DSCI 5340: PREDICTIVE ANALYTICS AND BUSINESS FORECASTING
5W1-2022 SYLLABUS

CLASS (DAY/TIME): Mon & Wed 12pm-3:50pm (Jun 6-July 8)
INSTRUCTOR: Dr. Mahdi Fathi
ROOM: BLB 010
E-MAIL (preferred): mahdi.fathi@unt.edu
OFFICE PHONE: (940) 565-3111
OFFICE HRS: schedule a meeting at: calendly.com/mahdi-fathi via Zoom ID: 9405653111
TUTOR HRS: Posted shortly

Textbooks
- Nicolas Vandeput, Data Science for Supply Chain Forecasting, 2021 (OPTIONAL text).
- In addition, a number of reference texts will be available in PDF (free of charge)

Software
SAS (main environment), Python, R. Also, Excel, Minitab, and IBM SPSS (some exposure).
(NOTE: All packages are available in our COB virtual lab)

Canvas Learning Management System
Materials for the DSCI 5340 course will be posted on Canvas LMS.

Course Description
This semester we will be working together to learn about how to create Predictive Models which have many applications for Social Goods. Areas of interest include, but are not limited to:

- Health and healthcare
- Humanitarian operations
- Disaster relief
- Education
- Social services
- Environment
- Sustainability
- Sharing economy
This course has 12 Modules as follow:

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<thead>
<tr>
<th>Module</th>
<th>Topics</th>
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<tbody>
<tr>
<td>1</td>
<td>An Introduction to Forecasting</td>
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Also, we have two sessions on real case studies including regression models and time series models.

**Course Objectives**

This course introduces the theory and practice of forecasting, time series, and regressions with an emphasis on practical skills. Having completed DSCI 5340, you will be able to apply forecasting techniques in behavioral decision and management problems, and model and forecast a time series as well as read papers from the literature for writing high-quality journal papers in predictive modeling. More generally, you will obtain an appreciation for the role of dependence in statistical modeling.

**Course Activities**

- Weekly Module Activities
- Discussion forums
• Researching, and Understanding of Journal Papers from "International Journal of Forecasting"
• Following the events and topics in "International Institute of Forecasters (IIF)"
• Searching for Dataset and Novel data science projects in
  o Github
  o Kaggle
  o United States Department of Transportation
  o Challenges for City of Frisco, Dallas, Irving data
  o GUN VIOLENCE ARCHIVE
  o UC Irvine Machine Learning Repository
  o Google data set
  o Dallas city data set
  o Data Science Central
  o COVID-19 Open Research Dataset Challenge

**Class Attendance**
Regular class attendance and informed participation are expected.

**Course Prerequisites**
Graduate status and some introductory graduate course in Business Statistics such as DSCI 5010, or DSCI 5180, or consent of the ITDS department, are required. While a high degree of mathematical skill is not necessary in an “applied” course such as this, there are certain insights into the course that are gained through the analytics involved. Statistical software such as SAS, Excel, R, Minitab, and IBM SPSS will be used to demonstrate specification applications. Information on the use of these software packages will be provided in the course and students are not required to have prior experience with the software.

**Course Data Sets**
Several course datasets required for the Mini-Case assignments, as well as examples covered in class, will be posted on Canvas.

**Point Allocation**

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Points</th>
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<tbody>
<tr>
<td>Homework (5@10 pts)</td>
<td>50 pts</td>
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<tr>
<td>Group Project 1 (Regression Data)</td>
<td>50 pts</td>
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<tr>
<td>Group Project 2 (Time series Data)</td>
<td>100 pts</td>
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TOTAL 200 pts

An extra credit (up to 100 pts) will be considered for contributing in writing a high quality journal paper.
**Letter Grades**

- 180+ pts (=90%) = A
- 160+ pts (=80%) = B
- 140+ pts (=70%) = C
- 120+ pts (=60%) = D
- Below 60 pts = F

**Quizzes**

There will be 12 Quizzes, worth 5 points each. These will be typically closed books, at the instructor’s discretion. The Quizzes will be multiple-choice or SAS coding. They will cover the material presented in class on the day of the Quiz. Make-up Quizzes will not be allowed, but the 4 lowest grades among the 12 Quizzes will be dropped.

**Homework**

There will be 12 HWs that will require individual work. Related handouts will be distributed in class and related datasets will be posted on Canvas.

**Group Project**

There will be two projects (regression data and time series data) that will require team work for developing predictive models. Related handouts will be distributed in class and related datasets will be posted on Canvas. You will be asked to form teams of 2 members. You will have to select a business problem that interests you (the instructor will suggest a problem in case you run out of ideas.) Problem data/facts can be real, obtained from published sources, or made up by your team in a way that they correspond to realistic situations. Your team will prepare a written report and a PowerPoint presentation, to be presented in class.

**Miscellaneous Policies**

IMPORTANT DATES: Dates of drop deadlines, exams, final exams, etc., are published in the university catalog and schedule of classes. It is your responsibility to be informed with regard to these dates. Unawareness is no excuse. Do not wait until the last day to drop the course if you are not making satisfactory progress in this class. Your instructor may not be available at that time.

**Campus Closures**

Should UNT close campus, it is your responsibility to keep checking your official UNT e-mail account (EagleConnect), the UNT Web site, and Canvas, to learn if your instructor plans to modify class activities, and how. This may include changing assignment due dates, rescheduling quizzes and exams, etc.

**Student Perceptions of Teaching (SPOT)**

Student Perceptions of Teaching (SPOT) utilizes IASystem® and is a requirement for all organized classes at UNT. This short Web-based survey will be available to you at the
end of the semester, providing you with a chance to comment on how this class is taught. I am very interested in this feedback from my students, as I work to continually improve my teaching. I consider SPOT to be an important part of your class participation.

**Use of Cell Phones**

As a courtesy to your instructor and to your fellow classmates, you are asked to set your cell phone to *vibrate*, or switch it off. In case of a personal emergency, if you must use your cell phone, you are asked to step out of the classroom.

**Students with Disabilities**

UNT and the College of Business comply with the Americans with Disabilities Act in making reasonable accommodations. If you have an established disability you should register with the Office for Disability Accommodation and receive further instructions. Please see your instructor as soon as possible if you have any questions.

**Academic Integrity**

This course adheres to the UNT policy on academic integrity. The policy can be found at [https://vpaa.unt.edu/fs/resources/academic/integrity](https://vpaa.unt.edu/fs/resources/academic/integrity). Practices that violate academic integrity, such as “cheating” or “plagiarism”, are strongly discouraged. If you engage in academic dishonesty related to this class, you may receive a failing grade on the test or assignment, or a failing grade in the course. In addition, the case may be reported to the UNT Dean of Students/Academic Integrity Office, which maintains a database of related violations.

**Class Schedule (Subject to change; Effective 6/6/2022)**

I assume each week includes two sessions.

<table>
<thead>
<tr>
<th>Week</th>
<th>Topics</th>
<th>Readings</th>
<th>Homework</th>
<th>Exam</th>
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<tbody>
<tr>
<td>Week 1</td>
<td>An Introduction to Forecasting</td>
<td>Module 1</td>
<td>HW1</td>
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<td></td>
<td>Basic Statistical Concepts</td>
<td>Module 2</td>
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<td>Week 2</td>
<td>Simple Linear Regression</td>
<td>Module 3</td>
<td>HW2</td>
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<td>Multiple Linear Regression</td>
<td>Module 4</td>
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<td>Model Building and Residual Analysis</td>
<td>Module 5</td>
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<td>Case studies Review-Regression modeling</td>
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<td>Week 3</td>
<td>Time Series Regression</td>
<td>Module 6</td>
<td>HW3</td>
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<td>Decomposition Methods</td>
<td>Module 7</td>
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<td>Exponential Smoothing</td>
<td>Module 8</td>
<td>HW4</td>
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<td>Group project 2</td>
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<td></td>
<td>Project presentation- Time series modeling</td>
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The UNT College of Business and the ITDS Department expect their students to behave at all times in an ethical manner. There are at least two reasons for this. First, ethical behavior affirms the personal value and worth of the individual. Second, professionals in all fields (but particularly in information systems, decision sciences, accounting, and HR) frequently handle confidential information on behalf of their employers and clients. Thus employers of UNT’s Ryan College of Business graduates expect ethical conduct from their employees because that behavior is crucial to the success of their organization. Academic dishonesty is unethical and often illegal too.

Students are expected to read (https://policy.unt.edu/policy/06-003) UNT’s Student Standards of Academic Integrity which defines academic dishonesty and sets out the consequences for unethical academic behavior. Cheating and plagiarism are the most common types of academic dishonesty. UNT’s Code of Student Conduct https://policy.unt.edu/policy/07-012 and the Provost’s Academic Integrity page are also helpful https://vpaa.unt.edu/ss/integrity.

The UNT’s Student Standards of Academic Integrity policy defines cheating as: The use of unauthorized assistance in an academic exercise, including but not limited to:

1. Use of any unauthorized assistance to take exams, tests, quizzes or other assessments;
2. Dependence upon the aid of sources beyond those authorized by the instructor in writing papers, preparing reports, solving problems or carrying out other assignments;
3. Acquisition, without permission, of tests, notes or other academic materials belonging to a faculty or staff member of the University;
4. Dual submission of a paper or project, or re-submission of a paper or project to a different class without express permission from the instructor;
5. Any other act designed to give a student an unfair advantage on an academic assignment.

The university’s policy defines plagiarism as the “Use of another’s thoughts or words without proper attribution in any academic exercise, regardless of the student’s intent, including but not limited to:

1. The knowing or negligent use by paraphrase or direct quotation of the published or unpublished work of another person without full and clear acknowledgement or citation.
2. The knowing or negligent unacknowledged use of materials prepared by another person or by an agency engaged in selling term papers or other academic materials.

Examples of academic dishonesty in an ITDS class include but are not limited to: copying answers from another person’s paper; using notes during an exam; copying computer code from another person’s work; having someone else complete your assignments or take tests on your behalf; stealing code printouts, software, or exams; recycling assignments submitted by others in prior or current semesters as your own; and copying the words or ideas of others from books, articles, reports, presentations, etc. for use as your own thoughts without proper attribution (i.e., plagiarism). It does not matter whether you received permission from the owner of the copied work; claiming the material as your own is still academic dishonesty.

The ITDS Department believes it is very important to protect honest students from unfair competition with anyone trying to gain an advantage through academic dishonesty. Academic dishonesty is not tolerated in ITDS classes, and those who engage in such behavior are subject to sanctions as outlined in the UNT’s policy and/or the course syllabus. Read the policy carefully so that you are aware of what constitutes academic dishonesty and the consequences of such behaviors. If you engage in academic dishonesty related to this class, you will receive a failing grade on the test or assignment, and a failing grade in the course.

By signing below, I acknowledge my responsibility to read the UNT policy on Student Academic Integrity (https://policy.unt.edu/policy/06-003); and attest that I have read and understand the statements in this document and agree to behave ethically in this class.

Student Name (Print) ___________________________ Student ID No. ___________________________

Student Signature ___________________________ Date ___________________________
These ethical guidelines are essential to maintain the integrity of the university, college, department, faculty and most importantly the students. I view breaking the code of conduct as been unfair to your peers and stealing a degree. These ethical guidelines are common to both in-campus and online courses and is especially crucial for online activities.

A few key points to remember:

1. If you can google, I can google. You are not receiving course credits for being the best web-crawler (looking for answers in the website). The course credit is for mastering the content and understanding how to apply in your career.

2. **Don’t use websites Chegg.com any website resources that offers solutions to textbook or problems. They all fall under plagiarism.** Credits are given only to your work

3. If you think you are doing something that is not right, then most probably it is not right. Ask the instructor or the tutor before proceeding that route.

4. Individual activities must be completed individually, and group activities as a group.

5. Give credit to your sources (data, article etc.), cite the source and acknowledge the help you receive – it will solve much of these issues. The instructor will grade based on your contribution.

6. Remember every online activity in canvas and Hawkes Learning websites are monitored.

7. If we have issues with your submissions, we will personally invite you to a zoom session and ask you explain the how you solved the problems. So be sure of what you submit

I would like to point out some of the activities we have sanctioned (awarded “F” grade and sometimes even more, removed from dean’s list, merit list etc.). I want to share this so that you know that we care integrity of the degree you receive from UNT.

1. In one of the semesters, some exams were conducted using Respondus lockdown browser and video monitoring. However, some students took advantage of a loophole and had help from resources outside the screen and camera. Our instructors viewed 120 hours of video recording and found a group of students involved in a coordinated plagiarism. **All were sanctioned, with some losing even scholarships!**

2. In one instance, a student outsourced all his assignments to a person outside this country. The assignments were flagged for abnormal activities and with the help of some technology providers we were able to trace the IP address. The student was sanctioned (**awarded a “F” grade in the course**)!

3. Don’t use outside sources without understanding. In one of the assignment activities in a class, almost all students took an answer/definition from Wikipedia before understanding it. Use those unvetted sources carefully, anyone can edit them! The faculty corrected the entry and went to class to seek how the students got the answer. Almost all pointed to wiki, and the faculty opened the website in class to prove the point. The entry was updated! Use library and vetted resources and look for the citation in the Wikipedia article itself before using it. Understand what you are doing. Here the sanction was receiving a “zero” credit for the wrong answer!

4. In a similar vein, some students used outside tutoring service – they got the answers from the tutors (both online and offline) and plugged in the values and submitted it. These are easy to identify. We invited the students for one on one zoom meetings and they were unable to show how to solve the problems. Here the sanction was receiving a “zero” for all those assignments.

5. Almost exams and quizzes have multiple versions, and the numbers and options are different. So, if you use your peer – the chances of choosing the wrong answer is extremely high. In worst cases (it has happened in some instances), the student would have used the numbers and details from the different version. In such instances, the student is automatically awarded a “F” grade.