

Syllabus: CB7600 Applied Cancer Statistics

Fall, 2024

Version: 03/12/2024

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Course Data

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- Number: CB7600
 - Title: Applied Cancer Biostatistics
 - Credit-hours: 2
 - Meeting Day: Thursday
 - Meeting Time: 1:30 PM – 3:10 PM
 - Meeting Place: Elliman conference room
 - Department: Cancer Biology Program, Department of Oncology
 - School/College: School of Medicine, Wayne State University
 - Type: Lecture
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Course Description

The objective of this course is to provide students with the ability to understand and utilize basic biostatistical concepts and tools through a statistical software package, as might be required when conducting or reviewing research in the field of biological science. Students learn and apply a statistical software package to capture and manipulate, biological data, including recording and transforming, and to generate descriptive statistics.

Course Objectives

The course focuses on the data management, data processing, and statistical computing methods and tools utilized in the field of biological science. Students are able to acquire the skills necessary for preparing and analyzing biological research data through the use of software packages. Emphasis is on manipulating research data and on elementary- and intermediate-level data analyses and presentations. Upon completion of this course, the successful student is able to:

- Process data into a statistical package from various sources.
- Merge data sets and communicate data with minimal errors.
- Analyze data sets.
- Build useful basic graphs and tables.
- Conduct elementary- to intermediate- level statistical analyses using a statistical software package.
- Interpret statistical reports.
- Apply statistical techniques independently using a statistical software package.

Prerequisites

No prerequisites.

Course Instructors

- **Instructor 1:** Janaka Liyanage, Ph.D.
- **Office:** Biostatistics and Bioinformatics Core, 3rd floor, MidMed Lofts
- **Phone:** : 313-576-8703
- **Email:** liyanagej@karmanos.org

- **Instructor 2:** Seongho Kim, Ph.D.
- **Office:** Biostatistics and Bioinformatics Core, 3rd floor, MidMed Lofts
- **Phone:** 313-576-8653
- **Email:** kimse@karmanos.org

The course instructors welcome conversations with students outside of class (through **Microsoft Teams**, **Zoom**, or in person). Students may correspond with instructors by email or set up appointments.

Student Evaluation

The components of student evaluation are weighted as follows:

1. Class Participation (25%): Regular assignments/quizzes will be given.
2. Project and Poster Presentation (20%)
3. Mid-term (Take-home, 25%)
4. Final (Take-home, 30%)

Grading is on an A-F basis.

Final Grade	Final Percent
A	90 - 100%
B	80 - 89%
C	75 - 79%
F	< 75%

Course Materials

Required Textbooks:

- **An Introduction to R** at <https://cran.r-project.org/doc/manuals/r-release/R-intro.pdf>
- **Learning Statistics with R** at <https://learningstatisticswithr.com/lsr-0.6.pdf>
- Peter Dalgaard. **Introductory Statistics with R (Statistics and Computing)**. 2nd edition (2008). Springer

Required Software:

- **R** Version 4.0.2 or later version at <https://www.r-project.org/>
- **RStudio** Version 1.3.1073 or later version at <https://rstudio.com/>
- R package **BTS** which will be provided

Other Readings:

- Calvin Dytham. *Choosing and using statistics: A biologist's guide*. 3rd edition (2011). Wiley-Blackwell
- Andy Field, Jeremy Miles, and Zoe Field. *Discovering statistics using R*. 1st edition (2012). SAGE Publications Ltd
- Introduction to R and RStudio at http://ncss-tech.github.io/stats_for_soil_survey/chapters/1_introduction/1_introduction.html#1_outline
- Cookbook for R at <http://www.cookbook-r.com/Basics/>

Course Topics and Schedule

IMPORTANT NOTE: The schedule and topics may change as the course unfolds. Changes will be posted on Canvas

Class	Date	Topic	Note (Peter Dalgaard)
1	8/29	Introduction to R, RStudio, and R package BTS	ch. 1,2,10
2	9/5	Probability & Distribution	ch. 3
3	9/12	Descriptive Statistics & Graphics	ch. 4
4	9/19	Contingency Table	ch. 8
5	9/26	T-test	ch. 5
6	10/3	Correlation and Linear Regression	ch. 6,11
7	10/10	Sample Size Calculation	ch. 9
8	10/17	Reading	
9	10/24-10/31	Midterm	take-home (Due: 1:30 PM on 10/31)
10	10/31	One-way ANOVA	ch. 7
11	11/7	Two-way ANOVA	ch. 7,12

Class	Date	Topic	Note (Peter Dalgaard)
12	11/14	Logistic Regression & Survival Analysis	ch. 13,14
13	11/21	Logistic Regression & Survival Analysis	ch. 13,14
14	11/28	Thanksgiving	No class
15	12/5	Small Project Poster Presentation	Poster (Due: 11:59 PM on 11/30)
16	12/12-12/17	Final Exam	take-home (Due: 1:30 PM on 12/17)

Course Policies

1. Students are allowed to have group discussion on homework matters, but they must work through and write up the assignments entirely on their own without looking at the assignments of their peers. If asked, they should be able to explain fully and reproduce the answers.
2. Students are expected to complete all assignments by the due dates communicated in class. Grade penalties will be imposed on homework accepted late. Late acceptance is at the discretion of the instructor.
3. Students should check their email and the course web-page regularly for homework assignments and other course related communication.
4. Participants should read from the lecture notes given in the previous lecture and from the suggested/required textbooks prior to each.
5. Learners are expected to participate by attending every class possible and by taking responsibility for course material when attendance is impossible. Participation also means actively engaged in class discussions, assignments, and activities.
6. Participants are expected to act with integrity.

Attendance

Attendance at lecture is required, although exceptions will be made for reasons such as illness or family emergency. Excessive absences will result in a reduced classroom participation score at the instructor's discretion, and will negatively impact the overall course grade.

Other Policies

Late Instructor Instructions

Students must wait 20 minutes if the instructor is late.

Syllabus Revision

The course director reserves the right to modify any portion of this syllabus. A best effort is made to provide an opportunity for students to comment on a proposed change before the change takes place.

Inclement Weather

This course adheres to the University's policy and decisions regarding cancellation or delayed class schedules. Adjustments are made to the class schedule as necessary to take into account any delays or cancellations of this class. Local television and radio stations broadcast University delays or closings.