



# Epidemiology & Biostatistics

## COBS 301

### Course Description

This course introduces the student to the practice of statistics such as displaying distributions with graphs, describing distributions with numbers, looking at data relationships, scatter plots, correlation, least-squares and multiple regression, relations in categorical data, the question of causation, sampling designs, statistical inference, estimating with confidence, tests of significance, power and inference, comparing two means, comparing several means, inference from two-way-tables, and nonparametric tests; and to the application of statistics to epidemiology in the matter of rates, incidence and prevalence, mortality and fatality, measures of risk such as the odds ratio, sensitivity and specificity, and predictive values.

Credit: 1.0 semester credit

Repeatable: No

### Course Structure

Biostatistics teaching activities will be published in individual course rosters. However, changes may be necessary on short notice. Students are advised to check possible updates of the roster regularly.

Learning objectives will outline the purpose of each individual Biostatistics course activity. These brief, bullet-pointed learning objectives should not be misunderstood as a table of contents. They rather describe the area of mastery and to some extent the level of mastery in Biostatistics expected from a Trinity medical student.

Lectures in this course provide the basic pillars to study and understand this subject of wide ranging applications in medicine. Trinity students will be provided the power-point slides ahead of time. In addition, lecture recordings and handout files in printable format will be provided on TSOM servers. Students are encouraged to glance over the topic of an announced lecture in their assigned textbook and take 10 minutes to review the handout before the actual lecture.

### Objectives

At the end of this course, the student will be able to:

- Recognize and give examples of different types of data arising in public health and clinical studies
- Interpret differences in data distributions via visual displays
- Calculate standard normal scores and resulting probabilities
- Calculate and interpret confidence intervals for population means and proportions
- Interpret and explain a p-value
- Perform a two-sample t-test and interpret the results; calculate a 95% confidence interval for the difference in population means

- Select an appropriate test for comparing two populations on a continuous measure, when the two sample t-test is not appropriate
- Understand and interpret results from Analysis of Variance (ANOVA), a technique used to compare means amongst more than two independent populations
- Choose an appropriate method for comparing proportions between two groups; construct a 95% confidence interval for the difference in population proportions
- Understand and interpret relative risks and odds ratios when comparing two populations
- Describe different kinds of studies
- Understand confounding and interaction in studies
- Evaluate epidemiological characteristics such as Incubation period, Infectious period, modes of transmission and reservoir of the Major infectious diseases of Humans.
- Calculate and interpret measures of risk in infectious diseases

## Schedule

The course is usually offered at Term 3. The class schedule is posted on the online calendar.

## Course Topics

Event	Title
BIOSTATS_ 01	Fundamental Concepts of Measurement
BIOSTATS _02	The Normal Distributions
BIOSTATS _03	Hypothesis Testing and Decision Making
BIOSTATS _04	Chi-squared Test
BIOSTATS _05	Student's t-test
BIOSTATS _06	Analysis of Variance
BIOSTATS _07	Relationships Among Variables
BIOSTATS _08	Treatment Studies 1
BIOSTATS _09	Non-Experimental Designs
BIOSTATS _10	Treatment Studies 2
BIOSTATS _11	Statistical Analysis of Treatment Studies
BIOSTATS _12	Other Designs
BIOSTATS _13	Validity and Reliability in Measurement
BIOSTATS _14	Sensitivity and Specificity
BIOSTATS _15	Morbidity and Mortality
BIOSTATS _16	Epidemiological Concepts and Terms

## Grading Policy

The course grade is determined from the Biostatistics questions contained in two unified examinations (usually the first two-thirds of the Term 3) as 100%.

## Textbooks and Reference Materials

### Required:

*High Yield Biostatistics*, 4<sup>th</sup> Edition: Anthony N Glaser

*BRS Behavioral Science* 6<sup>th</sup> Edition (Chapters on Epidemiology and Biostatistics):  
Barbara Fadem

### Recommended:

*Epidemiology* 4<sup>th</sup> Edition: Leon Gordis

*Biostatistics (The Bare Essentials)* 4<sup>th</sup> Edition: Norman & Streiner

## Grade:

Percent of Points	Letter Grade
95-100%	A+
90-94%	A
85-89%	B+
80-84%	B
75-79%	C+
70-74%	C
<70%	F

## Attendance:

Lectures are recorded and made available to students. Attendance at lectures should nevertheless redound to the benefit of students.

**Faculty:** Mr. Marcus Caine