COMPUTER SCIENCE (CSC)

CSC-5010 Foundations of Emerging Technologies (3 semester hours)
This course provides a comprehensive overview of emerging technologies shaping the future of computer science and their transformative impact on society, industry, and innovation. Students will explore foundational concepts and applications of groundbreaking advancements such as blockchain, quantum computing, Internet of Things (IoT), augmented and virtual reality (AR/VR), and edge computing. Through case studies, hands-on projects, and critical discussions, the course examines the technical, ethical, and societal implications of adopting these technologies. By the end of the course, students will be equipped to analyze emerging trends, assess their potential impact, and apply innovative solutions to complex, real-world challenges.

CSC-5050 Ethics and Sustainability in Tech Policy (3 semester hours)
This course explores the ethical and societal implications of technological advancements, focusing on the development of responsible and sustainable technology policies. Students will examine ethical frameworks, analyze case studies of technological failures and successes, and develop strategies for mitigating negative consequences. The course integrates principles of sustainability, considering the environmental, social, and economic impacts of technology throughout its lifecycle.

CSC-5100 Big Data Technologies and Architectures (3 semester hours)
This course provides a comprehensive understanding of big data technologies and architectures, covering data storage, processing, and analysis techniques. Students will learn about various big data platforms (Hadoop, Spark, cloud-based solutions), data warehousing methodologies, and data modeling techniques. Hands-on experience will be gained through projects involving the processing and analysis of large datasets.

CSC-5150 Computer Systems Architecture and Engineering (3 semester hours)
This course explores the design and implementation of computer systems, covering topics ranging from low-level hardware to high-level software interfaces. Students will gain an understanding of CPU architectures, memory systems, I/O devices, and operating systems. The course emphasizes a systems-level perspective, connecting hardware and software components to understand the overall system behavior.

CSC-5200 Cyber-Physical Systems and Security (3 semester hours)
This course explores the security challenges and solutions for cyber-physical systems (CPS), which integrate computing and physical processes. Students will learn about CPS architectures, attack vectors, and security mechanisms. The course emphasizes practical applications and hands-on experience through projects and simulations.

CSC-5300 Cloud Computing (3 semester hours)
This course provides a comprehensive overview of cloud computing technologies, encompassing various cloud models (IaaS, PaaS, SaaS), deployment strategies, and management practices. Students will learn about cloud service providers (AWS, Azure, GCP), virtualization technologies, and containerization. Practical experience will be gained through hands-on labs and projects deploying applications and managing resources on a cloud platform.

CSC-5400 Human-Computer Interaction (3 semester hours)
This course explores the principles, methods, and tools for designing, evaluating, and improving human-computer interaction. Students will examine user-centered design processes, usability testing, and emerging trends in HCI to create intuitive and effective interfaces. Through hands-on projects and case studies, participants will bridge the gap between human needs and technological capabilities, ensuring systems are accessible, inclusive, and aligned with ethical standards. The course emphasizes the integration of business, ethical, and technological considerations, preparing students to lead in designing transformative user experiences in a digitally connected world.

CSC-5500 Machine Learning and Large Language Models (3 semester hours)
This course introduces students to the fundamentals of machine learning (ML) and large language models (LLMs), blending theory with practical application. Students will explore key ML concepts and gain hands-on experience with widely used ML libraries. The course emphasizes real-world applications while fostering an understanding of the ethical and societal considerations associated with LLMs.

CSC-5600 Advanced Programming Paradigms (3 semester hours)
This course explores advanced programming paradigms beyond the procedural and object-oriented approaches, focusing on functional programming, logic programming, and concurrent/parallel programming. Students will learn the principles and techniques of each paradigm, applying them to solve complex problems and comparing their strengths and weaknesses for different applications.

CSC-5700 Supply Chain and BlockChain Resistance (3 semester hours)
This advanced course delves into the critical area of cybersecurity concerning complex supply chains and the rapidly evolving landscape of blockchain technologies. Students will learn to analyze vulnerabilities and threats within modern supply chains, understand the unique security challenges of blockchain implementations, and develop practical skills to build resilient systems. The course will emphasize both theoretical foundations and hands-on applications, utilizing real-world case studies and industry best practices. Building upon the foundation established in the emerging tech course, this specialization course will delve deeper into the security aspects and specific technical considerations when combining emerging technology, focusing on supply chains and blockchain security.

CSC-5750 Data Visualization, Storytelling, and Communication (3 semester hours)
This course teaches students how to transform complex datasets into compelling visual narratives. Emphasis is placed on design principles, data analysis, and effective communication techniques. Students will explore various visualization tools and techniques to create impactful presentations and interactive dashboards. This course will also focus on effective communication strategies to present data insights to a variety of audiences across different cultural backgrounds, which is vital for international students aiming for global impact.

CSC-5800 Incident Response & Digital Forensics (3 semester hours)
This course provides a comprehensive understanding of incident response methodologies and digital forensics techniques. Students will learn how to prepare for, detect, analyze, and recover from cybersecurity incidents. The course will cover digital evidence collection, preservation, and analysis across multiple platforms and operating systems. Real-world case studies and hands-on exercises will enhance students' practical skills in incident response and forensic investigation, preparing them to address security breaches in diverse technological and geographical environments.

CSC-5850 Big Data Analytics and Cloud Computing (3 semester hours)
This course explores the concepts and techniques for processing and analyzing large datasets using distributed computing frameworks and cloud-based platforms. Students will gain hands-on experience with technologies like Hadoop, Spark, and cloud services for big data processing and analysis. This course will also cover the challenges of processing internationalized datasets, data storage, and scaling solutions in a global context, essential for students aiming to contribute to data science internationally.

CSC-5900 Cloud Security and Infrastructure Protection (3 semester hours)
This course focuses on the unique challenges and best practices in securing cloud-based environments. Students will learn to implement security controls for various cloud deployment models (IaaS, PaaS, SaaS) and explore the latest cloud security technologies. This course is designed to address the security challenges in complex cloud infrastructures, considering diverse compliance and regulatory frameworks present across different regions. Hands-on labs will enable students to secure cloud resources in real-world settings.

CSC-5911 Curricular Practical Trng Tech Fields (0.5-1 semester hours)
This course is designed for Master of Science in Computer Science students participating in the Curricular Practical Training (CPT) work authorization program. It offers an in-depth exploration of leadership theories, communication strategies, ethical decision-making, and team-building, tailored to the context of the computer science field. Students will engage in hands-on internships, applying their leadership and technical skills in real-world settings. The internship component provides valuable industry experience, allowing students to connect theoretical knowledge with practical applications, and to reflect on their growth and areas for further development. Course can be repeated multiple times.

CSC-5950 Data Engineering & Scalable Systems (3 semester hours)
This course explores the principles and practices of data engineering, focusing on the design, implementation, and optimization of scalable systems for large-scale data processing. Students will learn how to construct robust data pipelines, manage distributed systems, and leverage modern database technologies to handle complex data workflows. Key tools and frameworks such as Apache Kafka, Apache Spark, and NoSQL databases will be covered, equipping students with the skills to manage data efficiently in real-world applications. Through hands-on projects and case studies, students will gain practical experience in building scalable and resilient data systems for diverse organizational needs.