DSCI 4510: Modeling for Business Intelligence – Spring 2020 Syllabus

CLASS (DAY/TIME):	Wednesday 2:00 pm – 4:50 pm: BLB 140
INSTRUCTOR:	**Dr. Arunachalam Narayanan (Chalam)**
OFFICE:	BLB 379J
OFFICE HRS:	W 12:00 – 1:30 pm
	TH 5 – 6:15 pm (Frisco Campus)
	T 6 – 8pm (Online) , or by appointment
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 2-3 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 3**, you will have the option to choose your partners and there will be group evaluation provided for it)

3. Beergame
   An online simulation game. <u>No charge for it.</u> Each supply chain will have four players, however they will be assigned randomly. Will be played in class and need a laptop or tablet 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 n^{th} 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 17th, 2020 – Last day to drop without penalty of W
> Mar 30th, 2020 – Last day for a student to drop a course (with W).
> (Always check **http://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
All quizzes in the class will be closed book/closed notes. 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. All exams will be closed books (i.e. you are not allowed to browse internet nor read the text). You can use your notes or cheat sheet. For each exam, bring a calculator, and your Student ID. Some exams will require a computer. 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 may 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.

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

Group Activities

Project (1st half of semester)	100
Startup Game (after Spring break)	100

TOTAL: **800**

Letter Grades:
$\geq$ 720 points (or $\geq$ 90%) $\rightarrow$ A
$\geq$ 640 points (or $\geq$ 80%) $\rightarrow$ B
$\geq$ 560 points (or $\geq$ 70%) $\rightarrow$ C
$\geq$ 480 points (or $\geq$ 60%) $\rightarrow$ D
< 480 points (or below 60%) $\rightarrow$ F

There will be some bonus opportunities throughout the class. There is a possibility of about 20-40 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. Leon Kappelman, 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.

10. **SEATS MAY BE ASSIGNED FOR EXAMS.**

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. All building occupants should immediately evacuate the building and proceed to the south side of Crumley Hall in the grassy area, west of parking lot 24.

Tentative schedule for Spring 2020
Any changes in the date will be communicated through email and announcement page in canvas

WEEK	TOPICS	Chapters in book
Week 1 (Jan 13-19)		
	Course policies	
	Forecasting	CHAPTER 15
	Introduction	
	Forecast Accuracy	
	Moving Averages	
Week 2 (Jan 20-26)		
	Forecasting	CHAPTER 15
	Exponential Smoothing	QUIZ 1
	Linear Trend Projection (Regression)	Assignment 1(assigned)
	Seasonality (Additive)	Project Teams due
Week 3 (Jan 27-Feb 2)		
	Forecasting	
	Seasonality (Multiplicative)	
	Advanced methods.	
	Waiting Line Models	CHAPTER 11
	Introduction	Assignment 1 (due)
	Single Server	
Week 4 (Feb 3-9)		
	Waiting Line Models	CHAPTER 11
	Single Server (contd.)	QUIZ 2
	Multi Server	Assignment 2(assigned)
	Other Waiting Line Models	**Project assigned**
	Project Discussion	
Week 5 (Feb 10-16)		
	Waiting Line Models	
	Any remaining topics	
	Simulation	CHAPTER 12
	What if analysis	Assignment 2 (due)
	Sanotronics Problem	
	Inventory management (basics)	
Week 6 (Feb 17-23)		
	Simulation	CHAPTER 12
	Inventory management simulation	QUIZ 3
	Waiting Line Simulation	Assignment 3(assigned)
	Advantages/Disadvantages	
Week 7 (Feb 24-Mar 1)		
	EXAM 1	Assignment 3 (due)
	(Part 1: Multiple choice, list type questions)	
	(Part 2: Solving problems using excel or Minitab)	

Week 8 (Mar 2-8)

Decision Analysis	CHAPTER 13
Introduction	Any last minute
DA without Probabilities	project discussion
DA with Probabilities	
Sensitivity Analysis	

Week 9 (Mar 9-15)

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SPRING BREAK - NO CLASSES

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Week 10 (Mar 16-22)

Decision Analysis	CHAPTER 13
Decision Trees	Quiz 4
Bayesian Analysis	Assignment 4(assigned)
Utility Theory	
Buy access to Startup Game	

Week 11 (Mar 23-29)

Project Presentation	Assignment 4 (due)
Startup Game discussed	
Starts on Monday (March 30th)	

Week 12 (Mar 30-Apr 5)

Industrial and Behavioral Dynamics	
Beergame	Beergame
Bullwhip effect	

Week 13 (Apr 6-12)

Multicriteria Decisions	CHAPTER 14
Goal Programming	

Week 14 (Apr 13-19)

Multicriteria Decisions	CHAPTER 14
Scoring Models	Quiz 5
Analytic Hierarchical Proces	Assignment 5(assigned)
Startup Game ends	

Week 15 (Apr 20-26)

Discuss Startup Game Strategies	Assignment 5 (due)
Catch up and Review	

Week 16 (Apr 27-30)

Reserve Day – Could be Guest Lecture

Finals Week (May 2-8)

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May 6th, 2020
** Exam 2 **
In your classroom, Starts at 1:30pm 75 minutes.
(NOTE THE TIME, it is 30 mins early)

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