

CSCI 5047/4047 Data Analytics and Visualization

Lab time: Mondays: 9:25 AM – 11:25 AM – BC 120

Lecture Time: Wednesdays (): 9:25 AM – 11:25 AM – BC 125

Office Hours: Brinkley Center 155 Tuesdays 9:00 AM – 11:00 AM

Welcome to Data Analytics!

The purpose of this course is to introduce data acquisition, cleaning, analysis and visualization. It exposes students to readily available and robust state-of-the-art tools to discover trends and make informative business decisions in the fields of finance, information sciences, marketing, healthcare, risk management, etc. It also exposes students to the data analytics practices implemented in the business world. No prior programming knowledge is required, students with varying programming background, which can vary from “none” to “proficient”, are supported via several implementation paths. Topics include data exploring, acquisition and preprocessing, model selection, model evaluation, classification, clustering, and data presentation and visualization.

This syllabus is a contractual agreement between the students and professor and contains the policies and expectations established for this course. Please read the entire syllabus carefully before continuing in this course. These policies and expectations are intended to create a productive learning atmosphere for all students. Unless you are prepared to abide by these policies and expectations, you risk losing the opportunity to participate further in the course.

Course Information

Course Objectives: The goal of this course is to help you conduct and provide insightful data analytics by meeting the following objectives. By the end of this course, you will be able to:

1. Define basic concepts in data analytics and list the state-of-the-art technologies in this domain.
2. Design applications to conduct data analytics using scientific methods.
3. Critique and defend using different data mining techniques and their suitability to a given problem.
4. Interpret and visualize the findings (knowledge) extracted from the data with detailed information.
5. Demonstrate the capability of using data analytics skills to provide informative business decision making.
6. Draw reasonable conclusions with sufficient explanation and elaboration.
7. Argue and evaluate the existence of trends in any given dataset.
8. Write insightful reports for a real-world case study, including illustrations and details.

Course Webpage: For this course, we will be using the ETSU Online Learning Management System, D2L. The course webpage can be accessed via the college main page at: elearn.etsu.edu. Be sure that you are able to access D2L the first week of class so that you can check for important course announcements, access online assignments, and view other course materials. Assignment grades and other important course materials will be posted on this webpage throughout the semester.

Textbooks and Material (All Optional)

Textbooks (Recommended, not required)

- Jiawei Han, Micheline Kamber, and Jian Pei. Data Mining: Concepts and Techniques (3rd Edition)
- Andy Field, Jeremy Miles, and Zeo Field. Discovering Statistics Using R.
- Wes Mckinney. Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython (2nd Edition)
- Jake VanderPlas. Python Data Science Handbook: Essential Tools for Working with Data (1st Edition)
- Ledolter, J. (2013). Data mining and business analytics with R. Hoboken, NJ: Wiley.
- Moreira, J., de Leon Ferreira, A. C. P., & Horváth, T. (2019). A General Introduction to Data Analytics. Wiley.

Main Topics

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|----------------------------|------------------------|
| • Data and Attribute Types | • Data Cleaning |
| • Data Preprocessing | • Data Visualization |
| • Descriptive Analytics | • Predictive Analytics |
| • Outlier Detection | • Classification |
| • Clustering | • Pattern Extraction |

Course Policies

Communication policy: It is course policy that regular questions about course content must be asked through the discussion forum. To contact Dr. Ghaith Husari via email, **please include the course title in the email subject and allow 1-2 days (excluding weekends) to receive an answer from me.** Also, feel free to answer each other's questions on D2L forums.

Disability

Students who need accommodations are asked to arrange a meeting during office hours the first week of classes, or as soon as possible if accommodations are needed immediately. If you have a conflict with my office hours, an alternate time can be arranged. To set up this meeting, please contact me by E-mail. Bring a copy of your Accommodation Memo and an Instructor Verification Form to the meeting. If you do not have a Letter of Accommodation but need accommodations, make an appointment with The Office of Disability Services, 423-439-8346 ([website](#)).

Religious Observances

It is the obligation of students to provide faculty with reasonable notice of the dates of religious observances on which they will be absent by submitting a Request for Religious Accommodation Form (Links to an external site.)Links to an external site. to their professor prior to the census date for enrollment for a given semester. The census date for each semester (typically the tenth day of instruction) can be found in ETSU academic calendar . The student will meet with professor when submitting the religious accommodation form to discuss accommodations.

Course Requirements and Grading

Late Submission Policy

Late assignments are assignments that are not submitted on time and do not have an approval for extension. Late assignments are penalized 50% per each late day (24 hours) after the deadline. Extensions for documented and approved reasons can be requested from the instructor.

Quizzes

There will be a shorter quiz that covers the readings, and study material discussed in the class of the previous week.

Course Grading Policy (Students might replace some graded activities with some research activity)

30% Quizzes (~ 11 Quizzes)

30% Exercises (~ 11 Exercises)

10% Midterm Exam

10% Course Project

20% Final Exam

Grading Scale

- A (93 – 100)
- A – (90-92)
- B + (87 – 89)
- B (83 – 86)
- B – (80 - 82)
- C + (77-79)
- C (73-76)
- C – (70-72)
- D + (67 - 69)
- D (60-66)
- F (< 60)

Other Resources

Disability Services

It is the policy of ETSU to accommodate students with disabilities, pursuant to federal law, state law and the University's commitment to equal educational access. Any student with a disability who needs accommodations, for example arrangement for examinations or seating placement, should inform the instructor at the beginning of the course. Faculty accommodation forms are provided to students through Disability Services in the D.P. Culp Center, Suite 390, telephone 423-439-8346.

Visit the Disability Services webpage for more information at <https://www.etsu.edu/students/ds/>

Academic Support and Mental Health Services

The BucsCARE website is meant to be a resource for students and for student referral. BucsCARE includes the most referenced offices and campus resources in various categories. This page includes a link to ETSU's "Need Help ?" site which includes a comprehensive listing to other resources by topic area.

Learn more about the BucsCARE services at <https://www.etsu.edu/bucscare/default.php>

Library Resources

The Sherrod Library extends access and services to all currently enrolled ETSU students. These services include traditional library patronage via Research and Instructional Services, Technology, and Content Services.

Learn more about the Sherrod Library by visiting <https://libraries.etsu.edu>

Help Desk

The Information Technology Services (ITS) Help Desk is the best resource for most technical problems. Find answers to common questions on the [Help Desk website](#), call, email, or stop in to see them on the first floor of the Sherrod Library. (423) 439-4648 itshelp@etsu.edu

Desire2Learn (D2L) Online Help

Many answers to D2L related questions can be found on the [D2L Help Student Home](#). If you are still having trouble finding what you need, contact the Help Desk.

Microsoft Office Software

Microsoft Office productivity applications, including Word, PowerPoint, Excel, OneNote, and more, are available free for students through the University's Office 365 campus agreement. For instructions on how to obtain the software, see the [Office 365 page of the ITS Help Desk website](#).

ETSU Technical Resources

Many other technical resources can be found on the [Online Help webpage](#).