

COMPUTER SCIENCE (DCS)

DCS502 Data Structures and Algorithms (3 course hours)

This foundational course provides a comprehensive exploration of data structures and algorithms, essential tools for efficient software development. Through a combination of theoretical concepts and practical exercises, students will gain a deep understanding of how to design, implement, and analyze algorithms for various applications.

DCS503 Computer Architecture (3 course hours)

Computer Architecture is the interdisciplinary field of study that combines principles and methods from business, information technology, and computer science to design, develop, and implement information systems that support business processes, decision-making, and innovation. This course is designed to provide students with a deep understanding of how businesses use technology and information systems to manage their operations and decision-making processes. Students will explore topics including CPU design, memory, bios, input/output systems, and advanced parallel processing. Students also gain practical experience for competitive advantage in the marketplace. REGISTRATION: Students must have a cumulative GPA of 2.75 or higher to enroll

DCS505 Introduction to Business Informatic (3 course hours)

Business informatics is the interdisciplinary field of study that combines principles and methods from business, information technology, and computer science to design, develop, and implement information systems that support business processes, decision-making, and innovation. This course is designed to provide students with a deep understanding of how businesses use technology and information systems to manage their operations and decision-making processes. Students will explore the various technologies, tools, and techniques used in business informatics and how they can be leveraged to gain a competitive advantage in the marketplace.

Course offered: FA, SP, SU

DCS510 Ethics in a Rapidly Advancing Society (3 course hours)

This course explores the challenges that arise when ethical principles and values are tested by rapidly evolving technology, political and economic changes. The course focuses on the analysis of ethical issues and decision-making frameworks that can help organizations navigate the complexities of a rapidly changing society. Through case studies, interactive discussions, and critical analysis, students will examine how emerging technologies, globalization, and changing social norms affect ethical decision making in various industries. The course also emphasizes the importance of leadership in cultivating an ethical culture and promoting responsible decision-making at all levels of an organization.

Course offered: FA, SP, SU

DCS512 Integrated Systems-Operating System and Computer Networks (3 course hours)

In this dynamic course, students will delve into the intricate interplay between operating system principles and computer networking, emphasizing their vital integration within modern computing environments. As the digital landscape continues to evolve, the need for seamless coordination between these two foundational pillars becomes increasingly apparent. Throughout the course, students will explore a wide spectrum of key topics, including but not limited to process management, network protocols, and distributed systems.

DCS515 Business Intelligence and Analytics (3 course hours)

This course provides an in-depth exploration of business intelligence and analytics, with a focus on the role of data-driven decision making in modern organizations. Students will learn how to collect, analyze, and interpret large and complex data sets using advanced analytical tools and techniques, and gain practical skills in data visualization, statistical modeling, and predictive analytics. They will also gain an understanding of the ethical implications of data collection and analysis and develop strategies for communicating analytical findings to stakeholders in a variety of business contexts.

Course offered: FA, SP, SU

DCS530 Design Thinking for Data Visualization (3 course hours)

Design Thinking for Data Visualization is a course that focuses on the principles and practices of design thinking in the context of data visualization. Students will learn how to apply design thinking methodologies to create effective and impactful data visualizations that communicate complex information to stakeholders. Through hands-on exercises, case studies, and projects, students will develop practical skills in user-centered design, prototyping, and iteration, and gain an understanding of the role of design thinking in the development of data visualization solutions. By the end of the course, students will be equipped with the skills and knowledge to create effective data visualizations that drive informed decision-making in a variety of business contexts. REGISTRATION: Students should complete DCS515 prior to registration OR have a background with data analysis skills

Course offered: FA, SP, SU

DCS532 Big Data Technologies and Tools (3 course hours)

This graduate-level course equips students with the knowledge and skills necessary to navigate the world of Big Data. Through lectures, discussions, hands-on exercises, and a final project, students will explore the fundamental concepts, frameworks, and tools associated with Big Data technologies and their real-world applications.

Course offered: SU

DCS535 Advanced Data Analytics (3 course hours)

This immersive course provides students with an in-depth exploration of advanced techniques for data analysis, elevating their expertise in the ever-evolving field of data science. Beyond the fundamentals, students will delve into the intricacies of machine learning, predictive modeling, and data visualization, gaining practical skills and theoretical insights.

Course offered: SP

DCS540 Deep Learning and Neural Networks (3 course hours)

This course immerses students in the rapidly evolving realm of deep learning and neural networks, equipping them with the knowledge and skills to master the intricacies of cutting-edge AI technologies. With a strong emphasis on hands-on experience, students will explore a multitude of deep learning concepts and neural network architectures, diving into their applications not only in computer vision and natural language processing but also in areas such as reinforcement learning, generative adversarial networks, and autonomous systems.

DCS545 AI Ethics and Responsible AI (3 course hours)

In our rapidly evolving world of Artificial Intelligence (AI), immense potential for positive change is accompanied by critical ethical considerations. This course delves into the core principles and challenges of AI ethics, equipping you to develop and use AI responsibly. You'll gain a comprehensive understanding of key ethical principles like fairness, accountability, transparency, and privacy. Explore the societal impacts of AI, analyze real-world case studies, and develop critical thinking skills to evaluate ethical implications. Finally, learn practical approaches to building responsible AI, including techniques for bias mitigation, fairness evaluation, and explainability. REGISTRATION: Students must have a major GPA of 2.75 or higher to enroll

DCS550 Information Technology Project Management (3 course hours)

This course is designed to provide students with a comprehensive understanding of the principles and practices of project management within the context of information technology. Students will learn to manage projects from initiation to closure, including project planning, execution, monitoring, controlling, and reporting. Topics covered in the course include project scope, time, cost, quality, risk, communication, and human resource management. Additionally, students will develop the skills and knowledge necessary to successfully manage IT projects, making them valuable assets in today's technology-driven workplace. Upon completion of the course, students will be able to apply project management techniques to a variety of IT projects, ensuring successful completion on time, within budget, and to the satisfaction of stakeholders.

Course offered: FA, SP, SU

DCS560 Network Security and Defense (3 course hours)

Prepare to embark on a comprehensive exploration of the critical domain of Network Security and Defense. In today's digitally interconnected world, the protection of sensitive information and the resilience of networks are paramount. This course equips students with the knowledge and skills needed to understand, implement, and enhance network security within complex enterprise environments. Topics covered include network security principles, threat detection, and defense strategies, and securing enterprise networks.

DCS570 Innovation and Entrepreneurship (3 course hours)

This graduate level elective invites students to explore the intersection of technology and entrepreneurship. Dive into the latest trends, learn to generate and validate ideas, and cultivate an entrepreneurial mindset. The course covers business model innovation, product development, market research, and legal considerations in the tech landscape. With a blend of theory, hands on experience, and real world insights, students gain the skills to drive innovation or launch their ventures.

Course offered: SP

DCS586 Independent Workshop:Computer Sci (0-3 course hours)

Allows students to explore topics in computer science outside the regular curriculum. Additional details may be found in the "Alternative Credit and Special Course Arrangement" section of the catalog.

Permission of dept chair

DCS602 Enabling Technologies (3 course hours)

The principles and concepts of various enabling technologies and their applications in various fields will be investigated in this course. Students will learn about the latest technologies and their potential in different areas such as manufacturing, healthcare, transportation, and energy. The course will also cover the selection, implementation, and integration of enabling technologies in real-world scenarios. Students will be provided with the support and guidance needed to conduct high-quality research on enabling technologies and communicate the results effectively.

Course offered: SU

DCS606 Emerging and Disruptive Tech (3 course hours)

An in-depth examination of the conceptual and theoretical foundations of emerging technology will be explored in this course, with examples of emerging and disruptive technologies including: IoT, blockchain, artificial intelligence, virtual/augmented reality, autonomous vehicles, etc. Doctoral candidates will learn to interpret the impact of technological, psychological, and societal constraints on evolving technology and will gain knowledge and skills in analyzing and evaluating disruptive technology policies and frameworks, as well as designing their own frameworks for digital disruptions. This course will be beneficial for students interested in technology management, innovation, strategic management, and entrepreneurship.

DCS615 Foundations of Machine Learning (3 course hours)

In this course, students will explore a comprehensive introduction to the field, covering both the theoretical foundations and practical applications of machine learning techniques. Fundamental concepts and techniques of machine learning, including supervised and unsupervised learning, linear and non-linear models, and probabilistic approaches will be introduced. Students will gain practical experience with a variety of machine learning algorithms and tools, including decision trees, neural networks, and deep learning frameworks. By the end of the course, students will gain the knowledge and skills they need to become proficient in machine learning and to be able to apply it in real-world scenarios.

DCS620 Software Engineering (3 course hours)

This graduate course is designed to provide students with a comprehensive understanding of the principles and concepts of software engineering and the software development process. Students will learn about the latest industry-standard tools and techniques for designing, implementing, and testing high-quality software systems. Throughout the course, students will develop skills in software project management, including requirements analysis, design, testing, and maintenance. They will learn to use these skills to manage software projects effectively and efficiently. The course will also focus on developing critical thinking and problem-solving skills to evaluate and improve software systems.

DCS691 Practical Professional Leadership (1 course hour)

This course is designed to provide doctoral students with a comprehensive understanding of leadership theories, skills, and practices, as well as practical experience in real-world settings through internships. The course will cover the fundamentals of leadership, including theories and models, ethical decision-making, communication, and team-building. Students will develop their own leadership style and philosophy, and have the opportunity to apply their skills and knowledge through internships in their field of study. The internship component of the course will provide students with the opportunity to gain practical experience in real-world settings, and to develop a wide range of professional skills, including resume and cover letter writing, networking, interviewing, time management, and goal setting. Students will also engage in professional development activities and opportunities, and reflect on their experiences to identify their strengths and areas for growth. REGISTRATION: This course is required for students pursuing the Ed.D. in Computer Science; students pursuing a Master's degree must have permission of the program director to enroll.

Course offered: FA, SP, SU

DCS701 Introduction to Doctoral Studies (3 course hours)

This course supports the international doctoral candidate in the development of foundational skills and habits for success in the program, including how to navigate online learning and a variety of technology tools and platforms. Candidates will develop routines of habit and mind, maintain academic honesty, build collaborative relationships, and explore cultural impacts on learning. By the end of the course, doctoral candidates will demonstrate readiness to fully engage in the Judson community. This course is eligible for CPT credit with the completion of two additional learning modules.

Course offered: FA

DCS702 Analytic Thinking and Statistics in Research (3 course hours)

The goal of this course is to equip doctoral researchers with advanced analytical skills that are essential for making effective decisions in various fields such as business, government, and other fields. Developing the ability to identify patterns and trends in data, draw logical conclusions from evidence, and evaluate complex arguments will be a central focus. Students will learn to apply various analytic frameworks and techniques such as statistical analysis, cost-benefit analysis, and decision-making models to real-world problems.

Course offered: SP

DCS703 Human Computer Interaction for Online Learning Systems (3 course hours)

This course is designed to provide doctoral candidates with a deep understanding of human-computer interaction (HCI) and its application in online learning systems. Students will learn to design, evaluate, and improve online learning systems from an HCI perspective. Various aspects of HCI, including user interface design, user experience, and accessibility will be discussed. By the end of the course, students will have developed advanced skills in HCI, and will be well-equipped to conduct research and contribute to the field.

DCS705 Ethics and Compliance (3 course hours)

This course will acknowledge the ways technology can perform unethical types of techniques to users. A smartphone can track or spy as you shop at the grocery store, drones can be used to spy on neighbors and other individuals, algorithms are used in social media to monitor and even track your offline data. Technology was created to benefit and should not cross the line of ethics. Students will analyze the new development and controversies and the short-term and long-term effects of technology use. The aspects of enhanced privacy and security are used in our merging technological society.

Course offered: SU

DCS708 Evaluating Computer Sci Curriculum (3 course hours)

science education. Students will critically analyze existing CS curricula, apply evaluation frameworks, and utilize data-driven assessment techniques to identify strengths and areas for improvement. Through a combination of asynchronous pre-workshop learning, interactive in-person workshops, and post-workshop applied projects, students will develop practical skills in stakeholder analysis, data interpretation, and curriculum redesign. The course emphasizes evidence-based decision-making, ensuring that students can assess and enhance computer science curricula in diverse educational settings.

Course offered: FA (evry other)

DCS722 Policy and Advocacy in CS Education (3 course hours)

This course explores the intersection of policy, advocacy, and computer science (CS) education. Through a hybrid learning model, students will critically analyze existing CS education policies, evaluate their impact on diverse learning contexts, and develop advocacy strategies aimed at promoting equity and inclusivity. The course combines theoretical knowledge with practical skills, equipping students with the tools to design and lead research initiatives focused on influencing policy and advancing the state of CS education. Topics covered include comparative policy analysis, ethical considerations in research, stakeholder collaboration, and the use of technology in policy advocacy. Students will engage in hands-on projects, including policy proposal design, case study presentations, and data analysis, to deepen their understanding of how policies shape CS education outcomes and how they can advocate for meaningful change in the field.

Course offered: FA (evry other)

DCS725 Data Warehouse Mining (3 course hours)

In a constantly changing business climate the importance of understanding data, information, and knowledge, both explicit and tacit, remain paramount to business success (as well as personal victories). Based on customer touchpoints, advertisers are now able to promote products shoppers are likely to purchase. The constructs of data, information, and knowledge are not limited to advertiser. Indeed, since the advent of the machine age, businesses have been using data gathering, analysis, and knowledge management systems to understand current inventory levels and manufacturing requirements in order to improve Return on Investment decisions. The focus of this course will encourage student to go beyond the basics of such constructs and promote better decision making using Machine Learning (ML) as well as one dimension of Artificial Intelligence (AI).

DCS730 Cyber Security and Warfare (3 course hours)

Given today s technologically advanced society, the critical need for data collection and analysis, are at odds with societal needs for privacy. Researchers and politicians alike have suggested the likelihood of Cyberwarfare will continue to increase in intensity as we move to the next century. Indeed, it has never become more important for leaders and educators to understand the current body of knowledge, skills, techniques, and tools used to recognize and mitigate cyber-attacks. Students will research current computer and network hardware / software used to identify harmful digital activities and associated actions that can be taken to prevent harmful data breaches.

DCS735 Retrieving, Processing, and Visualizing Data with Python (3 course hours)

This course provides an introduction to the fundamental skills and tools needed to retrieve, process, and visualize data with Python. Students will learn how to access and extract data from a variety of sources, including APIs, databases, and web scraping. They will also learn how to clean, transform, and prepare data for analysis, and how to use basic statistical techniques to analyze and aggregate data. An overview of popular data visualization libraries such as matplotlib, seaborn, plotly, and bokeh will also be explored. Students will learn how to create various types of visualizations, including bar charts, line charts, scatter plots, and heatmaps, and how to make their visualizations interactive and compelling.

DCS741 Disruptions in Technology (3 course hours)

DCS745 Artificial Intelligence in Educ (3 course hours)

This doctoral course provides a comprehensive exploration of the fundamentals of artificial intelligence (AI) and machine learning (ML), with a focus on their applications in the field of education and aims to help students demonstrate an understanding of AI and ML and their potential to improve student learning outcomes. Throughout the course, students will gain skills in designing and implementing AI-powered educational systems, including natural language processing, computer vision, and decision-making algorithms. Additionally, students will be exposed to real-world examples of AI in education and its impact on teaching and learning, helping them to understand the practical applications of these technologies.

DCS790 CPT Application (0 course hours)

This course provides students with an opportunity to gain practical work experience, linking that experience to the Doctor of Education in Computer Science courses learning outcomes. Students will submit papers providing a job description, resume and correlation of the work experience with courses in which the student is enrolled for the respective term. Students may work any number of hours per week throughout the academic term, must be enrolled in at least two other graduate course leading to their degree, and maintain a 3.0 GPA. A maximum of twelve Experiential Learning courses can be taken; however, only one can be taken in any academic term. There are no graduate credit hours for this course.