



Sports Data Analytics

COSC 4342 / CSCI 5342

Fall - 2019

Course Description

Prerequisites: MATH 1342 and MATH 1343, or other statistics course. Identifying the metrics, types of analyses and making sense of sports-related data from a managerial business perspective. Use of industry tools to gather, learn, make predictions and visualize large sports data sets.

Class Time

Tues/Thurs 3:30pm – 4:50pm COB 255

Instructor Information

Dr. Robert P. Schumaker
Professor, Computer Science Dept.
COB 315.05
rschumaker@uttyler.edu

Office Hours

Tues/Thurs 9:30am – 11:00am
If these times don't work for you, please make an appointment.
Appointments outside of office hours can be made at robschumaker.youcanbook.me

Textbook Information

| | |
|-----------------------------------------|----------------------|
| Mathletics – Winston, 2009 | ISBN: 978-0691154589 |
| Sport Analytics – Fried and Mumcu, 2018 | ISBN: 978-1138667136 |

Course Objective

This course is designed with the following goals:

- Identify a broad range of methods used in sports data acquisition, representation, analysis and reporting
- Demonstrate an understanding of statistics and their application to sport
- Develop the ability to recognize, formulate and analyze decision-making in sport
- Improve overall problem solving/analysis skills and critical thinking
- Conduct sports data acquisition, representation and prediction activities
- Assess current sports analytics trends and how they can apply to new areas

Computer Account Access

Students will need a Patriot account and password for computer access. This information can be found at <http://www.uttyler.edu/ccs>

Course Documents and Slides

This class will use Canvas for course documents, slides and other class-related materials. Students are encouraged to check the website frequently during the course of the semester to keep up to date about class changes.



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Course Grading

Course evaluation will be based on the following:

| | | |
|-------------------------------------------|-----|---------------------|
| MLB Playoff Decision Analysis Report | 20 | |
| Fantasy Football Decision Analysis Report | 20 | |
| Fantasy Football Ranking | ?? | (Bonus points 0-15) |
| Topic Report (COSC 4342 students) | 20 | |
| Semester Project (CSCI 5342 students) | 20 | |
| Case Discussion (5 cases @ 5 points) | 25 | |
| Lifelong Learning | 5 | |
| Class Participation | 10 | |
| Total Points | 100 | |

Grading Scale

| | |
|---|-----------------------|
| A | 90.0 points or more |
| B | 80.0 to 89.999 points |
| C | 70.0 to 79.999 points |
| D | 60.0 to 69.999 points |
| F | 59.999 points or less |

Course Policies

1. MLB Decision Analysis Report – Students will use their analytics skill to determine the winners of each round of MLB playoffs. Students will made predictions of winning teams using quantitative evidence from multiple analytic techniques and defend their choices. The report will be evaluated based on the depth of analyses used in decision making, the thoroughness of the report, and spelling/ grammar. More details will be given during the semester. Students that correctly pick their entire bracket will be immortalized in this syllabus forever.



Your name here
(2019)

Favorite quote that won't land either of us in the Dean's Office

2. Fantasy Football Decision Analysis Report – Students will put their analytics skill to the test by competing against each other in a fantasy football league. Students will keep a diary of every decision made in managing their team. The report will be evaluated based on the depth of analyses used in decision making, the thoroughness of the report, and spelling/grammar. More details will be given during the semester.
3. Fantasy Football Ranking – At the conclusion of the fantasy football season (as set by the instructor), students will receive bonus points based upon their end of season ranking.
4. Topic Report (COSC 4342 students) – Each student will produce a report on a current, state-of-the-art topic in sports analytics. Topics can be obtained from a news article, webpage, blog, or other source. This is an opportunity for the students to learn more about a cutting edge technology. Students must have approval from the instructor fourteen days in advance.
5. Semester Project (CSCI 5342 students) – For this assignment, student groups will focus on building a real-world sports analytics solution and present their work. Students must also meet milestone deadlines throughout the semester. More details will be given during the semester.



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6. Case Discussion – Throughout the semester we will analyze business technology cases through Canvas. Students will post their discussion questions and answer others. More details will be provided in Canvas.
7. Lifelong Learning – It is imperative for successful individuals to continue learning throughout their lifetime. Professional organizations are a wonderful opportunity to reinvent, retool and build connections with industry leaders. Students that attend a professional technology organization meeting (and bring proof of attendance) will receive credit. Upcoming meetings and events can be found on Canvas.
8. Class Participation – Class Participation points are broken up into two parts; tech stories (Tech) and operating the teaching workstation (Workstation). Participation.Tech will be scored by the quantity of quality discussion a student contributes regarding relevant technology-related articles. Participation.Workstation will be scored as to whether the student voluntarily operates the teaching workstation. The exact formula of Class Participation points will not be revealed until the end of the semester and the maximum points that can be earned is ten. Students that wear a Halloween costume to class on October 31 will receive 1 bonus point.
9. Attendance Policy – Attendance is a critical factor for student success. Attendance will be taken at the beginning of class for each class and students that arrive after attendance has been taken will be counted as an unexcused absence. If you know that you cannot make it to class, please contact your Instructor PRIOR to class. For every unexcused absence, the student's final grade will be reduced by 3%.
10. Missed Work: Business professionals must also take responsibility for attending all scheduled meetings and activities. Attendance is absolutely necessary in order to be successful in this class. We will cover a new topic each class period and each subsequent class will build upon prior skills and concepts. If you miss a class you will miss an entire topic and any materials and assignments passed out. **Students who miss class are responsible for getting missed materials and lecture information on their own time from their peers.**
11. Time Outside of Class: This course is a computer application course that requires students to complete computer application exercises and projects. It is the responsibility of the student to make a **backup** of all assignments or application projects. *If your work is not saved and accessible by the instructor, then it cannot be evaluated and a grade of F will be given for that particular project or assignment.* BACKUPS of projects and tests are imperative in order to avoid lost or damaged data.
12. Classroom Lab Rules
 - Please do not surf the Web during class unless instructed to access the Internet.
 - Do not access inappropriate Web sites during class. This will lead to dismissal from the class.
 - Please do not work on other computer assignments during class.
 - Please do not talk to your neighbor during class.
 - Please do not bring food or an uncovered drink into the computer classroom lab.
 - Please do not order food to be delivered to the classroom.
 - Do not use your phone during class.

University Policies and Additional Information that Must Appear in Each Course Syllabus (5/19)

UT Tyler Honor Code

Every member of the UT Tyler community joins together to embrace: Honor and integrity that will not allow me to lie, cheat, or steal, nor to accept the actions of those who do.



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Students Rights and Responsibilities

To know and understand the policies that affect your rights and responsibilities as a student at UT Tyler, please follow this link: <http://www.uttyler.edu/wellness/rightsresponsibilities.php>

Campus Carry

We respect the right and privacy of students 21 and over who are duly licensed to carry concealed weapons in this class. License holders are expected to behave responsibly and keep a handgun secure and concealed. More information is available at <http://www.uttyler.edu/about/campus-carry/index.php>

UT Tyler a Tobacco-Free University

All forms of tobacco will not be permitted on the UT Tyler main campus, branch campuses, and any property owned by UT Tyler. This applies to all members of the University community, including students, faculty, staff, University affiliates, contractors, and visitors. Forms of tobacco not permitted include cigarettes, cigars, pipes, water pipes (hookah), bidis, kreteks, electronic cigarettes, smokeless tobacco, snuff, chewing tobacco, and all other tobacco products.

There are several cessation programs available to students looking to quit smoking, including counseling, quitlines, and group support. For more information on cessation programs please visit www.uttyler.edu/tobacco-free

Grade Replacement/Forgiveness and Census Date Policies

Students repeating a course for grade forgiveness (grade replacement) must file a Grade Replacement Contract with the Enrollment Services Center (ADM 230) on or before the Census Date of the semester in which the course will be repeated. Grade Replacement Contracts are available in the Enrollment Services Center or at <http://www.uttyler.edu/registrar>. Each semester's Census Date can be found on the Contract itself, on the Academic Calendar, or in the information pamphlets published each semester by the Office of the Registrar.

Failure to file a Grade Replacement Contract will result in both the original and repeated grade being used to calculate your overall grade point average. Undergraduates are eligible to exercise grade replacement for only three course repeats during their career at UT Tyler; graduates are eligible for two grade replacements. Full policy details are printed on each Grade Replacement Contract.

The Census Date is the deadline for many forms and enrollment actions of which students need to be aware. These include:

- Submitting Grade Replacement Contracts, Transient Forms, requests to withhold directory information, approvals for taking courses as Audit, Pass/Fail or Credit/No Credit.
- Receiving 100% refunds for partial withdrawals. (There is no refund for these after the Census Date)
- Schedule adjustments (section changes, adding a new class, dropping without a "W" grade)
- Being reinstated or re-enrolled in classes after being dropped for non-payment
- Completing the process for tuition exemptions or waivers through Financial Aid

State-Mandated Course Drop Policy

Texas law prohibits a student who began college for the first time in Fall 2007 or thereafter from dropping more than six courses during their entire undergraduate career. This includes courses dropped at another 2-year or 4-year Texas public college or university.

For purposes of this rule, a dropped course is any course that is dropped after the census date (See Academic Calendar for the specific date).



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Exceptions to the 6-drop rule may be found in the catalog. Petitions for exemptions must be submitted to the Enrollment Services Center and must be accompanied by documentation of the extenuating circumstance. Please contact the Enrollment Services Center if you have any questions.

Disability/Accessibility Services

In accordance with Section 504 of the Rehabilitation Act, Americans with Disabilities Act (ADA) and the ADA Amendments Act (ADAAA) the University offers accommodations to students with learning, physical and/or psychological disabilities. If you have a disability, including non-visible disabilities such as learning disorder, chronic illness, TBI, PTSD, ADHD, or you have a history of modifications or accommodations in a previous educational environment you are encouraged to visit <https://hood.accessiblelearning.com/UTTyler> and fill out the New Student application. The Student Accessibility and Resources (SAR) will contact you when your application has been submitted and an appointment with Cynthia Lowery, Assistant Director of Student Services/ADA Coordinator. For more information, including filling out an application for services, please visit the SAR webpage at <http://www.uttyler.edu/disabilityservices>, the SAR office located in the University Center, # 3150 or call 903.566.7079.

Student Absence due to Religious Observance

Students who anticipate being absent from class due to a religious observance are requested to inform the instructor of such absences by the second class meeting of the semester.

Student Absence for University-Sponsored Events and Activities

If you intend to be absent for a university-sponsored event or activity, you (or the event sponsor) must notify the instructor at least two weeks prior to the date of the planned absence. At that time the instructor will set a date and time when make-up assignments will be completed.

Social Security and FERPA Statement

It is the policy of The University of Texas at Tyler to protect the confidential nature of social security numbers. The University has changed its computer programming so that all students have an identification number. The electronic transmission of grades (e.g., via e-mail) risks violation of the Family Educational Rights and Privacy Act; grades will not be transmitted electronically.

Emergency Exits and Evacuation

Everyone is required to exit the building when a fire alarm goes off. Follow your instructor's directions regarding the appropriate exit. If you require assistance during an evacuation, inform your instructor in the first week of class. Do not re-enter the building unless given permission by University Police, Fire department, or Fire Prevention Services.

Student Standards of Academic Conduct

Disciplinary proceedings may be initiated against any student who engages in scholastic dishonesty, including, but not limited to, cheating, plagiarism, collusion, the 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.

- "Cheating" includes, but is not limited to:
 - copying from another student's test paper;
 - using, during a test, materials not authorized by the person giving the test;



- failure to comply with instructions given by the person administering the test;
 - possession during a test of materials which are not authorized by the person giving the test, such as class notes or specifically designed “crib notes”. The presence of textbooks constitutes a violation if they have been specifically prohibited by the person administering the test;
 - using, buying, stealing, transporting, or soliciting in whole or part the contents of an unadministered test, test key, homework solution, or computer program;
 - collaborating with or seeking aid from another student during a test or other assignment without authority;
 - discussing the contents of an examination with another student who will take the examination;
 - divulging the contents of an examination, for the purpose of preserving questions for use by another, when the instructors has designated that the examination is not to be removed from the examination room or not to be returned or to be kept by the student;
 - substituting for another person, or permitting another person to substitute for oneself to take a course, a test, or any course-related assignment;
 - paying or offering money or other valuable thing to, or coercing another person to obtain an unadministered test, test key, homework solution, or computer program or information about an unadministered test, test key, home solution or computer program;
 - falsifying research data, laboratory reports, and/or other academic work offered for credit;
 - taking, keeping, misplacing, or damaging the property of The University of Texas at Tyler, or of another, if the student knows or reasonably should know that an unfair academic advantage would be gained by such conduct; and
 - misrepresenting facts, including providing false grades or resumes, for the purpose of obtaining an academic or financial benefit or injuring another student academically or financially.
- ii. “Plagiarism” includes, but is not limited to, the appropriation, buying, receiving as a gift, or obtaining by any means another’s work and the submission of it as one’s own academic work offered for credit.
- iii. “Collusion” includes, but is not limited to, the unauthorized collaboration with another person in preparing academic assignments offered for credit or collaboration with another person to commit a violation of any section of the rules on scholastic dishonesty.
- iv. All written work that is submitted will be subject to review by plagiarism software.

UT Tyler Resources for Students

- UT Tyler Writing Center (903.565.5995), writingcenter@uttyler.edu
- UT Tyler Tutoring Center (903.565.5964), tutoring@uttyler.edu
- The Mathematics Learning Center, RBN 4021, this is the open access computer lab for math students, with tutors on duty to assist students who are enrolled in early-career courses.
- UT Tyler Counseling Center (903.566.7254)



Tentative Course Schedule and Assignments:

Scheduled dates may vary depending on the pace of the class.

| Date | Concept | Readings | Assignments |
|---------|--------------------------------------------------------------------------|----------------|------------------------------|
| Aug 27 | Introduction to Sports Data Analytics | | |
| Aug 29 | Using Statistics - Mean, Standard Deviation and the DIKW Hierarchy | | |
| Sept 3 | Using Statistics - t-tests, p-values and Error | | |
| Sept 5 | Project Work Day | | |
| Sept 10 | Using Statistics - Regression and ANOVAs | | |
| Sept 12 | Baseball - Metrics, Pythagorean Theorem, Runs Created and Linear Weights | M Ch 1-3 | |
| Sept 17 | Baseball - Monte Carlo, ERA Forecasting and Decision Making | M Ch 4-6 | |
| Sept 19 | Baseball - Fielders, Win Averages and Value of Replacement Players | M Ch 7-9 | |
| Sept 24 | Project Work Day | | |
| Sept 26 | Project Work Day | | |
| Oct 1 | Baseball - Parks, Streakiness, Platoon Effects and Pitch Count | M Ch 10-12, 14 | MLB Decision Analysis |
| Oct 3 | Baseball Discussion | | Case - MLB Analytics |
| Oct 8 | Football - Metrics, State & Value Analysis and Decision Making | M Ch 20-21 | |
| Oct 10 | Football - Passing, Rushing and Conversions | M Ch 23-24 | |
| Oct 15 | Football - EPA, Advanced Analytics and Visualization | | Case - NFL Analytics |
| Oct 17 | Fantasy Football | | |
| Oct 22 | Basketball - Metrics, Linear Weights and +/- Ratings | M Ch 28-30 | |
| Oct 24 | Basketball - Lineups, Matchups and Simulation | M Ch 31-32 | Case - NBA Analytics |
| Oct 29 | Talent Management | SA Ch 4 | |
| Oct 31 | Sports Marketing | SA Ch 5 | Case - Promotion Analytics |
| Nov 5 | Digital Marketing | SA Ch 6 | |
| Nov 7 | Sports Finance | SA Ch 7 | |
| Nov 12 | Sports Law | SA Ch 8 | |
| Nov 14 | Manufacturing Analytics | SA Ch 9 | |
| Nov 19 | Event Management | SA Ch 10 | |
| Nov 21 | Facility Management Analytics | SA Ch 11 | Case - Concession Analytics |
| Nov 26 | No Classes - Thanksgiving | | |
| Nov 28 | No Classes - Thanksgiving | | |
| Dec 3 | Project Work Day | | |
| Dec 5 | Project Work Day | | Topic Report / Semester Proj |