

Chapter Format

- Chapter Introduction, including bullet pointed objectives.
- Chapter material
- Summary (bullet points), with keywords in bold.
- Exercises
- References
- Appendix: Software instructions (to be included at a later stage).

1 Introduction (Beatrix Jones)

Including the role of Data Collection.

2 Exploratory data analysis and presentation (Daniel Walsh)

2.1 Principles of the Graphical Display of Data

2.2 Tabular Data

2.3 Numerical Summaries

2.4 Understanding the Distribution of Data

2.5 Comparing Different Groups of Data

2.6 Trends and Relationships

3 Probability (Samantha Prins)

3.1 What is probability?

3.2 Conditional probability

3.3 Independence

3.4 Bayes Rule

4 Random Variables and Probability Distributions (Samantha Prins)

4.1 What is a random variable?

4.2 Continuous Random Variables

Including pdf, cdf, Normal Random Variables.

4.3 Discrete Random Variables

Including Binomial and Poisson.

4.4 Multivariate distributions

The idea of these with discrete examples (ie a bivariate pmf). Also what independence between random variables implies for their multivariate distribution.

5 One Sample Inference (Jones+ Rajesh Gunesh)

Include in chapters 6-8 relevant non-parametric tests as well.

5.1 Ideas of inference, point estimation

5.2 Confidence Intervals

5.3 Hypothesis tests

5.4 Applications of these ideas

(Some to be used earlier as examples/illustrations.)

- Decision making for population mean, variance unknown.
- Decision making for population proportion.
- Decision making for population variance (normal population).

6 Inference for two samples or Categories

- Decision making for means of two populations, variances same.
- Decision making for means of two populations, variances different.
- Paired t-test
- Decision making for two population proportions.
- Decision making for ratio of two variances (normal populations).

7 Design and Analysis of Experiments (Ken Russell)

8 Chi-Squared Tests (Paul Hewson)

Independence and GOF.

9 Simple Regression(Andreas Keirmeier, Issac Dialsingh)

9.1 Review of Scatterplots and Correlation

9.2 Fitting Regression a Simple Linear Regression Model

9.3 Diagnostics

9.4 Interpreting the Estimates

9.5 Making inferences and predictions

10 Multiple Regression (Colin Gillespie)

11 Statistics for Quality (Raj Govindaraju)

11.1 Role of Statistics in Quality

11.2 Shewhart-Deming cycle of process improvement

11.3 Statistical Thinking for Quality

11.4 Reducing Common Cause Variation

11.5 Process Monitoring with Control Charts

11.6 Variables Control Charts

11.7 Attribute and Control Charts

11.8 Acceptance Sampling

12 Future Chapters

The following will be included when volunteers arise or demand dictates.

12.1 Time Series

What is a time series, and how is it different from iid data. Include index statistics (eg Consumer Price Index).

12.2 More on Design of Experiments

Include factorial experiments (2^k designs).