

## ECE 453-101: Introduction to Discrete Event Systems

**Prerequisites:** Senior Student in ECE

**Description:** This course introduces fundamentals of discrete event systems: logical models, timed models, stochastic timed models, graphical representations, Markov chains, and discrete-event simulation. The primary mathematical and graphical model is Petri nets. It presents their applications in modeling, control, analysis, validation, simulation, and performance evaluation of various discrete event systems.

**Outline:**

Topic	Week
Discrete event systems	1
State machines and math	2-3
Hardware implementation	4
Petri nets and properties	5-6
Midterm Exam	7
Petri net invariant analysis	8
Petri net reduction	9
Deterministic time Petri nets	10
Markov chains	11-12
Stochastic Petri nets	13
Project presentation	14

**Instructor:**

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**Office hours:** Tuesday and Friday 5-6pm or by appointment

**Web page:** <http://web.njit.edu/~zhou>

**Classroom:** [ECEC100](#) **Instruction time:** 6-9pm, Tuesday

**Honor Code:** All students are expected to follow the NJIT Honor Code in this course. This includes pledging all homework assignments, quizzes, and tests.

**Textbook:** Hruz, B. and M. C. Zhou, *Modeling and Control of Discrete Event Dynamic Systems*, Springer, London, UK, 2007 (Advanced Textbooks in Control and Signal Processing). ISBN-13: 9781 8462 88722

**Reference book:**

1. R. H. Katz, Contemporary Logic Design, Chapter 10, Finite State Machine Implementation. 2nd Ed., Prentice Hall, 2004, **ISBN-10:** 0201308576
2. M. C. Zhou and K. Venkatesh, Modeling, Simulation and Control of Flexible Manufacturing Systems: A Petri Net Approach. World Scientific, 1998. ISBN 981-02-3029-X.

**Grading:** Midterm @ 36%; Final exam @ 32%; 4 homework assignments @ 32% total. Homework will be posted to the class's email list at least one week prior to their due dates. No points will be given to your homework submission if it passes its submission deadline.

**Modifications:** Students will be consulted prior to any modification to this syllabus and must agree to any modifications or deviations throughout the course of the semester. Listed test dates are tentative and subject to change. Students unable to submit homework assignments or take tests due to religious observances or other reasons should contact the instructor as soon as possible to make alternate arrangements for the missed assignments.

All students must adhere to the below-related document for each assignment and exam:

***"Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at: <http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf>.***

*Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university. If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at [dos@njit.edu](mailto:dos@njit.edu)"*