PROBABILITY & STATISTICS

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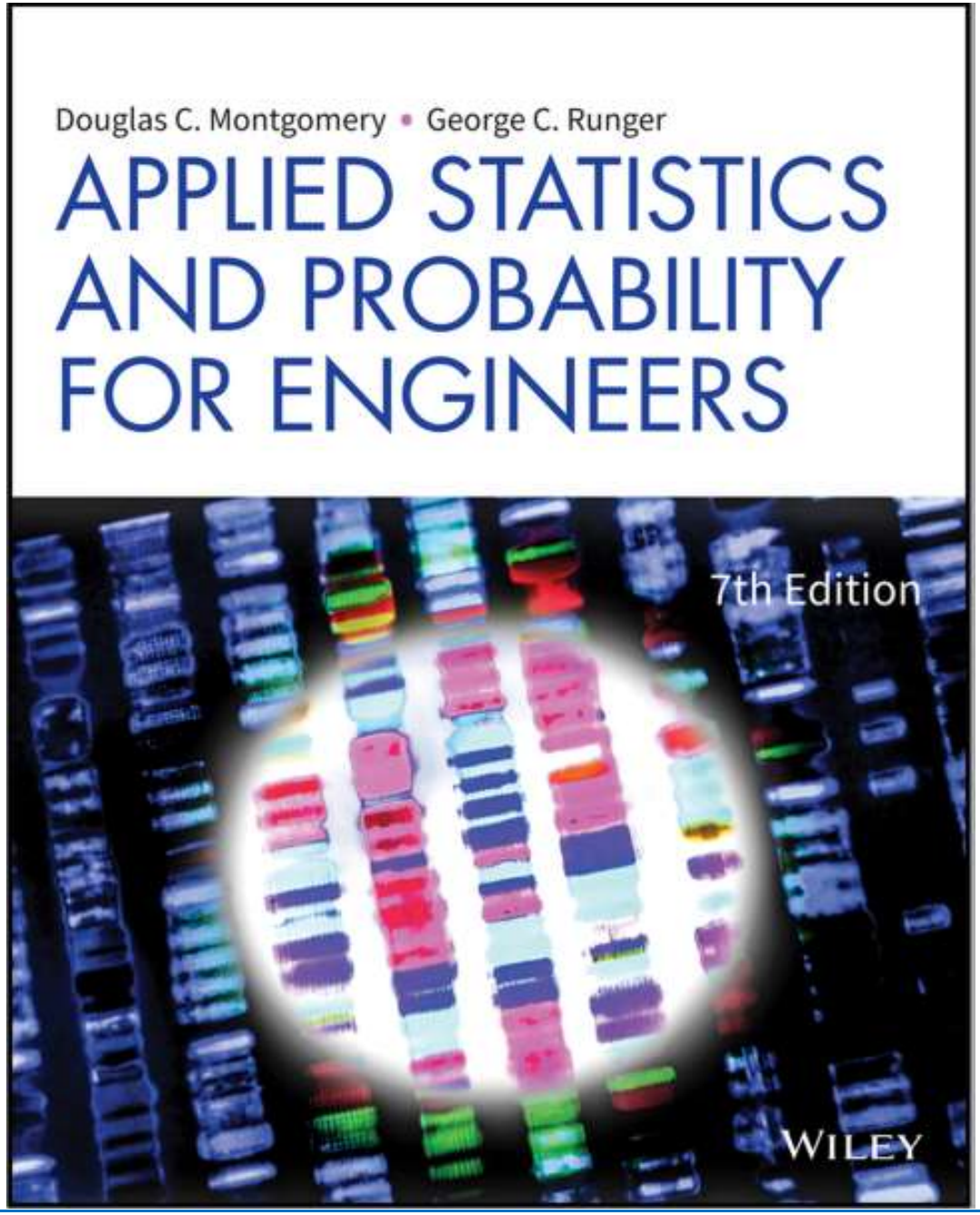
Evaluation Strategy

- Must attend more than 80% of contact hours
- Evaluating
  - 03 Progress tests: → 30%
  - 02 Assignments: → 20%
  - 01 computer project: → 15%
  - Final Exam (FE): → 35%
- Pass: Every on-going assessment component > 0
  and Final Exam score ≥ 4 (of 10)
  and Final Result ≥ 5
  Retake only the Final Exam when not passed

Materials


Douglas C. Montgomery • George C. Runger
APPLIED STATISTICS AND PROBABILITY FOR ENGINEERS
7th Edition
WILEY

Course description

Chapter 1: The Roles of Statistics in Engineering
Chapter 2: Probability
Chapter 3: Discrete Random Variables and Probability Distribution
Chapter 4: Continuous Random Variables and Probability
Chapter 6: Descriptive Statistics
Chapter 7: Point Estimation of Parameters
Chapter 8: Statistical Intervals for a Single Sample
Chapter 9: Test of Hypotheses for a Single Sample
Chapter 10: Statistical Inference for Two Samples
Chapter 11: Simple Linear Regression and Correlation

Chapter 1. The Roles of Statistics in Engineering

Discuss the roles of statistics in engineering

THE ROLES OF STATISTICS IN ENGINEERING

1.1 The Engineering Method and Statistical Thinking

1.2 Collecting Engineering Data

1.3 Mechanistic and Empirical Models

1.4 Probability and Probability Models

The Creative Process

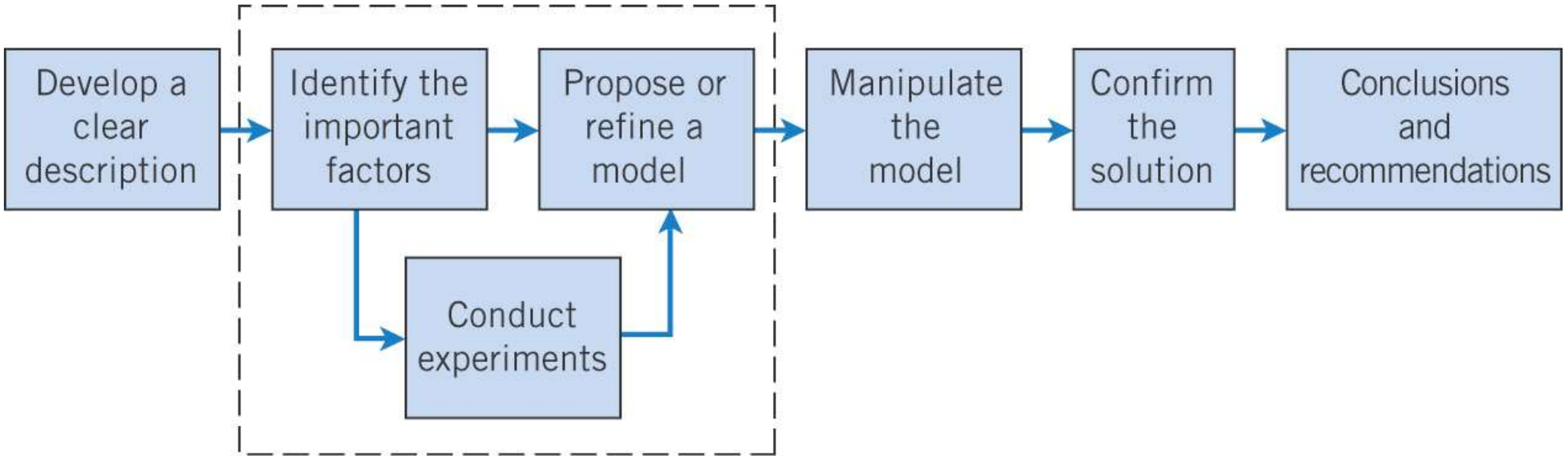


Figure 1.1 The engineering method

WHAT IS STATISTICS

What is Statistics

The science of collecting, organizing, analyzing, and interpreting **DATA** in order to make decisions.

Descriptive Statistics:
Involves organizing, summarizing, and displaying data.

e.g. Tables, charts, averages

Inferential Statistics
Involves using ***sample data*** to draw conclusions about a ***population.***

WHAT IS STATISTICS

Population

the complete collection of all individuals to be studied.

the collection is complete in the sense that it includes *all* of the individuals to be studied

Census

Collection of data from *every* member of a population

Sample

Sub-collection of members selected from a population

WHAT IS DATA

What is data

Consist of information coming from observations, counts, measurements, or responses.

Parameter

a numerical measurement describing some characteristic of a population.

Statistic

a numerical measurement describing some characteristic of a sample.

WHAT IS DATA

Type of data

Qualitative Data

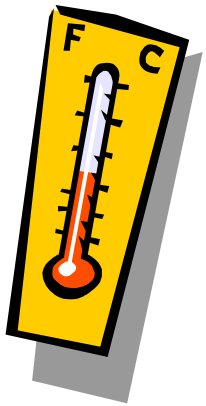
Quantitative data

Major

Place of birth

Age

Temperature



Discrete

Continuous

DATA COLLECTION: THE BASIC METHODS

(1) Retrospective study using historical data

(2) Observational study

A researcher observes and measures characteristics of interest of part of a population.

(3) Experiment

A treatment is applied to part of a population and responses are observed.

Errors

Sampling error

the difference between a sample result and the true population result; such an error results from chance sample fluctuations.

Non-sampling error

sample data incorrectly collected, recorded, or analyzed (such as by selecting a biased sample, using a defective instrument, or copying the data incorrectly).