

DSCI 4510: Modeling for Business Intelligence – Spring 2023 Syllabus

CLASS (DAY/TIME): Wednesday 2:00 pm – 4:50 pm: BLB 270 (Face to Face section)
INSTRUCTOR: Dr. Arunachalam Narayanan (Chalam)
OFFICE: BLB 379J
OFFICE HRS: Monday (In Office) - 10:30 – Noon
Tuesday (Zoom) – 6 – 7pm
Wednesday (In Office) 10:30 – 11:30 am or by appointment
Zoom link (When needed): <https://unt.zoom.us/my/chalamunt>
E-MAIL (preferred): Arunachalam.Narayanan@unt.edu

COURSE OBJECTIVES

To provide the student with a working knowledge of management science/operations research techniques for use in business. This will be achieved by using the real-world problem-oriented approaches and using examples that emphasize the multi-disciplinary nature of business problems. Spreadsheets will be used to strengthen students' ability to make business decisions. The course uses case studies, games, simulations and assignments that require communication and interaction, to strengthen students' understanding. Techniques covered will include Decision Analysis, Multi-objective optimization, Simulation, and Forecasting. (Be prepared to think innovatively, independently, logically and without the use of cook-book formulae in order to succeed in this course.)

Prerequisite(s): Please see UNT Undergraduate Catalog, specifically you should have taken DSCI 2710, 3870 and BCIS 2610.

(It is assumed that students taking this course have completed the college algebra course and also have a good foundation in calculus, basic statistics and probability theory as covered in the basic statistics course. Although some review of elementary concepts and terminology is provided in the textbook, it is not intended to replace a complete course, but rather to refresh your memory. 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 mathematics involved.)

REQUIRED TEXTBOOK and RESOURCES

1. An Introduction to Management Science: Quantitative Approaches to Decision Making | 15th Edition (The book you used in DSCI 3870)

By David R. Anderson/Dennis J. Sweeney/Thomas A. Williams/Jeffrey D. Camm/James J. Cochran/Michael J. Fry/Jeffrey W. Ohlmann
ISBN-13: 978-1337406529 | ISBN-10: 133740652X

The link below provides as alternate site besides the bookstore to buy or rent the textbook:

<https://www.cengage.com/c/an-introduction-to-management-science-quantitative-approach-15e-anderson/?filterBy=Student>

(It is fine if you have the 13 or 14th Edition of this textbook, which has fewer authors in the author roll. You will however need to **reconcile the self-test exercises, end-of-chapter cases and problems with the 15th edition as needed.** I will be using the 15th edition in class.)

2. A Simulation Game Code

You will be playing an online simulation game for which you will need an access code. You can buy the code directly at <http://mgr.responsive.net/Manager/ShowClient> . You will have to create an account to login. Note that the institution name in the drop down menu appears as “North Texas”. The product is titled "Startup Game Code for DSCI 4510". Operational details pertaining to the game appear later in this syllabus and semester. The simulation would be played during the final month of the course (It will be a 3 weeks simulation, where you will enter decisions based on your strategy. There are only 4 variables you can change and an excel sheet would be provided to help you in analyzing) - **\$18 per person**. A link will be provided in canvas for it. (It is played by **teams of three**, you will have the option to choose your partners and there will be group evaluation provided for it)

3. Beergame

An online simulation game. No charge for it. Each supply chain will have up to four players, however they will be assigned randomly. Will be in class and you need a laptop or tablet (no cell phones or any other smaller mobile devices) to play the game.

REQUIRED RESOURCES:

Business or scientific calculator; must be able to perform at least the following functions: square, square root, raise to nth power, extract nth root, logarithm. The lack of a calculator does not excuse the student from making math errors on exams. An access to a computer/laptop with excel solver. Minitab is available through UNT Business school.

Teaching method

1. You are encouraged to attend classes regularly. I believe that 80% of studying is done in classrooms, the students who understand the topics while being presented in class – tend to do well in exams and assignments.
2. You are encouraged to pay attention to commercials and news items in printed as well as audio-visual media to become aware of the wide use of modeling techniques in our daily lives. To better assist you in understanding the use of these methodologies in business many of the class problems will be presented as simple business cases.
3. You should **study** the material in the PowerPoint slides. You are strongly encouraged to try to independently solve the problems included in the lecture slides, not simply verify that the provided solutions “make sense”. **Actually work the problem by hand!**

GENERAL COMMENTS

1. Doing the assignments and regular work is essential for success in this course. In fact, the assignments and group activities constitute a large portion of your grade in this course (50%). You are encouraged to keep up with the work and meet the submission deadlines. Even if you 100% in all exams and score 0 in the assignments, the best grade possible will not be “C”. Therefore, doing assignments is crucial. They are simple and help you with the preparation.
2. You should not hesitate to ask questions in class. Usually someone else has the same question, so, when you ask a question in class, others can benefit from the question.

3. Regular and punctual attendance for the **full** period of each class is expected (irrespective of whether roll calls are made, or attendance is otherwise verified). Absences and tardiness are likely to cause you to miss the presentation of significant material and this may result in a lower grade. There will be no make-up if you miss any of the mid-term exams, unless you have a **University-approved excuse**. Whenever applicable, such an excuse is to be provided to the instructor in writing, as early as possible.
4. You have the final responsibility for seeing that you properly withdraw before the scheduled last drop day, in case you wish to withdraw from/ drop the course. If you stop attending class, you should execute the drop procedure since failure to do so will result in a grade of “F” which cannot be changed.

Note the dates:

Jan 30th, 2023 – Last day to drop without penalty of W

April 7th, 2023 – Last day for a student to drop a course (with W).

(Always check <https://registrar.unt.edu/registration/spring-registration-guide> for exact dates and procedures)

COURSE SPECIFIC POLICIES:

Assignments/Readings/Cases

Problems/cases from the textbook will be assigned as the course progresses. Some problems/cases are already assigned in the “Course Outline” which appears later. The student is responsible for solving these problems/cases in a timely manner. I will also hand out readings (magazine articles, newspaper clippings etc.) which I expect the student to go through.

Quizzes

Most quizzes **will be online during class** and will be closed book/closed notes (so make sure you bring your laptop to class, if you have issues reach out to me early). Formulas will be provided. The quizzes are to evaluate your progress in the class and help you prepare towards the exam.

Exams

There will be two exams and it is not comprehensive. **Each exam will have two parts**. One portion of the exams will be closed books (i.e. you are not allowed to browse internet nor read the text), respondus lockdown, another portion of exam will involving solving problems using software. You can use your notes or cheat sheet. For each exam, bring a calculator, and your Student ID.

Missed exams will receive zero marks unless a legitimate excuse is presented. If you miss an exam, please follow the steps below:

Step 1: If you miss an exam for any acceptable reason, please e-mail the instructor as soon as you are able about the reason why you missed the exam.

Step 2: Then, you should provide the instructor proof in the form of an official document as soon as you are able with proper documentation. Your documentation should be acceptable based on an interpretation of College of Business or University policy.

Step 3: After the instructor receives an acceptable proof, the instructor will then e-mail you to schedule a make-up exam.

Face to Face class

This is an on-campus class. The class sessions may not be recorded and posted online for reference. Therefore, if you miss any part of lecture/class for a health-related reason please reach out to me before the class session by email. We will record those class sessions and post them in zoom/canvas for you. This would be done only if we know **before-hand** that you will be missing the class for health reasons.

A few select portions of the class may be recorded and posted online for the entire class to reference. This would be ad-hoc and need based.

Remember, class participation and quizzes will be given only during in class sessions. There are points for class participation and some sessions like (project presentation, startup game presentation and beer game sessions have higher points). If there is a health-related reason for missing these sessions, a proper documentation should be provided to the instructor. An appropriate make up opportunity would be provided, if the excuse is deemed acceptable.

GRADING POLICIES

All assignments will be graded fairly and scores will be available before the start of next class period.

Point Allocation:

| | |
|--|------------|
| Exam 1 | 200 |
| Exam 2 | 200 |
| Assignments (4 out of 5) – Each 25 points | 100 |
| Quizzes – Each 10 points | 50 |
| In class activities/participation | 30 |
| Beergame | 20 |
| <u>Group Activities</u> | |
| Project (1 st half of semester) | 100 |
| Startup Game (after Exam 1) | 100 |
| TOTAL: | 800 |

| | |
|-----------------------|---------------------------------|
| Letter Grades: | ≥ 720 points (or ≥ 90%) → A |
| | ≥ 640 points (or ≥ 80%) → B |
| | ≥ 560 points (or ≥ 70%) → C |
| | ≥ 480 points (or ≥ 60%) → D |
| | < 480 points (or below 60%) → F |

There will be some bonus opportunities throughout the class. There is a possibility of about 20-30 bonus point activities in class. If you earn them, they will added to the raw score.

Startup Game and project are group activities. You need to select a team of 3 by end of Week 2.

There will be separate peer evaluation for each group activity, you are expected to work together and contribute towards the team.

DEPARTMENT, COLLEGE, and OTHER POLICIES

1. COMPLAINTS: If you wish to register a complaint, you should first discuss your complaint with me. If you wish to carry it further, then the ITDS Department Chair Dr. Anna Sidorova, but **only after first discussing it with your instructor**.
2. EXAMS: You are required to take all exams, unless a written medical or other UNT-approved excuse is provided. In that case, you should discuss the alternative arrangements with your instructor. Please have a picture ID in your possession when taking all exams. As a general rule, the course format requires **no make-up exam** be given.
3. ACADEMIC INTEGRITY: This course adheres to the UNT policy on academic integrity. The policy can be found at [Student Academic Integrity Policy \(06.003\)](#). If you engage in academic dishonesty **you will 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.
4. STUDENTS WITH DISABILITIES: The College of Business complies with the **Americans with Disabilities Act** in making reasonable accommodations for qualified students with disability. 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.
5. DEADLINES: Dates of drop deadlines, final exams, etc., are published in the university catalog and the schedule of classes. Please be sure you keep informed about these dates.
6. SPOT: The Student Perceptions of Teaching (SPOT) is a requirement for all organized classes at UNT. This short Web-based survey will be made available to you at the end of the semester/session, providing you a chance to comment on how this class is taught. I am very interested in the feedback I get from students, as I work to continually improve my teaching. I consider SPOT to be an important part of your participation in this class.
7. 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.
8. INCOMPLETE GRADE (I): The grade of "I" is not given except for rare and very unusual emergencies, as per University guidelines. An "I" grade cannot be used to substitute your poor performance in class. If you think you will not be able to complete the class, please drop the course.
9. CAMPUS CLOSING: In the event of an official campus closing, please check your UNT e-mail (EagleConnect) for instructions on how to turn in assignments, how the due dates are modified, etc.

Emergency Evacuation Procedures for Business Leadership Building:

- **Severe Weather** In the event of severe weather, all building occupants should immediately seek shelter in the designated shelter-in-place area in the building. If unable to move safely to the designated shelter-in-place area, seek shelter in a windowless interior room or hallway on the lowest floor of the building. All building occupants should take shelter in rooms 055, 077, 090, and the restrooms on the basement level. In rooms 170, 155, and the restrooms on the first floor.

- **Bomb Threat/Fire** In the event of a bomb threat or fire in the building, all building occupants should immediately evacuate the building using the nearest exit. Once outside, proceed to the designated assembly area. If unable to safely move to the designated assembly area, contact one or more members of your department or unit to let them know you are safe and inform them of your whereabouts. Persons with mobility impairments who are unable to safely exit the building should move to a designated area of refuge and await assistance from emergency responders.

Class videos

Class videos (if posted) are the intellectual property of the university or instructor and are reserved for use only by students in this class and only for educational purposes. Students may not post or otherwise share the recordings outside the class, or outside the Canvas Learning Management System, in any form. Failing to follow this restriction is a violation of the UNT Code of Student Conduct and could lead to disciplinary action.

Course Materials for Remote Instruction

Remote instruction may be necessary if community health conditions change or you need to self-isolate or quarantine due to COVID-19. Students will need access to a webcam, microphone and laptop with Office 365 and access to UNT VPN to participate in fully remote portions of the class. Additional required classroom materials for remote learning include: access to UNT VPN so that software like Minitab could be accessed without interruptions. Information on how to be successful in a remote learning environment can be found at <https://online.unt.edu/learn>

Academic Integrity Policy

Academic Integrity Standards and Consequences. According to UNT Policy 06.003, Student Academic Integrity, academic dishonesty occurs when students engage in behaviors including, but not limited to cheating, fabrication, facilitating academic dishonesty, forgery, plagiarism, and sabotage. A finding of academic dishonesty may result in a range of academic penalties or sanctions ranging from admonition to expulsion from the University. For this course, the ITDS ethics statement clearly delineates what activities are considered as violation, including some examples. An academic integrity violation will lead to a "F" grade in this course.

ADA Policy

UNT makes reasonable academic accommodation for students with disabilities. Students seeking accommodation must first register with the Office of Disability Access (ODA) to verify their eligibility. If a disability is verified, the ODA will provide a student with an accommodation letter to be delivered to faculty to begin a private discussion regarding one's specific course needs. Students may request accommodations at any time, however, ODA notices of accommodation should be provided as early as possible in the semester to avoid any delay in implementation. Note that students must obtain a new letter of accommodation for every semester and must meet with each faculty member prior to implementation in each class. For additional information see the ODA website (<https://disability.unt.edu/>).

The College of Business Administration complies with the Americans with Disabilities Act in making reasonable accommodations for qualified students with disability. If you have an established disability as defined in the "Act" and would like to request accommodation, please contact the ODA and your instructor (Dr. Chalam) as soon as possible: the instructor's office hours and phone number are in the syllabus.

Prohibition of Discrimination, Harassment, and Retaliation (Policy 16.004)

The University of North Texas (UNT) prohibits discrimination and harassment because of race, color, national origin, religion, sex, sexual orientation, gender identity, gender expression, age, disability, genetic information, veteran status, or any other characteristic protected under applicable federal or state law in its application and admission processes; educational programs and activities; employment policies, procedures, and processes; and university facilities. The University takes active measures to prevent such conduct and investigates and takes remedial action when appropriate.

Retention of Student Records

Student records pertaining to this course are maintained in a secure location by the instructor of record. All records such as exams, answer sheets (with keys), and written papers submitted during the duration of the course are kept for at least one calendar year after course completion. Course work completed via the Canvas online system, including grading information and comments, is also stored in a safe electronic environment for one year. Students have the right to view their individual record; however, information about student's records will not be divulged to other individuals without proper written consent. Students are encouraged to review the Public Information Policy and the Family Educational Rights and Privacy Act (FERPA) laws and the University's policy. See UNT Policy 10.10, Records Management and Retention for additional information.

Acceptable Student Behavior

Student behavior that interferes with an instructor's ability to conduct a class or other students' opportunity to learn is unacceptable and disruptive and will not be tolerated in any instructional forum at UNT. Students engaging in unacceptable behavior will be directed to leave the classroom and the instructor may refer the student to the Dean of Students to consider whether the student's conduct violated the Code of Student Conduct. The University's expectations for student conduct apply to all instructional forums, including University and electronic classroom, labs, discussion groups, field trips, etc. Visit UNT's Code of Student Conduct (<https://deanofstudents.unt.edu/conduct>) to learn more.

Tentative schedule for Spring 2023

Any changes in the date will be communicated through email and announcement page in canvas

| <u>WEEK</u> | <u>TOPICS</u> | <u>Chapters in book</u> |
|---|--|---|
| Week 1 (Jan 18) | Course policies Forecasting Introduction Forecast Accuracy, Moving Averages | CHAPTER 15 |
| Week 2 (Jan 25) | Forecasting Exponential Smoothing Linear Trend Projection (Regression) Seasonality (Additive) | CHAPTER 15 QUIZ 1 Assignment 1(assigned) |
| Week 3 (Feb 1) | Forecasting Seasonality (Multiplicative) Advanced methods. | Assignment 1 (due) Final Project Teams due |
| Week 4 (Feb 8) – Possible class start at 3pm | Waiting Line Models Introduction Single Server Multi Server Project Discussion | CHAPTER 11 QUIZ 2 Assignment 2(assigned) Project assigned |
| Week 5 (Feb 15) | Waiting Line Models Other Waiting Line Models Simulation What if analysis Sanotronics Problem | CHAPTER 12 Assignment 2 (due) |
| Week 6 (Feb 22) | Simulation Inventory management (basics) Inventory management simulation Advantages/Disadvantages | CHAPTER 12 QUIZ 3 Assignment 3(assigned) |
| Week 7 (Mar 1) | <u>EXAM 1</u> (Part 1: Multiple choice, list type questions) (Part 2: Solving problems using excel or Minitab) | Assignment 3 (due on Feb 28th noon) |
| Online, the exam in two parts: first part is for 60 minutes once you start, and the second part is for 75 minutes once you start. More instructions at least a week before the exam. | | |
| Week 8 (Mar 8) – Possible class start at 3pm | Simulation Waiting Line Simulation Decision Analysis Introduction DA without Probabilities <u>Buy access to Startup Game</u> | CHAPTER 12 CHAPTER 13 Any last minute project discussion |

Week 9 – SPRING BREAK

Week 10 (Mar 22)

Industrial and Behavioral Dynamics
Beer game
Bullwhip effect

Beer game & Quiz 4

Week 11 (Mar 29)

Project Presentation

Startup Game discussed
Starts on Thursday (Mar 30th)

Week 11 (Apr 5)

Decision Analysis
DA with Probabilities
Sensitivity Analysis

CHAPTER 13
Assignment 4(assigned)

Week 12 (Apr 12) – Possible start at 3pm

Decision Analysis
Decision Trees
Bayesian Analysis
Utility Theory

CHAPTER 13

Week 13 (Apr 19)

Multi-criteria Decisions
Goal Programming
Scoring Models

CHAPTER 14
Assignment 4(due)
Assignment 5(assigned)

Week 14 (Apr 26)

Multi-criteria Decisions - Analytic Hierarchical Process
Startup Game ends approx. on April 21st

CHAPTER 14

Week 15 (May 3)

Analytic Hierarchical Process (recap)
Discuss Startup Game Strategies
Catch up and Review

Quiz 5
Assignment 5 (due)

Finals Week (May 10)

May 10th, 2023- 1:30 pm – 3:30 pm

**** Exam 2 ****

As per UNT schedule

Online, the exam in two parts: first part is for 60 minutes once you start, and the second part is for 60 + 15 minutes grace time once you start. More instructions at least a week before the exam.

Participation credits

1. Attending class session on a regular basis and participation could earn participation credits of 15 points.
2. These three sessions are worth 5 points each
 - a. Participating in full session on Mar 22nd
 - b. Participating in full session on Mar 29th
 - c. Participating in full session on May 3rd