University of New Haven

Pompeo College of Business
Department of Economics & Business Analytics

BANL 6100: Business Analytics

Fall 2023

Course information

Course: BANL 6100-08 – Business Analytics
Credid hours: 3 credits
Semester: Fall 2023
Classroom: BCST 307
Class Hours: W 12:30 pm - 3:15 pm

Faculty Contact Information

Dr. Mehmet Balcilar
E: MBalcilar@newhaven.edu
T: (203) 479-4779
W: www.mbalcilar.net
Office: Orange Campus N125
Office Hours: W 09:00 am -11:00 am

Department Chair Contact Information

Dr. Gazi Duman
E: GDuman@newhaven.edu
T: (203) 479-4564
Office: Orange Campus N132A

COURSE SYLLABUS

Course Description

This course reviews statistical concepts and methods with emphasis on data analytics and visualizations. Topics to be covered include descriptive statistics,

plots and graphs for discrete and continuous data, statistical inference, regression, and selected non-parametrics including chi-square. In addition, power pivot and other Excel analytical tools will be covered. Students will obtain a solid introduction to R as a functional programming language and will be able to use Excel and R to effectively compute statistical and graphical procedures.

Course Format

The course will be delivered as a fully on-ground course, with every student meeting in person.

Required Text

OpenIntro Statistics, Christopher D. Barr, David M. Diez, and Mine Çetinkaya-Rundel, 4th Edition, 2019. This is a free eBook, available at http://openintro.org/os/pdf.

New and used hard copies of the book can be purchased at Amazon.

Required Software

All students are required to use **R** and **RStudio**, a no-cost add-on coding environment for `R` provided by **Posit**. `R` serves as a statistical programming language, while `RStudio` operates as a third-party software user interface designed for `R`. These tools will find application in nearly all course assignments. `R` is available under the GNP General Public License, compatible with various operating systems, including `Windows` and `Mac OS`. Similarly, `RStudio` can be downloaded free of charge. The computer lab has already installed both `R` and `RStudio`. You have the option to download them onto your personal computer as outlined below:

R: https://cran.r-project.org

R-Studio: https://posit.co/download/rstudio-desktop

Posit web page for `RStudio` will suggest the appropriate version for your operating system. Furthermore, the College of Business has acquired a license to locally operate the `RStudio` server at the University of New Haven. This server is accessible at

rstudio.newhaven.edu:8787

Additionally, it serves as a safeguard, ensuring that all R scripts are preserved in the event that any files are inadvertently lost within your desktop directories. You will be provide with your ID and password during the first week of the class. Using the online server presents a viable alternative in case you encounter technical difficulties with R on your personal computer. The RStudio Server offers enhanced convenience, allowing access to R from home, the classroom, or the library using any browser, computer, or tablet. Moreover, it facilitates the centralization of all your coursework in one location.

Posit also offers a free cloud bases RStudio Server. For more information, please refer to: https://posit.cloud/plans/free.

Additional Resources

- You can follow the steps at Posit to install R and RStudio on your computer.
- LinkedIn Learning, provided by the University of New Haven offer University faculty, staff, and students with free access to thousands of top-quality video tutorials. You can access New Haven LinkedIn here. One of the courses you may helpful is Getting Started with R for Data Science, which is available here
- Youtube videos, such as MarinStatsLectures channel: https://www.youtube.com/channel/UCaNIxVagLhqupvUiDK01Mgg
- R-Bloggers is web site to keep up-to-date with R and analytics: https://www.r-bloggers.com.
- Stack Overflow is a public platform serving 100 million people every month about technical questions and solutions suggested by users. An answer to any questions you may have is highly likely to already exist here. However, if you do not find your question already addressed, you are welcome to pose your inquiry for further assistance.

Course Goals

The goals of this course are:

1. to help students understand basic statistics and analytics concepts, and
2. to help students learn fundamental tools that will allow them to tackle with business

analytics challenges.

Course Learning Objectives

At the end of this course, students should be able to:

1. demonstrate basic statistical skills and data exploration,
2. conduct data analysis using appropriate statistical software, and
3. present data analysis graphically.

Course Requirements & Assessment

Expectations

This course will require significant in-class and out-of-class commitment from each student. The University estimates that a student should expect to spend two hours outside of class for each hour they are in a class. (For example, a three-credit course would average six [6] hours of additional work outside of class).

This course will teach you coding in R language at the intermediate level. Learning coding could be challenging in the beginning. You are expected to practice coding on a continuous basis and ask help from the instructor/TAs when you encounter an issue. Learning statistical concepts and analytics will occur simultaneous to students learning R. It is advantageous, but not required to know basis statistical concepts.

Exams

There will be a midterm and a final exam. Check the schedule below for the exam dates. Contact the instructor if you have any schedule conflict with another course. All exams will be taken during class session.

Homework

There will be several homework assignments during the semester. Your answer for each homework should be uploaded to Canvas by the due date. If a submission is late, it will receive no credit. Contact the instructor if you believe that extenuating circumstances prevail but be aware that exceptions will be made only for truly exceptional situations. Extra credit homework could be assigned at the discretion of the instructor.

Datacamp.com

It is strongly recommended that you finish a free course on statistical programming language `R` to speed up your understanding of coding in `R`. The name of this online course is `Introduction to R` and provided by datacamp.com. You receive a Certificate of Completion at the end. Also, you will get one full homework credits for completing this course. Register for datacamp.com using this link. You may also receive an invitation from the course (arranged by the instructor). One side benefit signing up for datacamp.com is that all other courses offered at this site will be free for you for 6 months.

Extra Credit

All students will have periodic opportunities for extra credit throughout the semester. Exams typically include extra credit inquiries, for instance. Additionally, there will be extra credit practice assignments. For reasons of fairness, no individual opportunities for extra credit will be offered.

Attendance and Class Participation

You are expected to participate in all class activities, and you should be prepared to contribute to the discussions and class work. This class moves at a demanding pace and requires consistent attendance to be successful. Attendance will be taken but will not be graded. It is recognized that absences may be unavoidable due to illness or family emergency. In this event, students are expected to keep up with their readings and assignments. Absences for more than two (2) weeks is detrimental to a student's ability to keep up with the course work. In this event, the instructor's permission is required for satisfactory completion of the course. Whether excused or not, excessive absences may result in a failing grade since these signify a failure to fulfill course requirements. Attendance will be recorded via the Qwickly Attendance application that is embedded in Canvas. Students will receive a pin code to record their attendance. If a student fails to log their attendance in Qwickly, then it is their responsibility to get with the instructor within 48 hours of the class to correct the attendance reporting issue.

Office Hours Policy

Students have the option to either attend the designated office hours in person or initiate contact via email in order to schedule a Zoom meeting appointment.

In cases where circumstances prevent direct communication with the instructor during the designated office hours, students are encouraged to arrange a mutually convenient appointment time that accommodates both the instructor and the student.

Course Outline/Schedule

Topics

Module 1 – Introduction to Business Analytics

- Course Syllabus, Overview, Logistics
- Data, Information, Knowledge, and Wisdom (DIKW)
- `R` and `Rstudio` overview, walk through the basics
- Basic `MS Excel` functions
- Analyzing public companies with 10-K's and Proxies
- Accessing 10-Ks via `SEC.gov` and `EDGAR`

Module 2 – Advanced Excel Functions and Business Analysis

- Pivot tables and complex `Excel` functions
- Understanding the Business via financial statements, calculating growth rates and margins
- Qualitative analysis based on 10-K's and Proxies
- Overview of the role of Statistics in Business, use case of simple linear regression model

Module 3 – Data Transformation and Visualization in R

- Data transformation and editing with `dplyr`
- Visualization with `ggplot2`
- Preparing datasets for the regression model

Module 4 – Basic Statistical Theory, Concepts and Metrics/Introduction to Statistics with R

- Mean, Median, Mode, Variance, Covariance, Standard Deviation and Correlation; Difference between correlation and regression
- Skewness, how to calculate and visualize in `R`
- Confidence intervals and t-test in `R` with use cases

Module 5 – Hypothesis Testing & Regression Analysis

- Null and alternative hypothesis, one and two tailed tests
- Dependent and independent variables, practicing with creating `SLR`
- Create a linear regression model in `R` with use cases
- Analyze the results of `SLR` and `MLR` based on the output from `R`
- Chi-square test and `ANOVA`

Module 6 – Data Transformation in R for Data Issues

- Heteroscedasticity problem; understanding the concept of heteroscedasticity
- Using `log` to transform the data
- Assessing the impact of data transformation on the regression model in `R`

Course Schedule

This schedule is informational in nature and subject to change due to unforeseen circumstances, as a result of any circumstance outside the University's control, or as other needs arise.

Table 1: Course Schedule.

Date	Class	Week	Lecture
2023-08-30	1	1	Module 1
2023-09-06	2	2	Module 2
2023-09-13	3	3	Module 2
2023-09-20	4	4	Module 3
2023-09-27	5	5	Module 3
2023-10-04	6	6	Module 3
2023-10-11	7	7	Module 4
2023-10-18	8	8	Midterm Exam
2023-10-25	9	9	Module 4
2023-11-01	10	10	Module 4
2023-11-08	11	11	Module 5
2023-11-15	12	12	Module 5
2023-11-29	13	14	Module 5
2023-12-06	14	15	Module 6
2023-12-20	15	17	Final Exam

Grading

Grades earned are based on your performance on homework, quizzes, midterm and the final exam.

Letter Grade	Grades Scored Between
A+	97 to 100
A	93 to Less than 97
A-	90 to Less than 93
B+	87 to Less than 90
B	83 to Less than 87
B-	80 to Less than 83
C+	77 to Less than 80
C	73 to Less than 77
C-	70 to Less than 73
F	Less than 70

Assignment weighting will follow:

Item	Weight
Homework	25 %
Midterm Exam	35 %
Final Exam	40 %

Diversity Statement

The University of New Haven embraces diversity and recognizes our responsibility to foster a diverse, inclusive, and welcoming environment in which all members of the Charger community of all backgrounds and identities can learn, work, and live together. We benefit from the academic, social, and cultural developments that arise from a diverse campus that is committed to equity, inclusion, belonging, and accountability.

We have a responsibility as a community and as individuals to address and remove barriers, achieve success, and sustain a culture of inclusivity, empathy, kindness, and compassion. We encourage, welcome, and embrace participation in ongoing dialogue, engagement, and education to critically examine and

thoughtfully respond to the changing realities of our community. Diversity, equity, inclusion, acceptance, and belonging enrich the Charger community and are instrumental to institutional success and fulfillment of the University mission.

Reporting Bias Incidents

At the University of New Haven, there is an expectation that all community members are committed to creating and supporting a climate which promotes civility, mutual respect, and open-mindedness. There also exists an understanding that with the freedom of expression comes the responsibility to support community members' right to live and work in an environment free from harassment and fear. It is expected that all members of the University community will engage in anti-bias behavior and refrain from actions that intimidate, humiliate, or demean persons or groups or that undermine their security or self-esteem.

If you have an immediate safety concern for yourself or others, and/or believe someone poses an immediate threat to themselves or others, please contact University Police at 203-932-7070 or call 911. Community members can report bias-motivated incidents by completing the form at www.newhaven.edu/biasreporting. Community members are encouraged to complete this form if they are the target of bias or harassing behaviors, witness such behaviors, or gain knowledge of these behaviors occurring within the University community. All matters concerning bias and harassment will be handled by the Dean of Students Office and Human Resources Office.

University-wide Academic Policies

A continually-updated list of University-wide Academic Policies and descriptions of key university student resources, can be found on Canvas. You can access them by simply clicking on the `(?)` help button.

The University-wide academic policies include (but are not limited to) the University's attendance policy, procedures for both adding / dropping a course and course withdrawals, an explanation for the sorts of circumstances where incomplete (INC) grades could be considered by the faculty, and the academic integrity policy (among others). Also in this location you will find information regarding the process for reporting bias and topics related to our maintaining

a positive learning environment (including, but not limited to, discrimination and sexual misconduct).

The list of key university student resources to enable learning include (but are not limited to) the University's Center for Student Success, Writing Center, Center for Learning Resources, and the Accessibility Resource Center.

University of New Haven

UNIVERSITY STUDENT SUPPORT SERVICES

The University recognizes that students can often use some help outside of class and offers academic assistance through several offices.

Accessibility Resources Center

The University of New Haven seeks to maintain a supportive academic environment for all students inclusive of those with disabilities including chronic health-related conditions and military service-connected disorders. If you feel that you may need reasonable accommodations to enable your full participation in this course, please provide me with your Verification of Reasonable Accommodations letter through AIM found in MyCharger or contact the Accessibility Resources Center to begin the process to ensure that accommodations can be made available to you. Reasonable accommodations are not required to be provided retroactively and may not be made without written verification from the Accessibility Resources Center. The Accessibility Resources Center is located in Sheffield Hall on the ground floor in the rear of the building, and can be reached by email at ARC@newhaven.edu or by phone at (203) 932-7332.

Center for Learning Resources (CLR)

The Center for Learning Resources (CLR), located in the Peterson Library, provides academic content support to the students of the University of New Haven using metacognitive strategies that help students become aware of and learn to apply optimal learning processes in the pursuit of creating independent learners. CLR tutors focus sessions on discussions of concepts and processes and typically use external examples to help students grasp and apply the material. We offer both in-person and online tutoring. To make an appointment, call us at 203-932-7215, write to us at clr@newhaven.edu, or download the Navigate app.

Center for Student Success (CSS)

The Center for Student Success can help you refine your study skills and develop new academic strategies. CSS staff assists with enhancing your time management and organizational skills. They provide understanding of your GPA, degree audit, and transcripts, and can answer general questions about academic policies. They also can connect you to campus resources and assist you with resolving issues as they arise. During registration periods, CSS advisors work in conjunction your faculty advisor to provide assistance with the advising and registration process. Finally, at various points throughout the semester, CSS works to provide students with progress reports from their instructors. Students can make an appointment to see a CSS staff member through Navigate; the Center for Student Success can be reached via email at css@newhaven.edu.

Counseling & Psychological Services (CAPS)

CAPS mission is to support the mental health care of students at the Univeristy. Our services are included in tuition, confidential, and include individual and group therapy, support groups, consultations, and 24/7 crisis support. We are available in person at Charger Plaza and remotely, and are in the office M-F, 8:30-4:30. Please call us to schedule an appointment or with any questions at 203-932-7333; you can also schedule online. If you experience a mental health crisis after hours, you can call our main number for support.

Myatt Center

The Myatt Center for Diversity and Inclusion is committed to creating a multicultural environment through intentional education, campus community engagement, and valuing the unique identities of each member of the Charger Community. Our commitment to diversity is driven by the core values of connection, belonging, inclusivity, equity, acceptance, and accountability. The Myatt Center's focus is to create a respectful and inclusive environment based our awareness and ability to engage with others who are different on many levels including ethnicity, race, sexual orientation, gender, military, religious belief, and life experiences. Please contact the Myatt Center at cdi@newhaven.edu for any and all questions related to our programs and resources.

Marvin K. Peterson Library

The Library provides access to online databases, e-books, e-journals, electronic U.S. Government Documents, print books, educational games, and audiovisual materials. A search can be conducted through many of these resources at once by using the search box "Quicksearch.'' The Library provides three floors with individual quiet study space, collaborative group study space, study rooms with technology, whiteboards, Dell desktops, iMacs, scanners, and printers. The entire library is a wireless zone.

Librarians assist in locating relevant sources of information for research papers, thesis, honors thesis, and other projects. Librarians answer general reference questions and help with effectively evaluating sources of information. Help is available through a Chat Service, with in-person or online research consultations, and by E-Mail. Complete the Research Consultation Form to arrange a time convenient for you. Appointments can also be made by using the Navigate app.

LibGuides are created to assist students with research. They contain an overview of resources available through the library, as well as tutorials, subject guides, and course specific guides.

University Writing Center

The mission of the Writing Center is to provide high-quality tutoring to undergraduate and graduate students as they write for a wide range of purposes and audiences. Tutors are undergraduate and graduate students who are majoring in a variety of fields across the University. We are here to work with you at any stage in the writing process; bring in your assignment, your ideas, and any writing you've done so far. You can make an appointment in Navigate or visit us in person in the lower level of the library. We offer appointments in person and via Zoom.

Military & Veteran Services

The Military & Veteran Affairs team is here to answer any questions Student Veterans (both current and prospective), active duty/reserve/national guard members, and military family members have regarding transitioning to higher education, VA educational benefits, formal advising, or to listen to issues pertaining to class. The University of New Haven's Military & Veterans Affairs team

consists of full-time staff, part time student employees, and VA Work Study students whose aim is to assist and support the student veteran population both on and off campus. These individuals have a dedication to the development, success, and well-being of the student veteran population on campus which includes veterans, active-duty military, service members in the reserves or national guard, and dependents using a veterans GI Bill. The office advises, guides, and supports this student population and is available to assist at a moment's notice to address the needs and concerns of this population.

Final thoughts

This document is a roadmap for our semester. We learn about the Earth together and our individual experiences shape how we interpret and value data. Like all your classes, you will get out what you put into this course. Asking for help from one another and your instructors is important, don't be afraid to ask a question about something you don't know or if you want to check your knowledge about something you think you know.

If this document is updated, a copy will be supplied to you via Canvas and changes will be announced in class.