Miami Dade College

Course Description

CIS2013C | Internet of Things Applications | 4.00 credits

In this course, students learn about the practical applications of Internet of Things (IoT) across various sectors and industries. They explore real-world use cases, ranging from smart homes and smart cities to the latest developments in the field. The course offers insights into how IoT solutions are designed, developed, and deployed, equipping students with the knowledge to create innovative IoT applications. Prerequisites: CIS2010C, CIS2011C.

Course Competencies:

Competency 1: The student will demonstrate understanding of basic project management concepts by:

1. Identifying key phases in a typical project lifecycle, including initiation, planning, execution, monitoring, and closure
2. Describing the roles and responsibilities of team members in collaborative project settings
3. Recognizing common tools and techniques used for tracking tasks, timelines, and deliverables
4. Summarizing the importance of clear communication, goal setting, and time management in successful project execution

Competency 2: The student will design and implement IoT projects by:

1. Collaborating in teams to develop IoT solutions based on real-world case studies from industries such as Smart Cities, Smart Homes, and Smart Grids
2. Applying project management principles to plan, develop, and deploy IoT prototypes
3. Using industry-standard hardware and software tools to create functional IoT applications
4. Documenting project milestones, challenges, and solutions in professional-grade reports and presentations

Competency 3: The student will apply IoT technologies to solve real-world challenges through case studies by:

1. Analyzing case studies to identify requirements, constraints, and opportunities for IoT implementations
2. Designing and building IoT systems inspired by industry examples, integrating sensors, actuators, and communication protocols
3. Implementing data collection, processing, and visualization pipelines tailored to case study needs
4. Presenting project outcomes to an audience, simulating a client or stakeholder review

Competency 4: The student will assess ethical, privacy, and security challenges in IoT projects by:

1. Analyzing case studies to identify ethical dilemmas and privacy concerns in IoT applications
2. Evaluating security vulnerabilities in case-based IoT systems and proposing mitigation strategies
3. Integrating security best practices into the design and deployment phases of project-based IoT solutions
4. Demonstrating knowledge of relevant legal and compliance requirements through project deliverables

Competency 5: The student will explore emerging IoT technologies and trends by:

1. Researching and incorporating appropriate technologies such as AI, blockchain, and 5G into IoT projects
2. Developing innovative IoT applications inspired by future-oriented case studies in transportation, healthcare, or energy
3. Critically evaluating emerging IoT tools and platforms for feasibility and scalability within project contexts
4. Reflecting on the lessons learned from case studies to propose enhancements for existing IoT applications

Competency 6: The student will integrate IoT applications into industry-specific scenarios through hands-on projects by:

1. Developing project-based IoT solutions for Smart Home automation, with a focus on energy efficiency and user experience

2. Creating Smart City prototypes addressing challenges like traffic congestion, waste management, and environmental monitoring
3. Designing and simulating Smart Grid applications to optimize energy production, distribution, and consumption
4. Conducting thorough testing and troubleshooting to ensure reliability and functionality of IoT projects

Learning Outcomes:

- Solve problems using critical and creative thinking and scientific reasoning
- Use quantitative analytical skills to evaluate and process numerical data
- Use computer and emerging technologies effectively