ECE 673 / SYST 620 Discrete Event Systems (3.0:3)
Prerequisites: ECE 521 or SYST 611 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

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Guest instructor: Prof. Alexander H. Levis Ph: 703 993 1619 alevis@gmu.edu

Fall 2009: Monday 4:30 – 7:10 PM
Office Hours: Monday 3:00 – 4:30 PM and by appointment

COURSE OUTLINE (subject to change)

08/31/2009	1. Introduction: Systems and Models; Graph Theory; Petri Net Basics
09/07/2009	*Labor Day, University Closed*
09/14/2009	2. Set Theory; Essential Features of Petri Nets; CPN Tools I
09/21/2009	3. Symbolic Logic; Petri Net models and Definitions
09/28/2009	4. Predicate Logic; Colored Petri Nets; CPN Tools II
10/05/2009	5. Functions and Relations; PN properties; Formal definition of CP Nets
10/13/2009	6. ML Programming. NOTE: This is a Tuesday class.
10/19/2009	Mid Term
10/26/2009	7. ML Programming (cont'd); Exam Review
11/02/2009	8. Petri Net Properties: Structural Methods and Invariants
11/09/2009	9. Petri Nets and Time
11/16/2009	10. Hierarchical Petri Nets; State Space Analysis in CPN
11/23/2009	11. State Space Analysis (Examples)
11/30/2009	12. Stochastic Petri Nets; Simulation based analysis using CPN
12/07/2009	13. Other DEDS models: Languages and Finite State Machines
12/14/2009	Final Exam

Reading and reference material (available via Blackboard):
Kurt Jensen and Lars Kristensen, *Coloured Petri Nets*, Springer, Berlin
Class notes by A. H. Levis and A. K. Zaidi

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