SYST 620/ECE 673 Discrete Event Systems (3.0:3)

Prerequisites: SYST 611 or ECE 521 or equivalent

Introduction to modeling and analysis of discrete event dynamical systems. Course covers elements of discrete mathematics and then focuses on Petri Net models and their basic properties: locality and concurrency. Condition/event systems; Place/transition nets; Colored Petri nets; Reachability graphs (Occurrence nets); and Invariant Analysis. Temporal issues in Petri nets and Temporal Logic. Stochastic Petri nets. Relation to other discrete event models of dynamical systems. Applications of the theory to modeling and simulation and to systems engineering problems

 Instructor: Prof. Alexander H. Levis   ST2   Room 261   703 993 1619   alevis@gmu.edu

Guest instructor: Prof. Abbas K. Zaidi   ST2 Room 237   703 993 1774 szaidi2@gmu.edu

Course Call numbers: ECE 673 001 72852; SYST 620 001 71930; SYST 620 607

Fall 2008: M 4:30 – 7:10 pm   in Room STI 110 (Science and Tech I)

COURSE OUTLINE (subject to change)

8/25/20081. Introduction: Systems and Models; Graph Theory; Petri Net basics

 9/8/20082. Set Theory; Essential Features of Petri Nets; CPN Tools I

9/15/20083. Symbolic Logic; Petri Net models and Definitions

9/22/20084. Predicate Logic; Colored Petri Nets; CPN Tools II

9/29/20085. Functions and Relations; Formal definition of CP Nets; PN properties

10/6/20086. ML Programming

10/14/20087. Petri Nets and Time; Hierarchical Petri Nets

10/20/2008Mid Term

10/27/20088. Petri Net Properties: Structural Methods and Invariants

11/3/20089. State Space methods; State Space analysis in CPN

11/10/200810. Stochastic Petri Nets; Simulation based analysis using CPN

11/17/200811. Other DEDS models: Languages and Finite State Machines

11/24/200812. Petri Net applications: V&V of rule bases, Adaptive architectures

12/1/200813. Engineering Applications of Petri Nets

Reading and reference material:

Kurt Jensen and Lars Kristensen, *Coloured Petri Nets,* Springer, Berlin (to be published in 08)

Class notes by A. H. Levis and A. K. Zaidi

Other references posted on WebCT

Student Evaluation Criteria: Homework 40%; Midterm 25%; Final 35%