Course number	**ECS 6103**
Course Title	**Cyber Physical Systems**
Course Outline	Models of computation: finite state machines, threads, ordinary differential equations, hybrid systems, actors, discrete-events, data flow Basic analysis, control, and systems simulation: Bisimulations, reachability analysis, controller synthesis, approximating continuous-time systems. Interfacing with the physical world: sensor/actuator modeling and calibration, concurrency in dealing with multiple real-time streams, handling numerical imprecision in software Mapping to embedded platforms: real-time operating systems, execution time analysis, scheduling, concurrency Distributed embedded systems: Protocol design, predictable networking, security
Learning Outcome	1. Basic understanding of cyber physical systems 2. To develop the skills to realize embedded systems that are safe, reliable, and efficient in their use of resources., 3. To learn to think critically about technologies that are available for achieving such joint dynamics.
Assessment Method	Quiz / Assignment / ESE

Suggested Reading:

- Introduction to Embedded Systems - A Cyber-Physical Systems Approach, Second Edition, by E. A. Lee and S. A. Seshia, 2015
- Vahid, F. and T. Givargis (2010). Programming Embedded Systems - An Introduction to Time-Oriented Programming, UniWorld Publishing.
- Schaumont, P. R. (2010). A Practical Introduction to Hardware/Software Codesign, Springer.
- E. A. Lee and P. Varaiya, *Structure and Interpretation of Signals and Systems*, Addison-Wesley, 2003.