

STATISTICS 201 "ELEMENTS OF FINITE PROBABILITY"

Calendar Description: H(3-1T)

Sets and events, counting techniques. Axioms of probability, conditioning and independence, Bayes' theorem. Random variables and their distributions. Expectations, variances and the law of large numbers.

Prerequisite: Mathematics 30 or Pure Mathematics 30, or Math II (Continuing Education).

Syllabus

<u>Topics</u>	<u>Number of hours</u>
Informal definitions of probability: classical frequency and axiomatic approach.	1
Set theory: unions, intersections complements, differences, Cartesian products. Commutative, associative and distributive laws, de Morgan's law. Product sets. Classes of sets.	4
Counting principles: multiplication principle, combinations and permutations with and without repetitions. Binomial coefficients and theorem. Order partitions. Tree Diagrams.	7
Sample space events. Axioms of probability. Finite probability and equiprobable spaces. Uncountable uniform spaces.	4
Conditional probability and independence: formula of total probability and Bayes' theorem. Multiplication principle for conditional probabilities and probability trees. Repeated trials.	5
Random variables, their distribution. Expectations, variances and covariances and their applications. Simple continuous random variables. Joint distribution Tchebycheff's Inequality and the weak law of large numbers.	6
Binomial, Negative Binomial, Normal and Poisson distribution. Normal approximation to the binomial distribution. Central limit theorem.	5
Probability vectors, stochastic matrices. Fixed points. Markov chains. Stationary distribution of regular Markov chains. Absorbing states.	4
TOTAL HOURS	36

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