**STAT200 – Elementary Statistics**

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##### Chapter 1 Summary

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| **Concept** | **When to use** | **Procedure** |
| **Population**  **Vs.**  **Sample** | Determine if data corresponds to population or sample | * Population data is where the data are collected from every individual of interest. A population **parameter** is a numerical measure that describes a characteristic of the population (such as the population mean) * Sample data is where the data are only from some of the individuals of interest (subset of the population). A sample **statistic** is a numerical measure that describes a characteristic of the sample (such as the sample mean). Note: a sample statistic may change from sample to sample. |
| **Descriptive Statistics,**  **Inferential Statistics** | Determine the branch of statistics | Descriptive statistics – organizing, summarizing and displaying data.  Inferential statistics – use a sample to draw conclusions about a population. |
| **Quantitative or Qualitative Data** | Determine the nature of a variable | Quantitative variable describes a numerical measurement which can be used in mathematical operations such as addition or averaging.  Note: Quantitative variables can be either discrete or continuous.  Qualitative variable describes a category or group, such as male or female (can also be numerical measurement where math operations do not make sense) |
| **Methods of Data Collection** | Identify various methods to collect data | * Observational study – observe and measure data of interest. * Experiment – apply some treatment to part of the group and measure responses * Simulation – use a mathematical or physical model to reproduce a process, typically simulations are performed using computer models * Survey – use interview techniques to ask questions and collect responses |
| **Random Sampling** | You want to use a random number table to select a random sample from a population | For a random sample, every member of the population has an equally likely change of being selected for the sample.  To use a random number table to select random samples:   1. Identify the population of interest and population size. Number all members of the population sequentially. Note how many digits are in the population size. Example, if the population size was 9635, then this represents 4 digits. 2. Identify the sample size. 3. Start at a random starting point in the random number table and group the digits in groups according to the number of digits in the population size. 4. Create the sample by selecting the population members with numbers that correspond to those numbers from the random number table. If a number from the random number table does not match the population, discard the random number and move to the next random number from the table. |
| **Sampling Methods** | Apply Various sampling techniques | * Random Sampling – every member of population has equally likely chance to be included in the sample * Stratified Sampling – divide population into different categories and select random sample from each category * Systematic sample – select every kth member from the population * Cluster sample – Divide population into segments or clusters (typically done on geographic basis). Randomly select clusters and then include every member from that cluster in the sample. * Convenience Sample - Select sample according to sample that is most readily and easily available – usually results in a biased sample! |