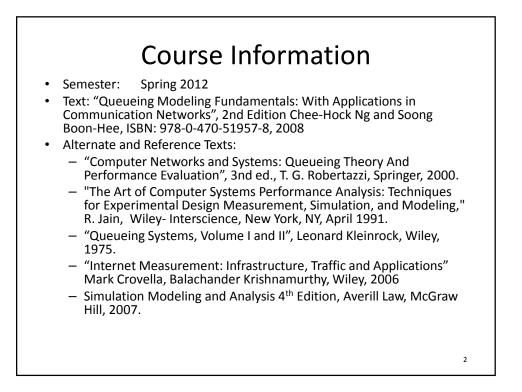
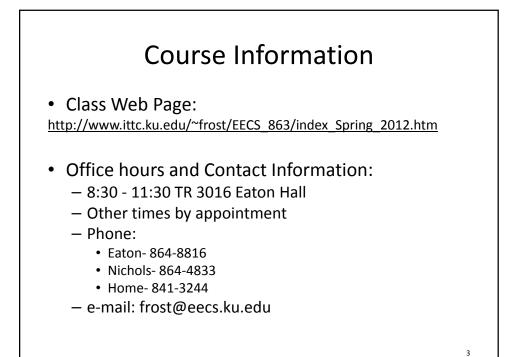
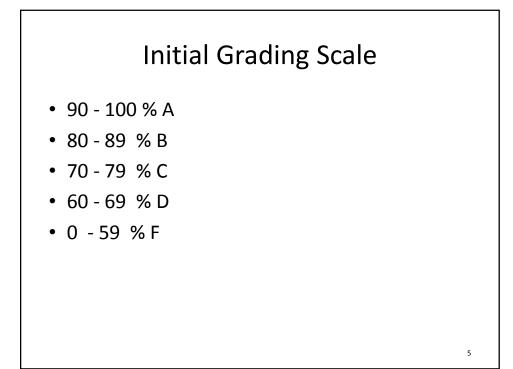
# EECS 863 Analysis of Communication Networks

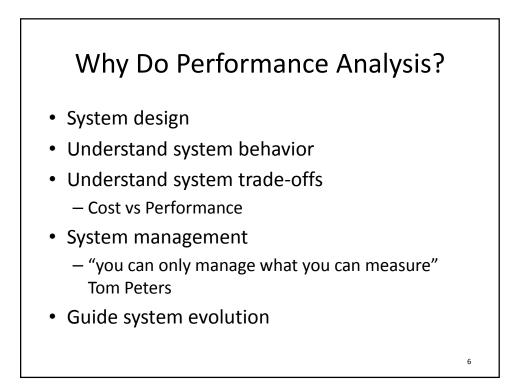
Victor S. Frost Dan F. Servey Distinguished Professor Electrical Engineering and Computer Science University of Kansas Phone: (785) 864-4833 e-mail: frost@eecs.ku.edu http://www.ittc.ku.edu/~frost





<ul> <li>Exams: 2 in class tests (open book a</li> <li>Homework: problems will be assign</li> <li>Grading: <ul> <li>2 - In class tests; open book &amp; note</li> <li>2 - projects</li> <li>Homework</li> <li>Paper &amp; Presentation</li> <li>Class participation &amp; attendance</li> <li>No Final</li> </ul> </li> </ul>	& notes) ned. s = 160 (80 points/test) = 160 (80 points/project) = 80 points = 120 points
<ul> <li>Produce a written review and make an oral presentation to the class of a published paper, the paper will be selected by the student <u>or</u> execute a substantial measurement/simulation project, write up the results, and make an oral presentation to the class. The paper or project must be selected and approved by <u>March 1, 2012</u>.</li> </ul>	
<ul> <li>General guidelines: Only under very extreme conditions will make up tests be given. No late homework will be accepted</li> </ul>	

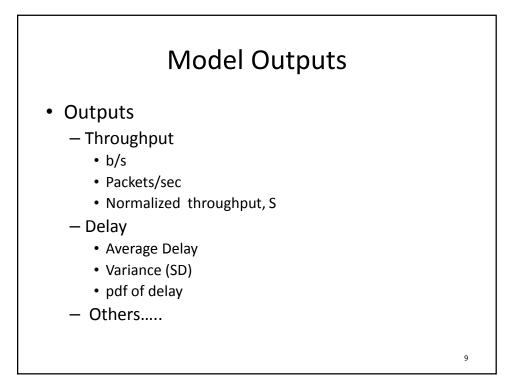


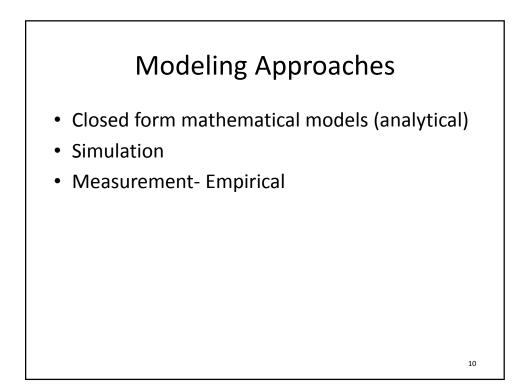


# Role of Models

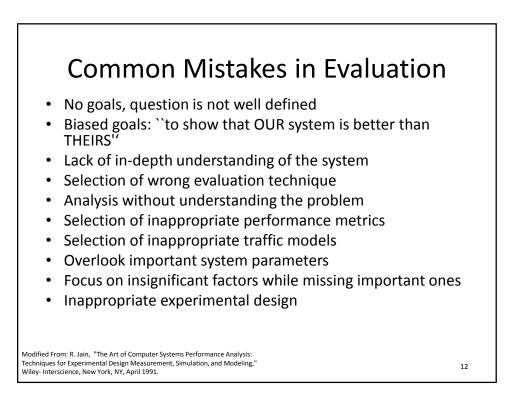
- Models are abstract descriptions of the physical world.
- Models are used to predict future system behavior.

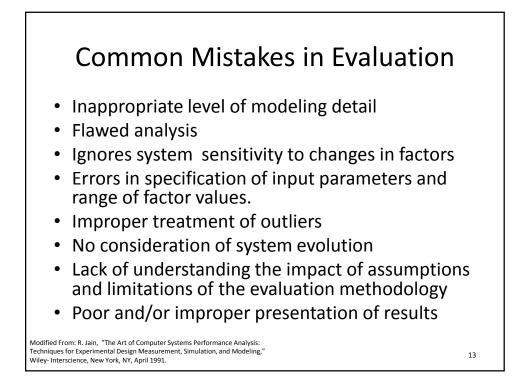
#### **Model Inputs** Inputs - Traffic (workload) Controllable system parameters • Number of traffic sources • Min/max packet size Packet size pdf • Maximum burst size • Packet interarrival time pdf • Link capacities • Geographical distribution of • Buffer size traffic sources • Queue service disciplines • Motion of traffic sources • Queue priorities • ..... Routing - Environmental parameters • Window size Noise environment • Transmit signal power • Fading environment • Receiver sensitivity • ..... • ..... 8

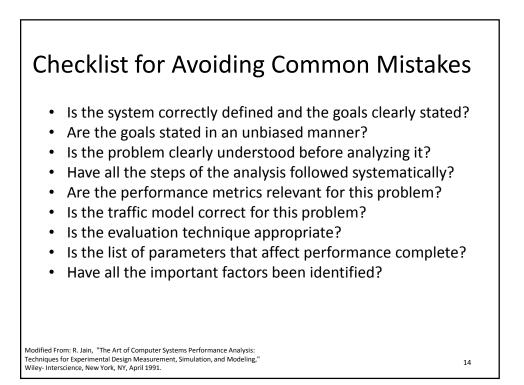




### Steps in Performance Analysis Understand who is the customer and what is their expectation Clearly define goals for the analysis, what is the question to be answered Define the system Articulate the outcomes Select metrics (outputs) Select fixed system parameters Select system variables (factors) to study (define the x-y axis on output performance plots) ٠ Select traffic model (workload) ٠ Select modeling approach (evaluation technique) • Clearly state and understand modeling assumptions Design and execute the analysis, e.g., simulation experiments Analyze and interpret data Present results Plan for success, the customer will say, "that is informative, but can you answer this related question ......' Modified From: R. Jain. "The Art of Computer Systems Performance Analysis: Techniques for Experimental Design Measurement, Simulation, and Modeling, 11 Wiley- Interscience, New York, NY, April 1991.



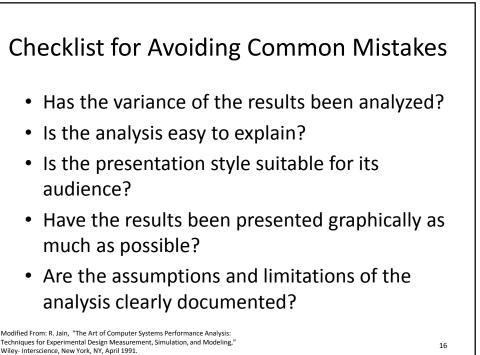




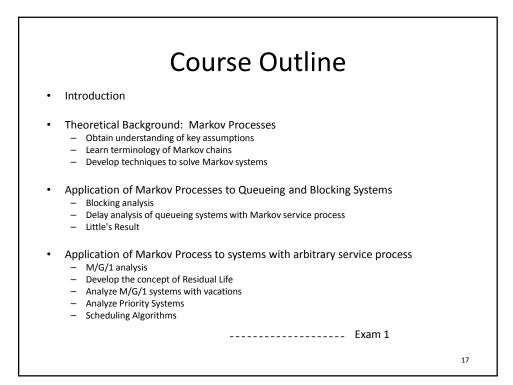
### **Checklist for Avoiding Common Mistakes**

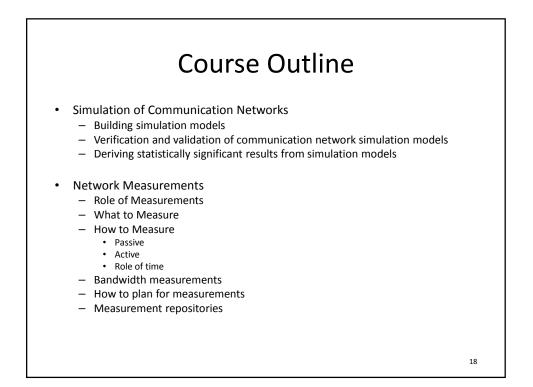
- Is the experimental design efficient in terms of time and results?
- Is the level of detail proper?
- Is the measured data presented with analysis and interpretation?
- Is the analysis statistically correct?
- Has the sensitivity analysis been done?
- Would errors in the input cause an insignificant change in the
- results?
- Have the outliers in the input or output been treated properly?
- Has the evolution of the system and traffic been considered?
- Has the variance of input been taken into account?

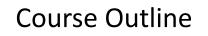
Modified From: R. Jain. "The Art of Computer Systems Performance Analysis: Techniques for Experimental Design Measurement, Simulation, and Modeling, Wiley- Interscience, New York, NY, April 1991.



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- Analysis of Networks of Queues
  - Analysis of open networks
  - Analysis of closed networks and application to analysis of window flow control techniques
- Topological Design of Networks.
- Routing Algorithms of Networks.

----- Exam 2