Data Analytics COSC 6380.001
Department of Computing Sciences
Fall 2020

A. COURSE INFORMATION
Course number/section: COSC-6380.001
Class meeting time: TR 05:30-06:45PM
Class location: virtual or IH-156 when face-to-face
Course Website: bb9.tamucc.edu
Course Communication: email

B. INSTRUCTOR INFORMATION
Instructor: Scott King
Office location: CI 324
Office hours: MW 1:00-3:30PM virtual (https://tamucc.webex.com/meet/sking)
Telephone: 361 825 5877
e-mail: scott.king@tamucc.edu
Appointments: Virtual or in-person. Call me or send me an email.

C. COURSE DESCRIPTION
Catalog Course Description
This course will introduce state-of-the-art techniques to process and analyze different types of data, generate insights and knowledge from data, and make data-based decisions and predictions. Real-world examples will be used to familiarize students with the theory and applications. Main topics include data preprocessing, probability theory, tests of hypothesis, and various data analysis techniques (e.g., clustering, classification, prediction/forecasting, etc.) for different types of data including static, time-series, spatial, and spatiotemporal.

Extended Course Description
This course is required for all GSCS students starting in Fall 2021. This course counts as an elective in group B: Data Science for Computer Science MS students on courses only option and as an elective for MS students on the thesis option.

D. PREREQUISITES AND COREQUISITES
Prerequisites
None
Corequisites
None

E. REQUIRED TEXTBOOK(S), READINGS AND SUPPLIES
Required Textbook(s)
None

Optional Textbook(s) or Other References

Supplies
No supplies are required, but you will need to have a computer that you can use to access online resources or to install software. You need to be administrator on that machine.

F. STUDENT LEARNING OUTCOMES AND ASSESSMENT
Assessment is a process used by instructors to help improve learning. Assessment is essential for effective learning because it provides feedback to both students and instructors. A critical step in this process is making clear the course’s student learning outcomes that describe what students are expected to learn to be successful in the course. The student learning outcomes for this course are listed below. By collecting data and sharing it with students on how well they are accomplishing these learning outcomes students can more efficiently and effectively focus their learning efforts. This information can also help instructors identify challenging areas for students and adjust their teaching approach to facilitate learning.

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

1. Understand and implement the techniques to preprocess and clean different types of data
2. Understand the statistical fundamentals necessary to build data analysis models
3. Apply different supervised learning (regression or classification) techniques to extract useful information from different types of data, and analyze and evaluate their performances
4. Apply different unsupervised learning techniques to understand patterns underlying different types of data, and analyze and evaluate their performances
5. Select the appropriate data analysis technique for a particular data type and application
6. Implement an appropriate data analysis technique to solve a real-world application problem

G. INSTRUCTIONAL METHODS AND ACTIVITIES
This course will have much of the material online for students to learn on their own, and will consist of several course modules. We will then meeting weekly as a group in a synchronous manner to have discussions on the course modules and on solving problems using the material learned in the course modules. There will be both individual and group work. Students will also present the results of the work orally as a video, with synchronous questions.
H. MAJOR COURSE REQUIREMENTS AND GRADING

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>% of FINAL GRADE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mid-Term Exams</td>
<td>15</td>
</tr>
<tr>
<td>Final Exam</td>
<td>25</td>
</tr>
<tr>
<td>Quizzes and Learning Modules Completions</td>
<td>20</td>
</tr>
<tr>
<td>Homework and Programming Assignments</td>
<td>20</td>
</tr>
<tr>
<td>Term Project</td>
<td>20</td>
</tr>
</tbody>
</table>

I. COURSE CONTENT/SCHEDULE

<table>
<thead>
<tr>
<th>Week</th>
<th>TOPIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction to data analytics, Data preprocessing</td>
</tr>
<tr>
<td>2</td>
<td>Data Types, Measures of Similarity</td>
</tr>
<tr>
<td>3</td>
<td>Probability theory</td>
</tr>
<tr>
<td>4-5</td>
<td>Hypothesis testing</td>
</tr>
<tr>
<td>6-7</td>
<td>Data analysis techniques for static data</td>
</tr>
<tr>
<td>8</td>
<td>Mid-Term Exam</td>
</tr>
<tr>
<td>9-10</td>
<td>Data analysis techniques for time-series data</td>
</tr>
<tr>
<td>11-12</td>
<td>Data analysis techniques for spatial data</td>
</tr>
<tr>
<td>13</td>
<td>Data analysis techniques for spatiotemporal data</td>
</tr>
<tr>
<td>14-15</td>
<td>Term Project Presentations</td>
</tr>
<tr>
<td>16</td>
<td>Final Exam Dec 4:30PM-7:00pm</td>
</tr>
</tbody>
</table>

Note: Changes in this course schedule may be necessary and will be announced to the class by the Instructor. The assignments and exams shown are directly related to the Student Learning Outcomes described in Section F.

J. COURSE POLICIES

COVID-19
Face Coverings
Face coverings (cloth face covering, surgical mask, etc.) must be properly worn in all non-private spaces including classrooms, teaching laboratories, common spaces such as lobbies and hallways, public study spaces, libraries, academic resource and support offices, and outdoor spaces where 6 feet of physical distancing is difficult to reliably maintain. Extra masks will be made available if needed.

Virtual Meetings
Many of our meetings will be virtual. We may use Zoom, Webex, or Teams. Meetings will be recorded and available for later use. During these meetings you should keep your microphone muted unless speaking. Use the chat as much as possible. Bandwidth can become an issue and so keeping your camera off is often acceptable, but you should turn your camera on when asking questions. But in general, if possible, keep the camera on. For exams that are virtual, you may be required to have a camera turned on during the full exam.

Attendance/Tardiness
Quizzes are often at the beginning of class for the first 5 minutes, if you are late, you may miss the quiz entirely or have less time to complete it. But quizzes can be at any time during the class. No makeup quizzes.

Late Work and Make-up Exams
No makeup exam without adequate doctor's excuse explaining your absence. Makeup exams will not be the same exam. If for any reason you have a conflict you must see me as soon as you know about the conflict!

Late assignments will be marked off at a rate of: 10% for 1 day, 25% for 2 days, 50% for 3 days, 60% thereafter

Extra Credit
No extra credit is available unless explicitly listed on an assignment or exam, and will only be for the assignment or exam.

Cell Phone Use
Turn off cell phones and pagers before class. If any cell phone goes off in class, even mine, it is quiz time.

Laptop Use
Laptops can be used to take notes and follow along in class. No volume for sound is allowed. No playing computer games.

Participation
Lectures, in-class activities, and virtual activities are expected to be interactive and all students are required to participate.

Others
Incompletes only with documented reasons in accordance with the university policy.

All work must be your own, group work is CHEATING, and all group members will receive a zero

Unless otherwise noted, the due time will be 11:59:59PM, 12:00:01AM is 10% off.

In general, your actions should not interrupt class and effect the other students in class.

K. COLLEGE AND UNIVERSITY POLICIES

Academic Integrity (University)
University students are expected to conduct themselves in accordance with the highest standards of academic honesty. Academic misconduct for which a student is subject to penalty includes all forms of cheating, such as illicit possession of examinations or examination materials, falsification, forgery, complicity or plagiarism. (Plagiarism is the presentation of the work of another as one’s own work.) In this class, academic misconduct or complicity in an act of academic misconduct on an assignment or test will result in a failing grade.

Classroom/Professional Behavior
Texas A&M University-Corpus Christi, as an academic community, requires that each individual respect the needs of others to study and learn in a peaceful atmosphere. Under Article III of the Student Code of Conduct, classroom behavior that interferes with either (a) the instructor’s ability to conduct the class or (b) the ability of other students to profit from the instructional program may be considered a breach of the peace and is subject to disciplinary sanction outlined in article VII of the Student Code of Conduct. Students engaging in unacceptable behavior may be instructed to leave the classroom. This prohibition applies to all instructional forums, including classrooms, electronic classrooms, labs, discussion groups, field trips, etc.

Statement of Civility
Texas A&M University-Corpus Christi has a diverse student population that represents the population of the state. Our goal is to provide you with a high quality educational experience that is free from repression. You are responsible for following the rules of the University, city, state and federal government. We expect that you will behave in a manner that is dignified, respectful and courteous to all people, regardless of sex, ethnic/racial origin, religious background, sexual orientation or disability. Behaviors that infringe on the rights of another individual will not be tolerated.

Deadline for Dropping a Course with a Grade of W (University)
I hope that you never find it necessary to drop this or any other class. However, events can sometimes occur that make dropping a course necessary or wise. Please consult with your academic advisor, the Financial Aid Office, and me, before you decide to drop this course. Should dropping the course be the best course of action, you must initiate the process to drop the course by going to the Student Services Center and
filling out a course drop form. Just stopping attendance and participation WILL NOT automatically result in your being dropped from the class. Please consult the Academic Calendar (http://www.tamucc.edu/academics/calendar/) for the last day to drop a course.

- **Grade Appeals (College of Science and Engineering)**
  As stated in University Procedure 13.02.99.C0.03, Student Grade Appeal Procedures, a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is required to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University Procedure 13.02.99.C0.03, Student Grade Appeal Procedures. These documents are accessible through the University Rules website at http://academicaffairs.tamucc.edu/rules_procedures/assets/13.02.99.c0.03_student_grade_appeals.pdf. For assistance and/or guidance in the grade appeal process, students may contact the chair or director of the appropriate department or school, the Office of the College of Science and Engineering Dean, or the Office of the Provost.

- **Disability Services**
  The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please call (361) 825-5816 or visit Disability Services in Corpus Christi Hall 116.

  If you are a returning veteran and are experiencing cognitive and/or physical access issues in the classroom or on campus, please contact the Disability Services office for assistance at (361) 825-5816.

  http://disabilityservices.tamucc.edu/

- **Civil Rights Complaints**
  Texas A&M University-Corpus Christi is committed to fostering a culture of caring and respect that is free from discrimination, relationship violence and sexual misconduct, and ensuring that all affected students have access to services. For information on reporting Civil Rights complaints, options and support resources (including pregnancy support accommodations) or university policies and procedures, please contact the University Title IX Coordinator, Sam Ramirez (Samuel.ramirez@tamucc.edu) or Deputy Title IX Coordinator, Rosie Ruiz (Rosie.Ruiz@tamucc.edu) x5826, or visit website at Title IX/Sexual Assault/Pregnancy.
Limits to Confidentiality. Essays, journals, and other materials submitted for this class are generally considered confidential pursuant to the University's student record policies. However, students should be aware that University employees, including instructors, are not able to maintain confidentiality when it conflicts with their responsibility to report alleged or suspected civil rights discrimination that is observed by or made known to an employee in the course and scope of their employment. As the instructor, I must report allegations of civil rights discrimination, including sexual assault, relationship violence, stalking, or sexual harassment to the Title IX Coordinator if you share it with me.

These reports will trigger contact with you from the Civil Rights/Title IX Compliance office who will inform you of your options and resources regarding the incident that you have shared. If you would like to talk about these incidents in a confidential setting, you are encouraged to make an appointment with counselors in the University Counseling Center.

• Statement of Academic Continuity
  In the event of an unforeseen adverse event, such as a major hurricane and classes could not be held on the campus of Texas A&M University–Corpus Christi; this course would continue through the use of Blackboard and/or email. In addition, the syllabus and class activities may be modified to allow continuation of the course. Ideally, University facilities (i.e., emails, web sites, and Blackboard) will be operational within two days of the closing of the physical campus. However, students need to make certain that the course instructor has a primary and a secondary means of contacting each student.

L. OTHER INFORMATION

• Academic Advising
  The College of Science & Engineering requires that students meet with an Academic Advisor as soon as they are ready to declare a major. The Academic Advisor will set up a degree plan, which must be signed by the student, a faculty mentor, and the department chair. Meetings are by appointment only; advisors do not take walk-ins. Please call or stop by the Advising Center to check availability and schedule an appointment. The College’s Academic Advising Center is located in Center for Instruction 350 or can be reached at (361) 825-3928.

GENERAL DISCLAIMER

I reserve the right to modify the information, schedule, assignments, deadlines, and course policies in this syllabus if and when necessary. I will announce such changes in a timely manner during regularly scheduled lecture periods.