

1. Apply advanced skills in software engineering, data management, data analytics artificial intelligence, and cybersecurity.
2. Implement architecture and technologies for data processing, data mining, and data analysis.
3. Evaluate new knowledge and technologies in computer science.
4. Assess ethical issues related to technology, data privacy, data security, and the societal impact of technology, while adhering to professional standards.
5. Manage engineering projects based on best practices for requirements gathering, system design, testing, and maintenance.
6. Lead technology-related operations to maintain alignment of organizational strategies.

Program Content

A minimum of 37.00 semester credit hours is required for graduation.

Required Courses

All courses, 37.00 semester credit hours, are required.

Course Number and Number	Prerequisites/Corequisites	Semester Credit Hours
IT 500 Network Engineering	None	3.00
IT 505 Cybersecurity Systems Analysis	None / IT 500 Network Engineering	3.00
IT 510 Development Security Operations (DevSecOps)	None	3.00
IT 515 High Performance Operating Systems	IT 500 Network Engineering	3.00
IT 521 Scalable Database Systems	IT 500 Network Engineering	3.00
IT 525 Data Mining	IT 500 Network Engineering	3.00
IT 611 Big Data Analytics	IT 500 Network Engineering	3.00
IT 615 Software Engineering Management	IT 500 Network Engineering	3.00

Course Number and Number	Prerequisites/Corequisites	Semester Credit Hours
IT 621 Advanced AI and Machine Learning (AI/ML)	IT 500 Network Engineering	3.00
IT 625 Deep Learning Methodologies	IT 500 Network Engineering	3.00
IT 630 Strategic Leadership in Technology	IT 500 Network Engineering	4.00
IT 690 Graduate Capstone or IT 699 Graduate Internship	Final Semester	3.00

* Online students in some states may not be allowed to take this internship due to state restrictions.

Distribution of Contact Hours by Course

Course	Lecture Hours	Internship Hours	Total Contact Hours	Credits
IT 500	45.00	0.00	45.00	3.00
IT 505	45.00	0.00	45.00	3.00
IT 510	45.00	0.00	45.00	3.00
IT 515	45.00	0.00	45.00	3.00
IT 521	45.00	0.00	45.00	3.00
IT 525	45.00	0.00	45.00	3.00
IT 611	45.00	0.00	45.00	3.00
IT 615	45.00	0.00	45.00	3.00
IT 621	45.00	0.00	45.00	3.00
IT 625	45.00	0.00	45.00	3.00
IT 630	60.00	0.00	60.00	4.00
IT 690 or IT 699	45.00 or 0.00	0.00 or 135.00	45.00 or 135.00	3.00
Totals with IT 690 Capstone	**555.00**	**0.00**	**555.00**	**37.00**
Totals with IT 699 Internship	**510.00**	**135.00**	**645.00**	**37.00**

New Course Descriptions

Course	Course Description
IT 515 High Performance Operating Systems	This course explores advanced topics in operating systems, blending theoretical concepts with practical implementation. It also addresses the unique challenges of operating systems for Internet of Things (IoT) devices. Students will gain expertise in managing operating systems across various applications, including distributed and real-time systems.
IT 521 Scalable Database Systems	This course introduces advanced concepts in database systems. Topics include the relational model, database design with Entity Relationship Diagrams (ER Diagrams), query processing, and optimization. Students will be able to design, optimize, and manage databases effectively in different environments.
IT 525 Data Mining	This course offers a thorough introduction to data mining, enabling students to extract valuable insights from large datasets. It covers essential concepts and techniques, including data preprocessing, exploratory data analysis, and association rule mining. Students will be equipped with the skills necessary to analyze and interpret complex data across various industries.

IT 611 Big Data Analytics	This course offers students a fundamental understanding of big data analytics. The curriculum emphasizes real-time data processing, data visualization principles, and exploratory data analysis, providing hands-on experience with advanced tools.
IT 615 Software Engineering Management	This course focuses on skills such as requirements engineering, communicating with stakeholders, and managing time, budget, and personnel for software engineering projects. Students will learn to help direct a team through every stage of the software development process.
IT 621 Advanced AI and Machine Learning (AI/ML)	This course focuses on machine learning and artificial intelligence techniques essential for industry transformation. Students will gain expertise in algorithms while also building a strong foundation in Artificial Neural Networks (ANN). Students will develop the skills and innovative mindset needed to address complex, real-world challenges.
IT 625 Deep Learning Methodologies	This course provides a comprehensive introduction to the principles and applications of deep learning. Students will explore various neural network architectures and gain hands-on experience with frameworks. Additionally, the course covers essential techniques for training and optimizing models, with practical applications in computer vision, natural language processing, and reinforcement learning. By the end of the course, students will be equipped to tackle complex problems using advanced deep learning methods.
IT 630 Strategic Leadership in Technology	This course focuses on the role of leaders in dynamic organizations. The course addresses best practices in technology, the importance of strong leadership at all levels in organizations, and the relationship between leadership and organizational success. Additionally, the course covers data and security concerns, avoiding bias, and ethical practices.