

**PERFORMANCE ANALYSIS OF NETWORKS**  
**(CSE- 844)**

**Credit Hrs** 3.0

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1. **Pre-requisite:** Communication Systems and Networks.
2. **Course Objectives:** The course applies the concepts of available modeling techniques, including mathematical methods like Markov chains and Petri nets, and simulation methods. Models are usually too large to be handled by a computer system, and, due to model complexity, model development is very time consuming. Further, the course will present the methods for complexity reduction, which considerably reduces development time. In addition, a strategy for developing a generator for automatic model derivation is also the part of this course.
3. **Outcomes:** After the course the student will be able to analyses design, optimize and evaluate modern day cellular and multistage interconnection network using both simulation and mathematical models.
4. **Course Contents:**
  - (a) Introduction
    - (1) Models and Performance Evaluation
    - (2) Parallel System Architecture
    - (3) Distributed System Architecture
  - (b) Characteristics of Network Architectures
    - (1) Switching Techniques
    - (2) Traffic patterns
    - (3) Wired Network Architectures
    - (4) Wireless Network Architectures
    - (5) Network-on-Chip Architectures
    - (6) Network Reconfiguration
  - (c) Performance Evaluation

- (1) Numerical Simulation
- (2) Markov Chains
- (3) Petri Nets
- (d) Model Engineering
  - (1) Model Development
  - (2) Complexity Reduction
  - (3) Automatic Model Generation
- (e) Example Simulations
  - (1) Application: Multistage Interconnection Network
  - (2) Cellular Network

**5. Text Books/Reference Material:**

- a. Dietmar Tutsch, *Performance Analysis of Network Architectures*.  
(2006)
- b. Several handouts and papers.