# Chapter 1

- 1. Be able to determine the sample space, outcomes and event(s) from a given situation and be able to write the event in symbols and words.
- 2. Set Theory: be able to use set theory notation.
- 3. Set Theory: Be able to determine the union, intersection, compliment, setminus and combinations of events. These include de Morgan's laws, associative, distributive and commutative properties and the null set.
- 4. Set Theory: Be able to draw Venn Diagrams of union, intersection, compliment, subsets, etc for sets or events.
- 5. Be able to write sets in words (English).

## Chapter 2

- 6. Be able to state the frequentist interpretation of probability in words and calculate the appropriate probability.
- 7. Determine if two events are disjoint.
- 8. State and use the three probability axioms. There may be proofs using these axioms on the exam. If there are proofs, I will tell you which theorems you can use. You may state a theorem by its name (description).
- 9. Be able to use:  $P(\emptyset) = 0$
- 10. Determine if a listing of numbers is a legitimate probability.
- 11. Be able to create and show that a set of events is a partition.
- 12. Determine if a situation utilizes the equal likelihood assumption for finite or infinite sample spaces.
- 13. Determine probabilities using the equal likelihood assumption..
- 14. Determine if a situation utilizes empirical probabilities.
- 15. Determine if a situation utilizes subjective probabilities.
- 16. Be able to use the basic properties of probability to calculate probabilities:
  - a) Domination principle
  - b) Complementation Rule
  - c) Inclusion Exclusion Principle

## Chapter 3

- 17. Be able to determine if two (or more) events are independent using  $P(A \cap B) = P(A)P(B)$ 
  - a) subsets are dependent
  - b) complements are dependent
- 18. Be able to determine if two events are independent using P(A|B) = P(A) (P(B|A) = P(B)).

- 19. Be able to differentiate between (mutual) independence and pairwise independence.
- 20. Be able to differentiate between independent events and disjoint events.
- 21. Be able to use the concept of independent events to calculate probabilities.
- 22. Be able to determine the probability of good before bad (Th. 3.24).

#### Chapter 4

- 23. Be able to determine what is given in a problem involving conditional probabilities and/or intersections. (Also in Chapter 5).
- 24. Be able to calculate conditional probabilities using the definition of conditional probability.
- 25. Be able to use the fact that a conditional probability follows the probability axioms.

#### Chapter 5

- 26. Be able to calculate a probability using a partition.
- 27. Be able to determine when to use Bayes' Theorem and which form to use.
- 28. Be able to use Bayes' Theorem to calculate conditional probabilities.
- 29. Be able to calculate intersections by using the general multiplication rule. (Also in Chapter 4)
- 30. Be able to use the Pôlya's urn situation.
- 31. Be able to calculate probabilities using circuits in series, or parallel, or a combination of the two.