1. Basics:

- Random variables:
  - Overview [video - 12 min] and [article].
  - In the context of a dataset [video - 4 min].
- Cumulative Distribution Functions and Probability Density Functions:
  - Clearly explained [video - 16 min] and [article].

2. Descriptive Statistics:

- Statistics, their point estimations with properties (skewness, kurtosis, shape) in the [video - 13 min] and [article].
- Degrees of freedom: [article - also includes explanation in the context of **6. Hypothesis Testing**];
- Interval estimations or confidence intervals:
  - For known Standard Deviation in [video - start at 9:44];
  - For unknown Standard Deviation + Student's T-distribution in [video - start at 6:15] ;
  - For both [post].
- Robust estimations, an overview [post].
- Maximum likelihood method explained: [video - 6 min] and [video - 5 min]; how to estimate model's parameters with MLM [article].

3. Sampling methods:

- All methods explained in the article (an overview).
- A presentation for Stratified Sampling with examples of statistic estimation, properties of different approaches and so on: slides (15 slides).

4. Hypothesis testing:

- Basics of HT: null hypothesis - H_0, alternative hypothesis - H_1, significance level in [video - 22 min];
- P-values clearly explained in [article], how to estimate it for 1-tailed tests [video - 22 min] and 2-tailed tests [video - only to 12 min];
- Type 1 and 2 errors [video - 11 min] and [article];
- Also H_0, H_1, p-value, types of errors in [article];
- How to check *normality* of a distribution:
  - Shapiro-Wilk, Kolmogorov-Smirnov, Lilliefors tests, QQ-plots: [article - points 3-6; histogram and boxplots are not valid as normality checking approaches];
  - D'Agostino's K^2, Anderson-Darling tests and python API's: [article];
  - QQ-plots clearly explained in the [video - 7 min];
- How to check *mean equality* of 2 distributions *(pay attention to the test assumptions!)*:
  - T-test and Paired T-test: [article], [Python API];
  - Welch T-test: [article], [Python API - the same link, use parameter *equal_var*];

- ○ 2- and 1-Tailed T-test [video - 13 min].

Additional:

- ● ANOVA - mean equality test for 3 and more distributions:
  - ○ 1-Way ANOVA [video - 14 min];
  - ○ 2-Way ANOVA [video - 18 min];
  - ○ These are described in [article].
  - ○ Post hoc analysis of the ANOVA results:
    - ■ Bonferroni correction [video - 10 min] and [pdf - points 1-2];
    - ■ Tukey's test (correction) [article];
- ● Chi^2 test:
  - ○ For independence of *categorical* variables hypothesis [article].