

CS 4623: Introduction to Cyber Physical Systems

Required Course: Elective

Course Number: CS 4623

Course Name: Introduction to Cyber Physical Systems

Credit Hours: 3

Lecture Hours: 3

Lab Hours: 0

Instructors: Dr.J.Cecil

Book Title(s):

Book Author(s):

Book Year(s):

Course Description: Introduction to principles and technologies dealing with cyber physical systems and Internet of Things (IoT). Design of cyber physical frameworks and the process underlying creation of 3D VR based simulation models and Next General Internet frameworks to support the adoption of cyber physical methodologies. Information modeling and systems engineering based techniques to support the design of collaborative methodologies for CPS contexts from various domains including robotics and medicine.

Course Prerequisites: None

Course Goals: The primary objective of this course is to introduce students to concepts, principles and methods in Cyber-Physical Systems (CPS), Internet-of-Things (IoT) and design of immersive VR/AR environments. Students will be exposed to theory as well as the practices relevant to Cyber-Physical Systems (CPS), Internet-of-Things (IoT) and immersive VR/AR environments; there will a focus on design of VR/AR models for various process domains. Students will be expected to demonstrate understanding of concepts and software tool through homework and project activities. A secondary objective is to encourage students to work as teams as well as become proficient at presenting their work to the class.

Student Outcomes:

Student Outcomes	Course outcomes
1	Ability to identify the various components of a CPS/IoT systems and have a understanding of different phases in the VR/AR model building process.
2	Ability to apply structured concepts, methodologies for the design and implementation of CPS, IoT and VR/AR environments.

3	Ability to develop activity, function models, collaboration, sequence and class diagrams based on the Unified Modeling Language
5	Ability to work as part of a team to design and build software applications
6	Ability to give technical presentations

Course Topics:

- Introduction to cyber physical modeling and information based collaborative engineering techniques.
- Importance of IoT, CPS principles in collaborative engineering approaches
- Concepts related to virtual prototyping / engineering and their role in today's global engineering practices.
- Design and development of VR/AR based Virtual Prototypes and simulation environments of process domains using software tools (process domains may vary each semester)
- Information modeling of process design activities and use in developing VR/AR based environments.
- Mid-term project exam and project presentation.
- Final exam and final project presentation