AUA CS108, Statistics, Fall 2020

Lecture 01

Michael Poghosyan

26 Aug 2020

Welcome to the AUA Statistics Course

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And Happy New ~~Year~~ Semester ! ◡̈

Contents

- Syllabus highlights
- Intro to the Course
- Intro to the Descriptive Statistics

Syllabus Highlights

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- Question: Do we need some supplementary R Labs? YESSS/No

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- No late HWs (except some veeery special cases)

Syllabus Highlights, Cont'd

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- Advice: Run over the Probability Topics, especially, about RVs and Distributions

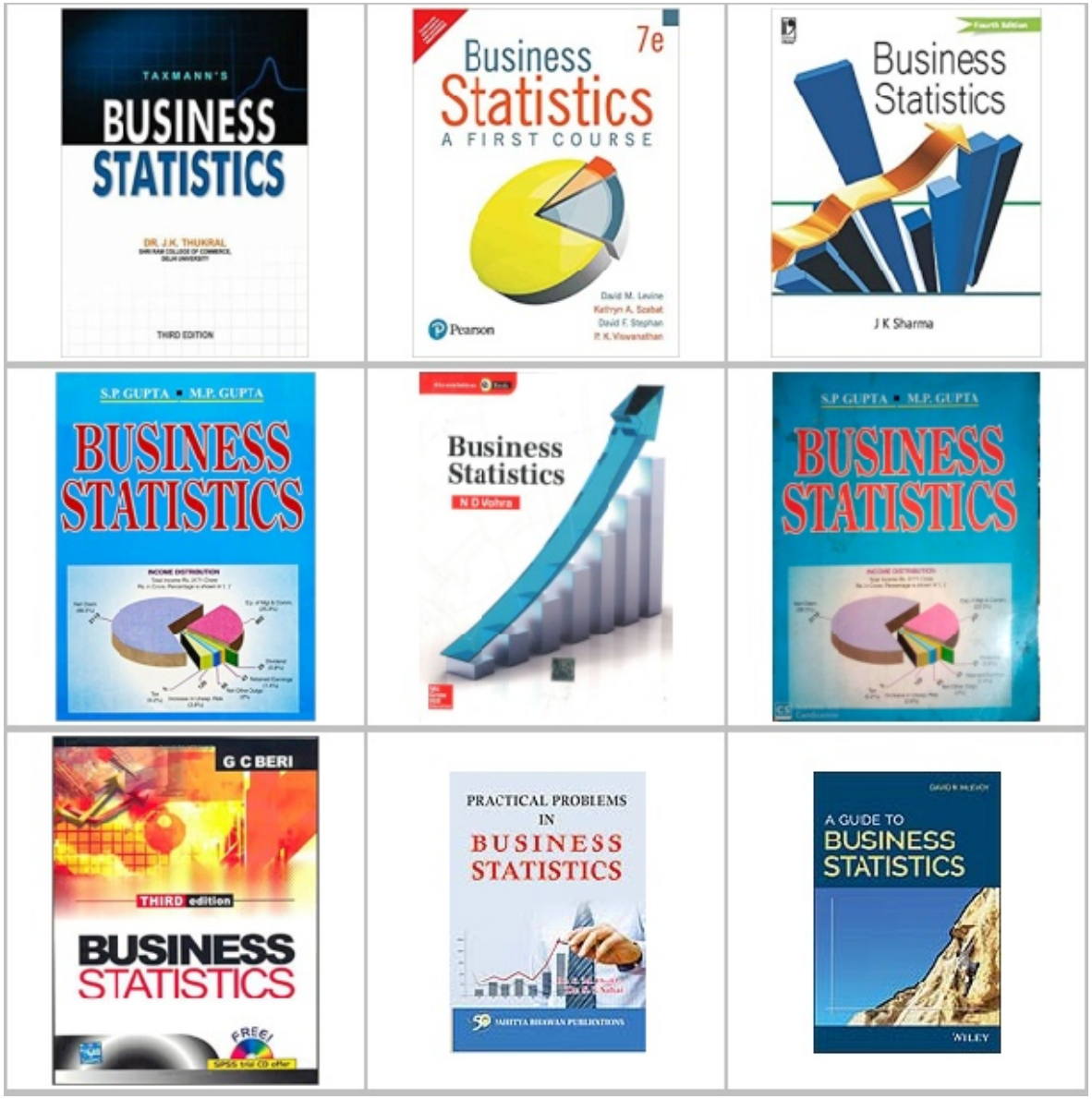
QA Session

Questions?

Where we use Statistics

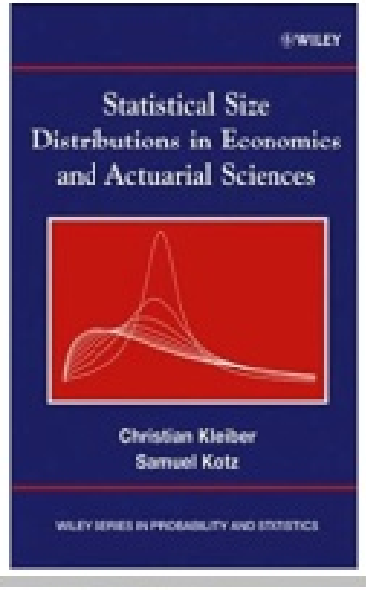
Where we use Statistics

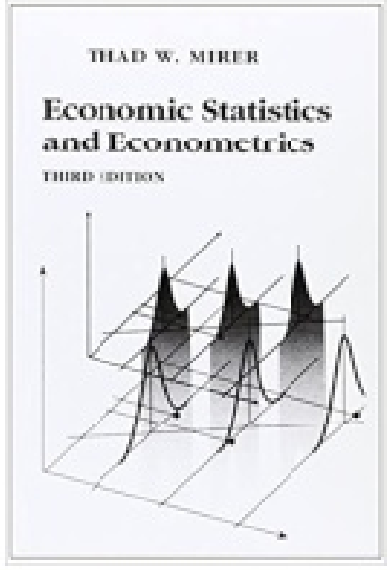
Business

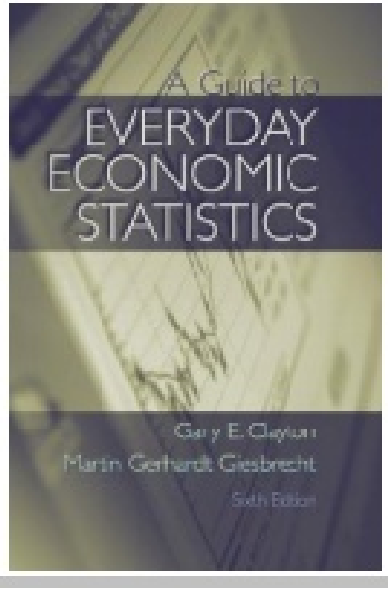


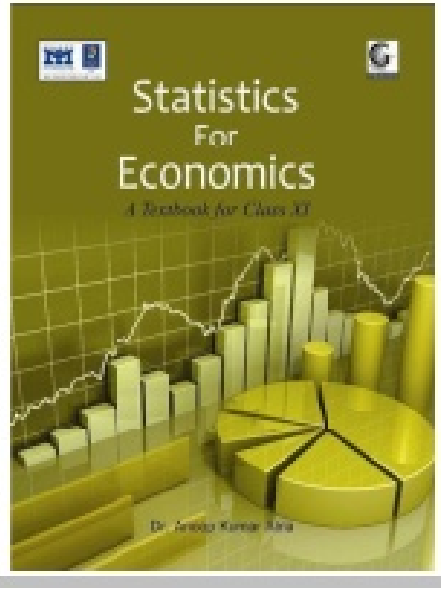
Where we use Statistics

Economics









Where we use Statistics

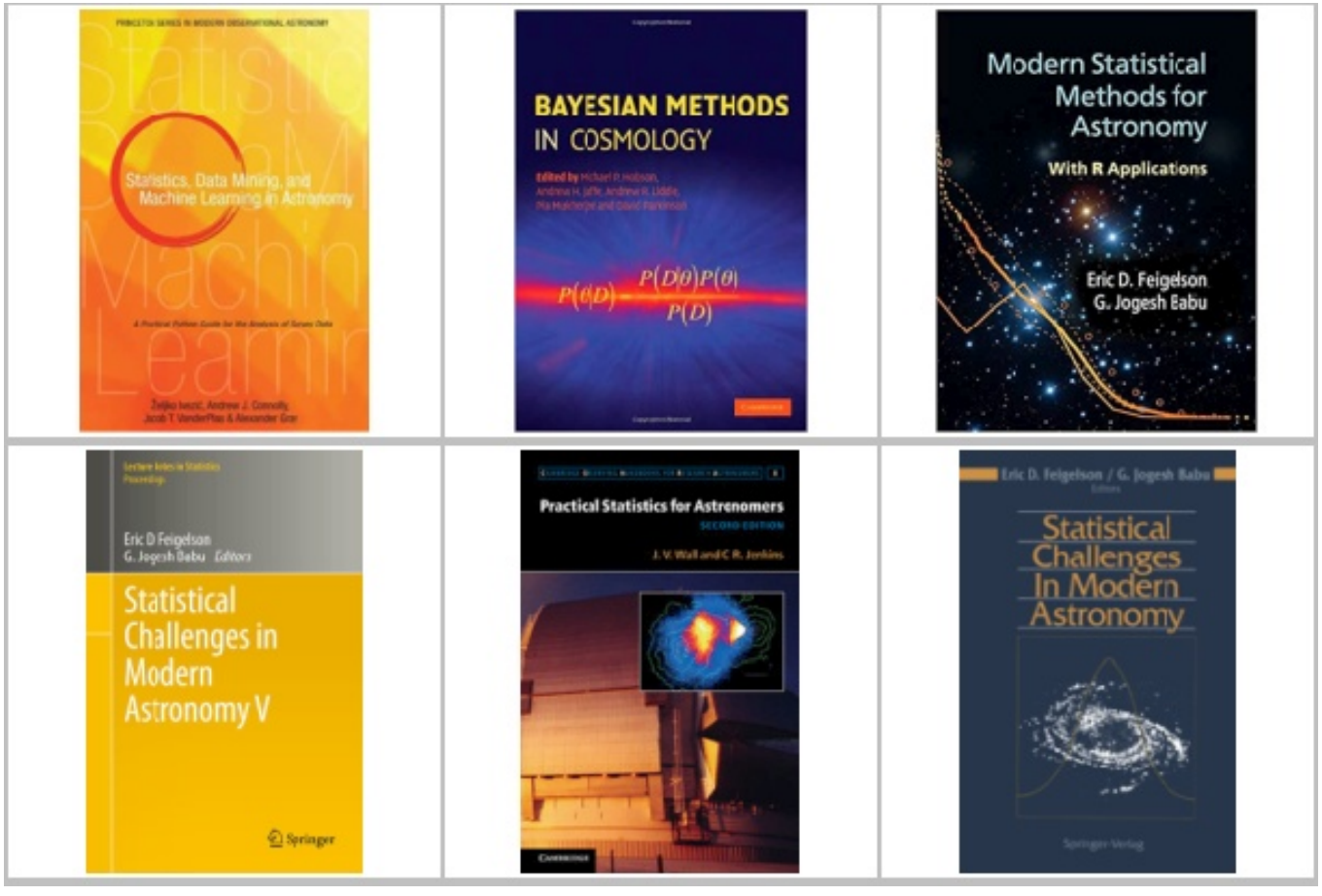
Agriculture

Where we use Statistics

Finance

Where we use Statistics

Astronomy



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Biology

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BioStatistics

Where we use Statistics

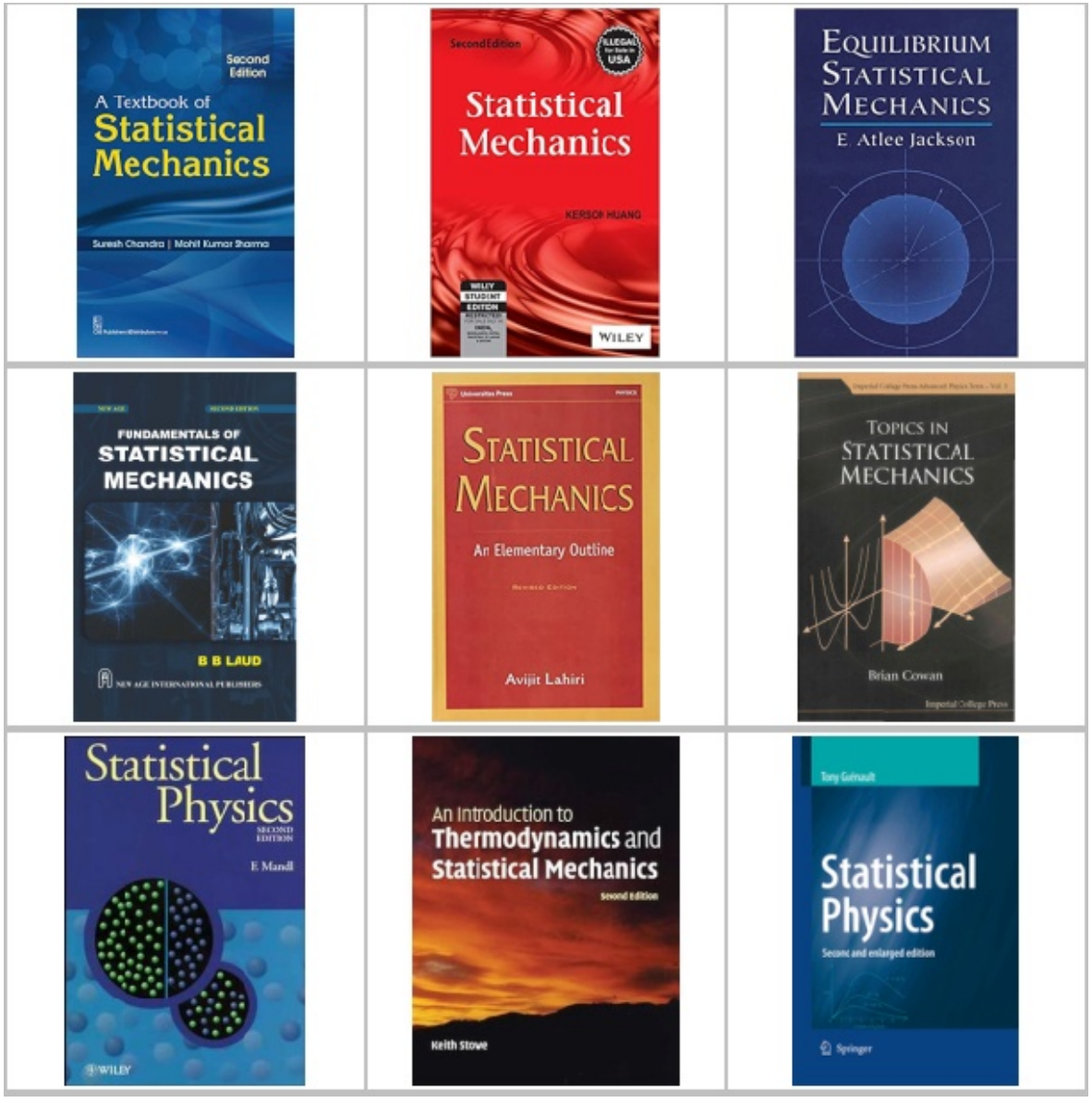
Psychology

Where we use Statistics

Medicine

Where we use Statistics

Physics and Mechanics



Where we use Statistics

Marketing

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Language Study

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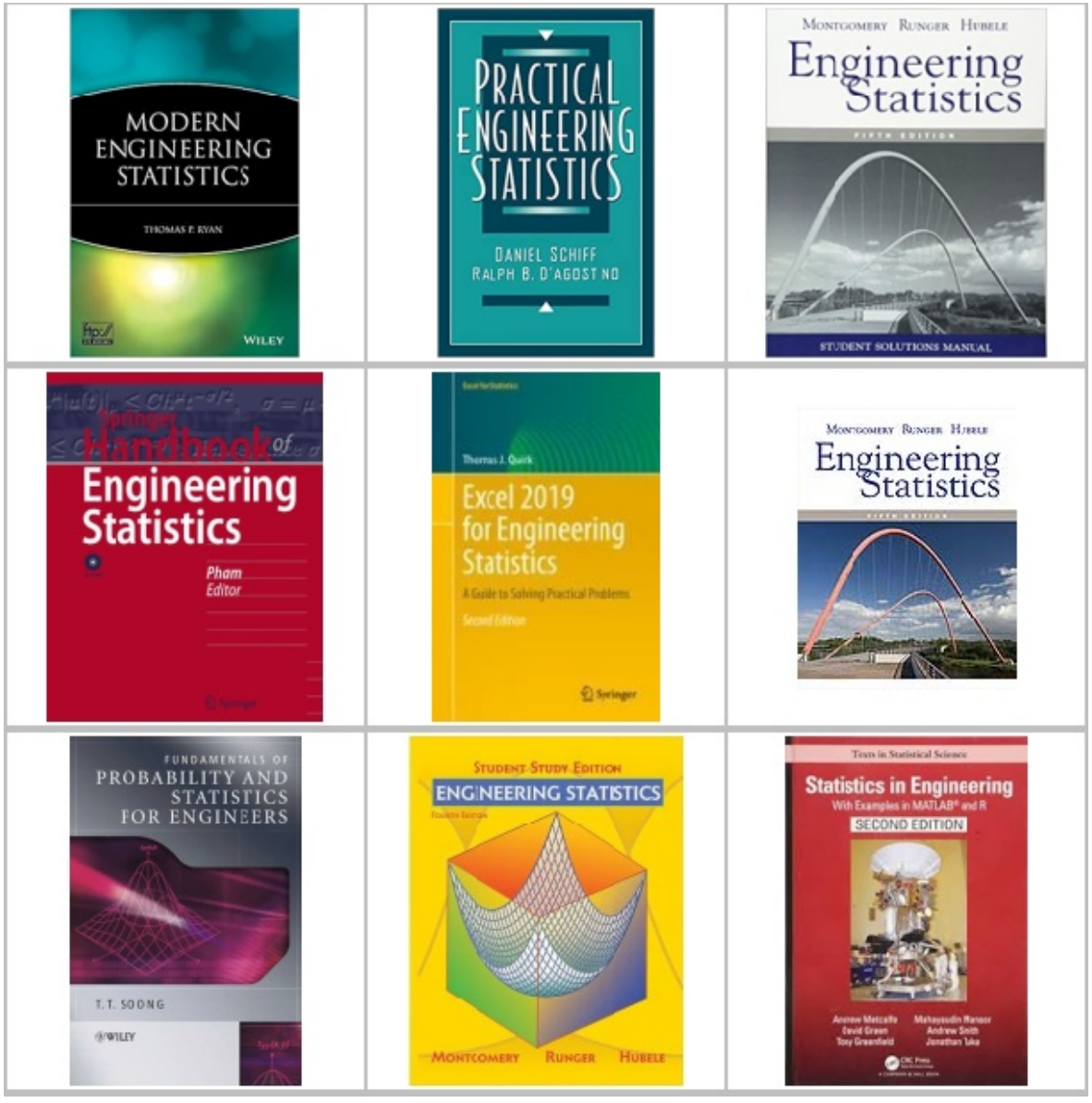
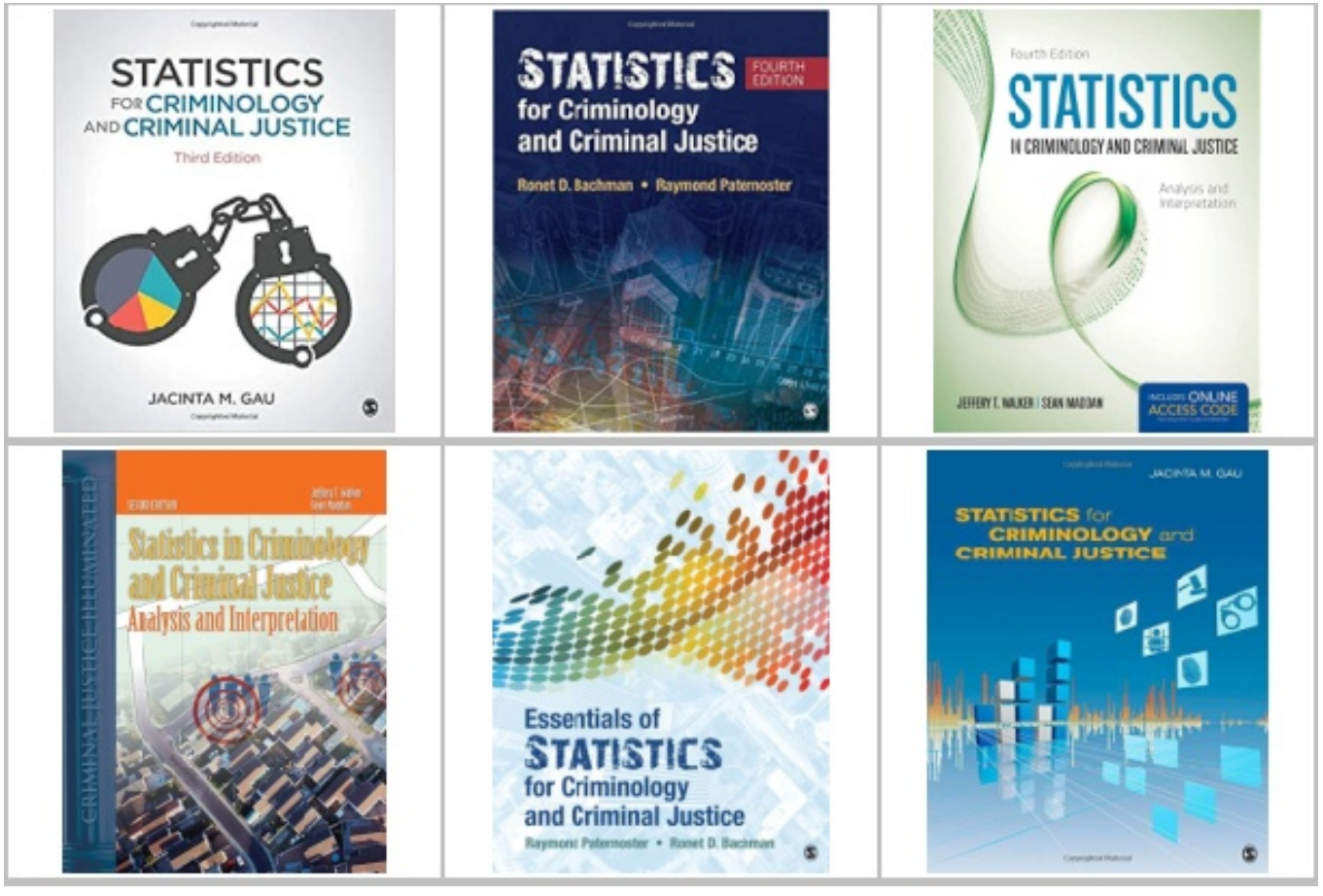
Engineering



Where we use Statistics

Criminology

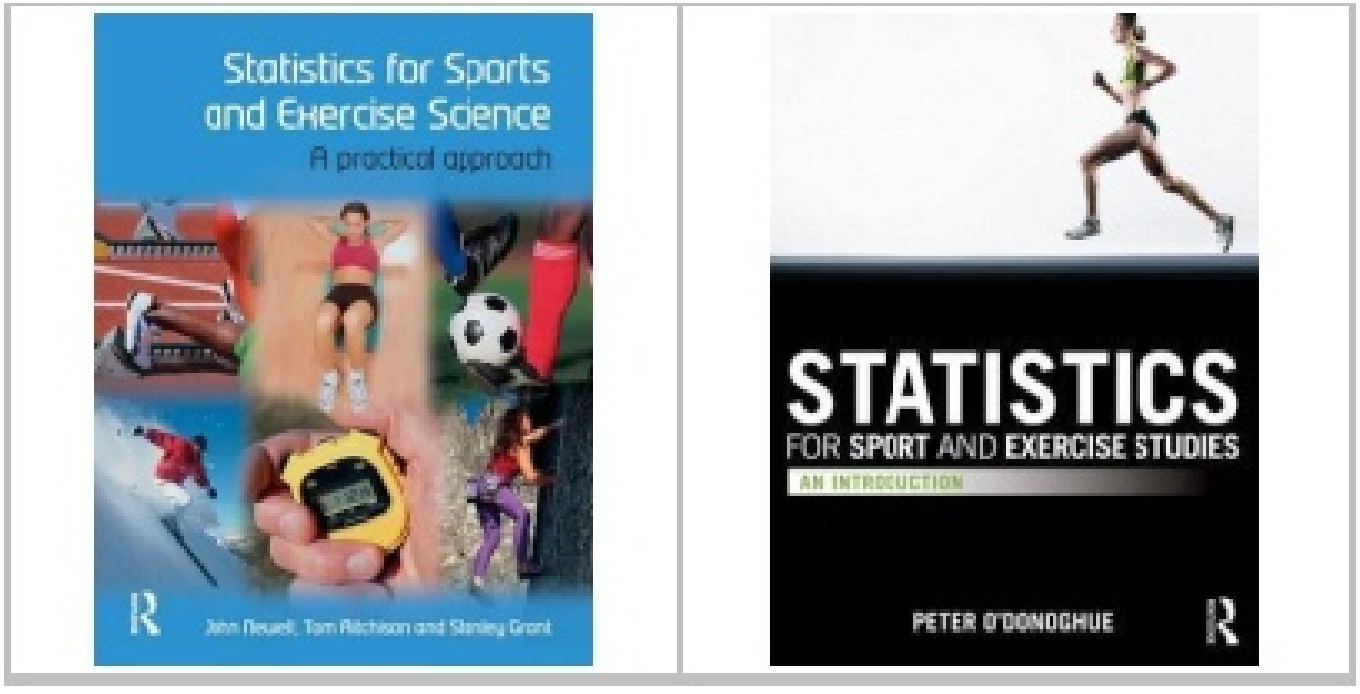


Where we use Statistics

Quality Control

Where we use Statistics

Sport



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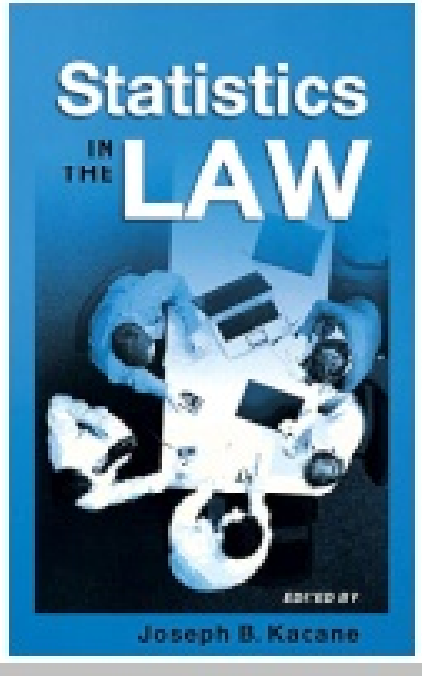
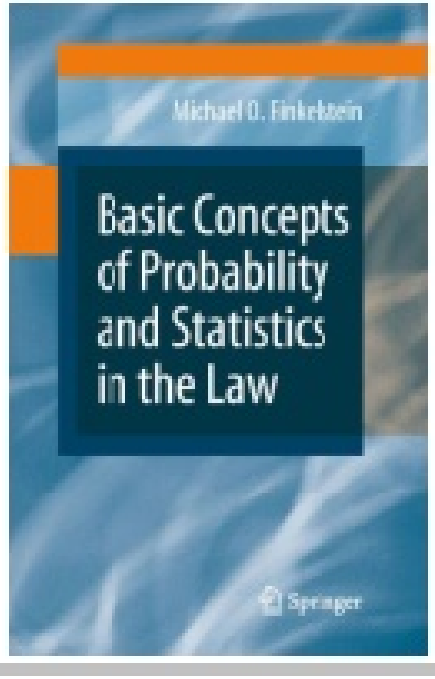
Law





Where we use Statistics

Food

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Genetics

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Chemistry

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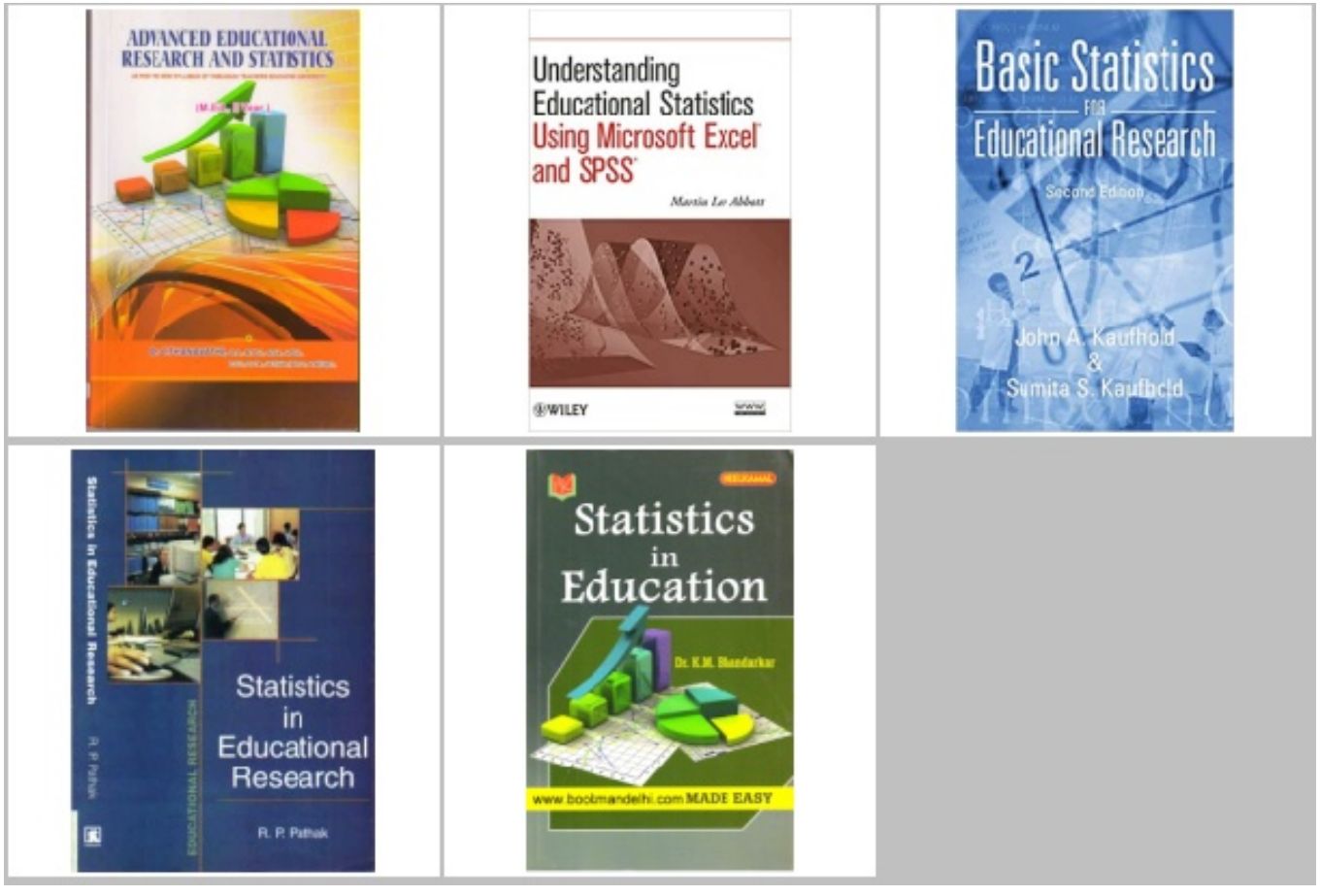
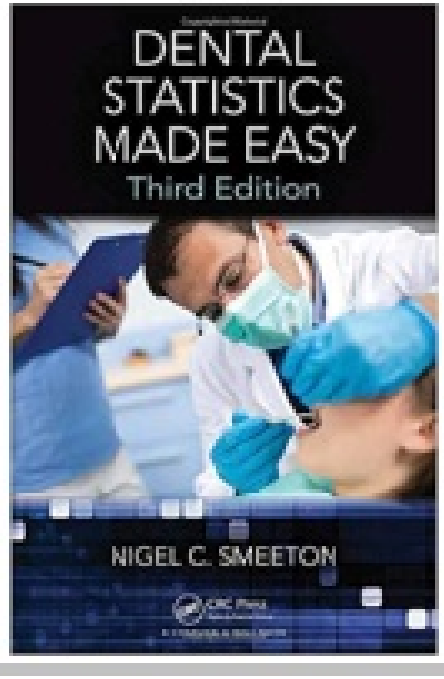
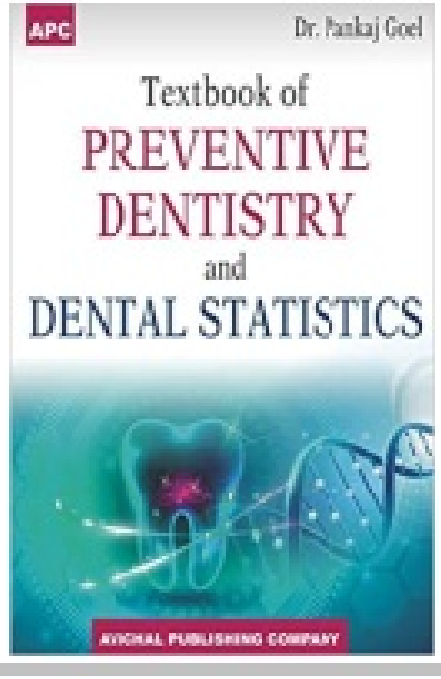
Education



Where we use Statistics

Dentistry





Where we use Statistics

Other. . .

Where we use Statistics

ML, Statistical Learning

Where we use Statistics

. . . and so on . . .

About Statistics

- What is Statistics?

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Statistics is an Art and Science of Learning from Data. In a little bit detailed form,

Statistics is the Art and Science of ***Collecting, Describing and Analyzing Data****, getting insight from Data.*

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- in Probability Theory, we assume the Reality, the Truth, the Generating Process is given, and we get information about possible outcomes, possible observations. Say,

We assume that the daily number of customers who are ordering Pepperoni Pizza at a particular pizzeria is following the $Pois(15.2)$ Distribution (*the Reality, the Generating Process*), and we are interested in the Probability that the daily number will exceed 17 (*Probability of a possible outcome*)

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- in Statistics, we have Observations, we have Data, Outcomes, we want to learn about the Reality, about the Truth, about the Generating Process (from which that Data is obtained).

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We have Data about daily number of customers ordering Pepperoni Pizza at that pizzeria for some days:

$$10,\ 15,\ 14,\ 20,\ 7,\ 12,\ 10,$$

and we want to find out the Distribution of the r.v.

$X =$ the daily number of customers ordering PP at that pizzeria.

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And finally, to understand the everyday usage of Statistical language, graphs and estimates, say, about polls and salaries ⌣̈

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- Estimate the number/proportion of defective production in a manufacturing plant;
- Show that there is a strong correlation between education and income;
- Determine whether it is true that, in average, women earn less than men;

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- Check if the newly developed drug is more effective (in curing some disease) than the old one;

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- Calculate the percentage of body fat based on only easily calculated body measurements (say, biceps and abdomen measurements);
- Predict apartment prices based on various (given) characteristics of that apartment;
- Check if the newly developed drug is more effective (in curing some disease) than the old one;
- Check if the drug is effective against Corona