ECE 3502 Dataflow Programming for Embedded Systems

Students will use a graphical dataflow programming paradigm to develop a simulated traffic management system. Individual autonomous robots will play the roles of vehicles that obey basic traffic laws (stay in lane, stop at red light, maintain adequate distance). The iRobot Create systems are controlled using the myRIO platform programmed in LabVIEW using interacting state machines.

Topics include:
- Dataflow programming: students will learn LabVIEW, a graphical dataflow programming language developed by National Instruments (NI).
- State machine concepts: Students will learn how to specify and analyze interacting state machines for controlling the robot and its interactions with the environment.
- iRobot navigation, sensing and actuation: Students will learn the specifics of controlling the iRobot using the LabVIEW interface to sensors and actuators.

Intended participants:
This special topics course is intended for 2nd and 3rd year computer engineering and electrical engineering students. Computer science students would probably be OK taking this course. Prerequisites: Digital Logic Design, Software Development Methods and knowledge of circuits & physics.

Students will be expected to be self-motivated and willing to figure things out without much guidance, and be able to work well with others.

Logistics:
The class is scheduled for Wednesday & Friday afternoons (1:00 – 1:50) plus a Friday morning lab (9 – 11AM) and will be held in Rice 120. The students will have access to Rice 120 after hours so that there should be ample time to work on the projects. Sometimes there will be formal lab assignments, other times the lab time will be made available for group work.