
Final Exam Syllabus
Probability and Statistics
Engineering Mathematics for Advanced
Studies
IIT Dharwad
Autumn 2019

1. Comparison of Statistics vs Probability
2. Combinatorial Analysis
 - (a) Permutations
 - (b) Combinations
 - (c) Number of integer solution of equations (Distribution of n units into r baskets
 - i. Empty baskets not allowed
 - ii. Empty baskets allowed)
3. Terminology - Experiment, trial, outcome, events, sample space, sample population, etc.
4. Venn diagram representation
5. Sets
 - (a) Operations - Union, Intersection, Complement
 - (b) Mutually exclusive sets/events
 - (c) Laws - Commutative, Associative, Distributive
 - (d) De Morgan's law
6. Axioms of Probability
7. Simple propositions used in probability
8. Independent events
9. Conditional probability
10. Bayes' formula
11. Random Variables
 - (a) Discrete Random variables
 - (b) Expected value (EV)
 - i. EV of random variable
 - ii. EV of a function of random variable
 - iii. Mean and analogy to Center of Gravity
 - iv. Variance and analogy to Moment of inertia
 - v. Relation between mean and variance
 - (c) Binomial distribution
 - (d) Poisson distribution
 - (e) Normal distribution

- **Important topics that could not be covered in the class (excluded for exam)**
Distribution of several random variables, most of the statistics concepts, Hypothesis testing, Goodness of fit, Student's t-test, χ^2 -test, ANOVA.