**SC531 PROBABILITY & RANDOM VARIABLES**

1. Quick review:

Logical deduction [understood as a form of "inference"]  
Logic --> making deductions from "known facts"  
a) Propositional logic, logical connectives  
b) Predicate logic, quantifiers, PROLOG  
Examples  
  
2. Dealing with uncertainty:

Two interpretations: *relative frequency*, *degree of plausibility*

**Axioms** of probability  
Basic rules  
Conditional probability and Bayes’ rule  
Laplace's rule of succession  
Prior and posterior probability, role of "new information"  
Examples  
  
3. Random variables:

Discrete and continuous random variables  
Probability distributions

Joint distributions   
Some useful distributions: binomial, uniform, Gaussian, Poisson ...  
Examples

4. Learning about the real world:

Correlation, regression

Role of samples  
Sample statistics

Tchebycheff inequality  
Central limit theorem

Tests of hypotheses

Examples

5. Introduction to random processes:

Basic definitions

Markov process

Poisson process

Birth and death process

Single server queue

Examples

[Simple applications & simulation techniques, where applicable]

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Lecture slots:

Mondays 8:00 am to 8:50 am

Tuesdays 12:00 noon to 12:50 pm

Thursdays 12:00 noon to 12:50 pm

For lecture notes & notices:

Google Classroom class code: colnbh4

Link: <https://classroom.google.com/c/Mzc2NjU3MTc5NDQz?cjc=colnbh4>

Main references:

1. *Artificial Intelligence: A Modern Approach*, Russell & Norvig, Pearson, 2010.

2. *Probability and Statistics, Random Processes and Queueing Theory*, Veerarajan, McGraw Hill Education, 2019.

3. *Probability, Random Variables and Stochastic Processes*, Papoulis & Pillai, Tata McGraw-Hill Publishing, 2002.