



**CIVE 6399: Introduction to Data Science  
SYLLABUS  
Fall 2021**

*Subject to any new Texas legislative mandate changes.*

**COURSE INFORMATION**

Meeting times: Thursday 17:00 - 19:30

Meeting location:

- In person in EENGR 1.272
- Online via Zoom platform (link will be shared via Blackboard)

Course modality: Hybrid/Reduced Seating Courses (REDUC)

**INSTRUCTOR INFORMATION**

Instructor Name: Dr. Fatemeh Nazari, Ph.D.

Phone: (956) 665-8812

E-Mail: [fatemeh.nazari@utrgv.edu](mailto:fatemeh.nazari@utrgv.edu)

Office location: EACSB 1.207

Office hours: TR 15:30-17:00 by appointment only (via e-mail); will be held online until further notice (link will be shared via Blackboard)

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**WELCOME & INTRODUCTION TO COURSE MODALITY STATEMENT**

Welcome to CIVE 6399 Introduction to Data Science. The course will be delivered Hybrid/Reduced Seating Courses, as defined below:

**Hybrid/Reduced Seating Courses:** A Hybrid course, as defined by the Texas Higher Education Coordinating Board (THECB), is a “course in which a majority (more than 50 percent but less than 85 percent), of the planned instruction occurs when the students and instructor(s) are not in the same place.”

**COURSE DESCRIPTION, PREREQUISITES & MODE OF LEARNING**

This course introduces students to techniques of complexity science and machine learning with a focus on data analysis. One new technique is covered every week, which are listed in the tentative calendar of activities. The main assessment is a final paper where the students are asked to pick any data set (preferably from their own research) and apply one or multiple techniques from the course.

There is no prerequisites for the course. No computer coding experience is required, but the course will include Python programming.

The course modality is Hybrid/Reduced Seating Courses. For the online meetings, the class will be held via Zoom platform (the link will be posted on Blackboard) on Thursday at 17:00-19:30. For face-to-face meetings, the class will meet on Thursday at 17:00-19:30 in the classroom in the Engineering building room 1.272 (EENGR 1.272). The date of face-to-face meetings are **tentatively** indicated in the tentative calendar of activities. **Potential changes will be informed in advance.**

## **COVID-19 RESOURCES**

Please visit the [UTRGV COVID-19 protocols web page](#) for the most up-to-date COVID-19 campus information and resources. The [COVID-19 Frequently Asked Questions \(FAQs\) web page](#) offers additional guidance to specific questions. To submit a question for the FAQ, please email [WelcomeBack@utrgv.edu](mailto:WelcomeBack@utrgv.edu).

## **UTRGV VACCINE PORTAL**

UTRGV Students are eligible to receive the COVID-19 Vaccine. Students may access and complete their vaccine profile via the [UTRGV Vaccine Portal](#). For additional information on the COVID-19 Vaccine, please visit the [UTRGV Vaccine web page](#).

## **LEARNING OBJECTIVES/OUTCOMES FOR THE COURSE**

This course aims to provide students with introductory knowledge of several data science techniques that can be used for data analysis. The materials learned should then be useful in the student's own research. More specifically, at the end of this course, students should be able to:

1. explain the main concepts behind all the techniques covered
2. identify the type of technique preferable to use depending on the type of data to analyze
3. use the various python libraries learned to be able to apply these techniques
4. apply rigorously one or multiple of these techniques learned in their own research

The main assessment is a final paper where the students are asked to pick any dataset (preferably from their own research) and apply one or multiple techniques from the course.

## **LEARNING OBJECTIVES FOR CORE CURRICULUM REQUIREMENTS**

The course objects match the set outcomes by the Texas Higher Education Coordinating Board (THECB) and the Department of Civil Engineering.

- Critical Thinking- Students will demonstrate comprehension of a variety of written texts and other information sources by analyzing and evaluating the logic, validity, and relevance of the information in them to solve challenging problems, to arrive at well-reasoned conclusions, and to develop and explore new questions.
- Communication Skills- Students will demonstrate the ability to adapt their communications to a particular context, audience, and purpose using language, genre conventions, and sources appropriate to a specific discipline and/or communication task.
- Empirical & Quantitative Skills- Students will be able to make and communicate informed conclusions and predictions based on the interpretation, manipulation, and analysis of empirical and quantitative data.

## **TEXTBOOK, TECHNOLOGY, AND/OR RESOURCE MATERIAL**

No textbook is required, but the following books may be useful:

- # Batty, M., 2013, "[The New Science of Cities](#)", MIT Press, Cambridge, MA. # Batty, M., 2007, "[Cities and Complexity](#)", MIT Press, Cambridge, MA.
- # Han, J., Kamber, M., Pei, J., 2011, "[Data Mining: Concepts and Techniques](#)", Elsevier Science.
- # Murphy, K., 2012, "[Machine Learning: A Probabilistic Perspective](#)", MIT Press, Cambridge, MA.
- # Barabási, A-L., 2014, "[Network Science](#)", Creative Commons: CC BY-NC- SA 2.0. PDF V26, 05.09.2014

- # Epstein, J., and Axtell, R., 1996, "[Growing Artificial Societies: Social Science from the Bottom Up](#)", MIT Press, Cambridge, MA.

#### Software

- # NetLogo (sometimes the 32bit version works better even for 64bit computers): <https://ccl.northwestern.edu/netlogo/>
- # Python x.x: <https://www.python.org/downloads/>  
# Libraries: NumPy, SciPy, Pandas, igraph, SciKit: <https://packaging.python.org/tutorials/installing-packages/>

or

- # Anaconda – python x.x (install a package that includes python and most recommended libraries; sometimes the 32bit version works better even for 64bit computers): <https://www.anaconda.com/products/individual>

#### Devices (required and intended for online attendance in this course)

- Laptop or desktop or tablet with **webcam** and **microphone** (a laptop or desktop or tablet may be needed for face-to-face meetings).
- **Internet** connection, WiFi-reliable access
- Zoom platform which can be accessed through <https://zoom.us/>

#### TENTATIVE GRADING POLICIES

A total of 100 points, as explained below.

**Note:** A > 90, 80 < B < 89, 70 < C < 79, 60 < D < 69

**Attendance and participation (3%):** Both Class attendance and active participation is required. Any student with *more than three absences without pre-excuse will be dropped from the class*. For online meetings, attendance check will be done in lecture sessions by screen capturing of the live video meeting. Only students who are shown in the live webcam will be counted. For face-to-face meetings, attendance check will be done at the beginning of lecture sessions.

**Homework (22%):** A total of 11 homework assignments (each 2 points). Each homework assignment due is shown in the table of Calendar of Activities below which may change (the potential changes will be informed in the class or via Blackboard announcement). *No late submission is allowed*. Homework assignments will be solved in the lab session after the due dates.

**In-class technique presentation and application (5%):** In each meeting, 1-2 students (depending on the total number of students) present one course topic along with the results of applying the related technique on any dataset. The date of presentation for each student will be discussed in the class.

#### **Term project:**

**Abstract draft (5%):** The due date is shown in the calendar of activities.

**Presentation (5%):** An interim in-class presentation on the preliminary results of the project. The date of presentation is shown in the calendar of activities and also will be discussed in the class.

**Visualization (10%):** The students will present the results of their research in one single poster. The details will be discussed in the class along with presenting a number of examples. See the calendar of activities for the due date.

**Final paper (50%):** The final paper includes an in-class presentation and the written report. See the calendar of activities for the due dates.

**Note:** Plagiarism is a serious offense and it will not be tolerated; see university policy. All reviews, papers and any other submitted material will be run through a plagiarism tool.

**CALENDAR OF ACTIVITIES:**

The table below the *tentative* calendar of activities. Potential changes in the due dates of exams and homework assignments will be informed in advance. The date of face-to-face meetings are determined in the table, but the dates may change that will be announced on Blackboard in advance.

Week	Date	Topic	Assignments
1	Aug 26	Scaling Laws, Zipf's Law, and Regression Analysis	
2	Sep 02	Agent-Based Modeling	HW #1 on regression analysis (due Sep 1)
3	Sep 09	Network Science	HW #2 on agent-based modeling (due Sep 8)
4	Sep 16	Introduction to Basic Probability for Data Mining	HW #3 on network science (due Sep 15)
5	Sep 23	Introduction to Scikit-Learn and k-Nearest Neighbor Algorithm	HW #4 on data mining (due Sep 22)
6	Sep 30	Clustering Analysis	HW #5 on k-nearest neighborhood (due Sep 29)
7	Oct 07	Fisher Information	HW #6 on clustering analysis (due Oct 6)
8	Oct 14	Decision Tree Learning and Random Forests	HW #7 on fisher information (due Oct 13)
9	Oct 21	Neural Networks and Deep Learning	HW #8 on decision tree learning (due Oct 20)
10	Oct 28	Principal Component Analysis <b>Face-to-face class</b>	HW #9 on neural networks (due Oct 27) <b>Abstract draft (due Oct 28)</b> <b>Abstract presentation in class for group 1</b>
11	Nov 04	Support Vector Machine <b>Face-to-face class</b>	HW #10 on principal component analysis (due Nov 3) <b>Abstract presentation in class for group 2</b>
12	Nov 11	Network-Based Frequency Analyses	HW #11 on support vector machine (due Nov 10) <b>Visualization (due Nov 11)</b>
13	Nov 18	Final paper presentation <b>Face-to-face class</b>	<b>Final paper in-class presentation</b>
14	Nov 25	Thanksgiving Holiday - NO classes	
15	Dec 02	Study day - NO classes	
16	Dec 09	The week of final exams	<b>Final paper report (due Dec 9)</b>

The UTRGV academic calendar can be found on [My.UTRGV](#) at the bottom of the screen prior to login. Some important dates for Fall 2021 include:

Fall Module 1

August 25

First day of classes.

August 25

Last day to add a class or register for Fall 2021 Module 1 classes.

October 5 Last day to drop a class or withdraw.  
 October 13 Final Exams (Term Ends)  
 October 15 Grades Due at 3 p.m.

Fall Regular Term

August 23 First day of classes.  
 August 26 Last day to add a class or register for Fall 2021 classes.  
 November 10 Last day to drop a class or withdraw.  
 December 2 Study Day – NO classes  
 December 3-9 Final Exams  
 December 13 Grades Due at 3 p.m.

Fall Module 2

October 20 First day of classes.  
 October 20 Last day to add a class or register for Fall 2021 Module 2 classes.  
 November 30 Last day to drop a class or withdraw.  
 December 8 Final Exams (Term Ends)  
 December 10 Grades Due at 3 p.m.

**BLACKBOARD SUPPORT**

If you need assistance with course technology at any time, please contact the [Center for Online Learning and Teaching Technology](#) (COLTT).

<b>Campus:</b>	<b>Brownsville</b>	<b>Edinburg</b>
<b>Location:</b>	Casa Bella (BCASA) 613	Education Complex (EEDUC) 2.202
<b>Phone:</b>	956-882-6792	956-665-5327

**Toll Free: 1-866-654-4555**

Office Hours: Monday - Friday, 7:30 a.m. - 6:00 p.m.

Support Tickets Submit a Support Case via our [Ask COLTT Portal](#)

**24/7 Blackboard Support**

Need Blackboard assistance after hours? You can call our main office numbers, 956-882-6792 or 956-665-5327, to speak with a support representative.

**ATTENDANCE**

Students are expected to attend all scheduled classes and will be dropped from the course for **more than three absences without pre-excuse**. UTRGV’s attendance policy excuses students from attending class if they are participating in officially sponsored university activities, such as athletics; have been provided such an accommodation by Student Accessibility Services (SAS); for observance of religious holy days; or for military service. Accommodations related to COVID-19 should also go through SAS. Students should contact the instructor in advance of the excused absence and arrange to make up missed work or examinations.

**ABSENCE/SICK POLICY**

The online lecture/lab sessions of this course will not be recorded. However, lecture materials will be posted after completion of each topic of the lecture, which can help you follow the class discussions after an absence. In sickness/COVID-19-related circumstances, you can contact the instructor with documentation for extending

homework due date or changing the date of in-class presentation (see the student reporting protocol on the [UTRGV COVID-19 protocol web page](#)).

## ACADEMIC INTEGRITY

Members of the UTRGV community uphold the [Vaquero Honor Code](#)'s shared values of honesty, integrity and mutual respect in our interactions and relationships. In this regard, academic integrity is fundamental in our actions, as any act of dishonesty conflicts as much with academic achievement as with the values of honesty and integrity. Violations of academic integrity include, but are not limited to: cheating, plagiarism (including self-plagiarism), and collusion; submission for credit of any work or materials that are attributable in whole or in part to another person; taking an examination for another person; any act designed to give unfair advantage to a student; or the attempt to commit such acts (Board of Regents Rules and Regulations, STU 02-100, and UTRGV Academic Integrity Guidelines). **All violations of Academic Integrity will be reported to Student Rights and Responsibilities through [Vaqueros Report It](#).**

## STUDENTS WITH DISABILITIES

Students with a documented disability (physical, psychological, learning, or other disability which affects academic performance) who would like to receive reasonable academic accommodations should contact **Student Accessibility Services (SAS)** for additional information. In order for accommodation requests to be considered for approval, the student must apply using the [mySAS portal](#), and is responsible for providing sufficient documentation of the disability to SAS. Students are required to participate in an interactive discussion, or an intake appointment, with SAS staff. Accommodations may be requested at any time but are not retroactive, meaning they are valid once approved by SAS. Please contact SAS early in the semester/module for guidance. Students who experience a broken bone, severe injury, or undergo surgery may also be eligible for temporary accommodations.

## Pregnancy, Pregnancy-related, and Parenting Accommodations

Title IX of the Education Amendments of 1972 prohibits sex discrimination, which includes discrimination based on pregnancy, marital status, or parental status. Students seeking accommodations related to pregnancy, pregnancy-related condition, or parenting (reasonably immediate postpartum period) should submit the request using the form found at <https://www.utrgv.edu/pregnancyandparenting> for review by **Student Accessibility Services**.

### Student Accessibility Services:

**Brownsville Campus:** Student Accessibility Services is located in 1.107 in the Music and Learning Center building (BMSLC) and can be contacted by phone at (956) 882-7374 or via email at [ability@utrgv.edu](mailto:ability@utrgv.edu).

**Edinburg Campus:** Student Accessibility Services is located in 108 University Center (EUCTR) and can be contacted by phone at (956) 665-7005 or via email at [ability@utrgv.edu](mailto:ability@utrgv.edu).

## MANDATORY COURSE EVALUATION PERIOD

Students are encouraged to complete an ONLINE evaluation of this course, accessed through your UTRGV account (<http://my.utrgv.edu>); you will be contacted through email with further instructions. Students who complete their evaluations will have priority access to their grades. Online evaluations will be available on or about:

Fall Module 1 (7 weeks)	October 6-12, 2021
Fall Regular Term 2021	November 12- December 1, 2021
Fall Module 2 (7 weeks)	December 1-7, 2021

## SEXUAL MISCONDUCT AND MANDATORY REPORTING

In accordance with UT System regulations, your instructor is a “Responsible Employee” for reporting purposes under Title IX regulations and so must report to the Office of Institutional Equity & Diversity (OIED@utrgv.edu) any instance, occurring during a student’s time in college, of sexual misconduct, which includes sexual assault, stalking, dating violence, domestic violence, and sexual harassment, about which she/he becomes aware during this course through writing, discussion, or personal disclosure. More information can be found at [www.utrgv.edu/equity](http://www.utrgv.edu/equity), including confidential resources available on campus. The faculty and staff of UTRGV actively strive to provide a learning, working, and living environment that promotes personal integrity, civility, and mutual respect that is free from sexual misconduct, discrimination, and all forms of violence. If students, faculty, or staff would like confidential assistance, or have questions, they can contact OVAVP (Office for Victim Advocacy & Violence Prevention) at (956) 665-8287, (956) 882-8282, or [OVAVP@utrgv.edu](mailto:OVAVP@utrgv.edu).

## COURSE DROPS

According to UTRGV policy, students may drop any class without penalty earning a grade of DR (drop) until the official drop date. Following that date, students must be assigned a letter grade and can no longer drop the class. Students considering dropping the class should be aware of the “3-peat rule” and the “6-drop” rule so they can recognize how dropped classes may affect their academic success. The 6-drop rule refers to Texas law that dictates that undergraduate students may not drop more than six courses during their undergraduate career. Courses dropped at other Texas public higher education institutions will count toward the six-course drop limit. The 3-peat rule refers to additional fees charged to students who take the same class for the third time.

## STUDENT SERVICES

Students who demonstrate financial need have a variety of options when it comes to paying for college costs, such as scholarships, grants, loans and work-study. Students should visit the Student Services Center (U Central) for additional information. U Central is located in BMAIN 1.100 (Brownsville) or ESSBL 1.145 (Edinburg) or can be reached by email ([ucentral@utrgv.edu](mailto:ucentral@utrgv.edu)) or telephone: (956) 882-4026. In addition to financial aid, U Central can assist students with registration and admissions.

Students seeking academic help in their studies can use university resources in addition to an instructor’s office hours. University Resources include the Advising Center, Career Center, Counseling Center, Learning Center, and Writing Center. The centers provide services such as tutoring, writing help, counseling services, critical thinking, study skills, degree planning, and student employment. In addition, services such as the Food Pantry are also provided. Locations are listed below.

Center Name	Brownsville Campus	Edinburg Campus
<b>Advising Center</b> <a href="mailto:AcademicAdvising@utrgv.edu">AcademicAdvising@utrgv.edu</a>	BMAIN 1.400 (956) 665-7120	EITTB 1.000 (956) 665-7120
<b>Career Center</b> <a href="mailto:CareerCenter@utrgv.edu">CareerCenter@utrgv.edu</a>	BINAB 1.105 (956) 882-5627	ESTAC 2.101 (956) 665-2243
<b>Counseling Center</b> <a href="mailto:Counseling@utrgv.edu">Counseling@utrgv.edu</a> <a href="#">Mental Health Counseling and Related Services List</a>	BSTUN 2.10 (956) 882-3897	EUCTR 109 (956) 665-2574
<b>Food Pantry</b> <a href="mailto:FoodPantry@utrgv.edu">FoodPantry@utrgv.edu</a>	BCAVL 101 & 102 (956) 882-7126	EUCTR 114 (956) 665-3663
<b>Learning Center</b> <a href="mailto:LearningCenter@utrgv.edu">LearningCenter@utrgv.edu</a>	BMSLC 2.118 (956) 882-8208	ELCTR 100 (956) 665-2585
<b>Writing Center</b> <a href="mailto:WC@utrgv.edu">WC@utrgv.edu</a>	BLIBR 3.206 (956) 882-7065	ESTAC 3.119 (956) 665-2538

## DEAN OF STUDENTS RESOURCES

The Dean of Students office assists students when they experience a challenge with an administrative process, unexpected situation such as an illness, accident, or family situation, and aids in resolving complaints. Additionally,

the office facilitates student academic related requests for religious accommodations, support students formerly in foster care, helps to advocate on behalf of students and inform them about their rights and responsibilities, and serves as a resource and support for faculty and campus departments.

[Vaqueros Report It](#) allows students, staff and faculty a way to report concern about the well-being of a student, seek assistance in resolving a complaint, or report allegations of behaviors contrary to community standards or campus policies.

The Dean of Students can be reached by emailing [dos@utrgv.edu](mailto:dos@utrgv.edu), by logging into [Virtual Office hours](#) in which a representative is available Monday-Friday 9:00-11:00 a.m. and 1:00-4:00 p.m, or by visiting one of the following office locations: Cavalry (BCAVL) 204 or University Center (EUCTR 323). Phone: 956-665-2260.