Course Description
Prerequisites for Undergraduates: COSC 1342 and COSC 1343. Creating value from business data by converting it into meaningful and useful information for business decision making by using current industry business intelligence (BI) and business analytics (BA) tools and technologies.

Class Time
Tues and Thurs 11:00am – 12:20pm COB 211

Instructor Information
Dr. Robert P. Schumaker
Professor, Computer Science Dept.
rshumaker@uttyler.edu

Office Hours
DM through Slack (preferred), Zoom, email
If your inquiry is grade-related, please make a Zoom appointment.
Because of University regulations regarding Covid-19, there will be no physical office hours this semester.

Textbook Information

Course Objective
This course is designed with the following goals:
• Identify the appropriate analytical tool based on the problem type and characteristics
• Properly conduct a collection and analysis of big-data
• Relate the tools learned to appropriate classes of problems
• Analyze a variety of business datasets for non-trivial patterns
• Predict future trends based on historical data
• Interpret results and appropriately explain them to business managers

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 course changes.
Course Grading
COSC 4347 (Undergraduate): COSC 5347 (Graduate):
Homeworks 20 Homeworks 20
MidTerm I 20 MidTerm I 20
MidTerm II 20 MidTerm II 20
Final Exam 20 Final Exam 20
Participation 10 Participation 10
Lifelong Learning 10 Semester Project 10
Total Points 100 Total Points 100

Grading Scale
A 85.0 points or more
B 70.0 to 84.999 points
C 55.0 to 69.999 points
D 40.0 to 54.999 points
F 39.999 points or less

This grading scale is fixed and immutable. While heart-breaking, the Instructor is not responsible for the following consequences for bad grades as reported by former students: assault by family member, delayed graduation, deportation, homelessness, failure to attend grad school, loss of significant other, crushing their hopes and dreams. Grades are not curved, individual extra credit is not offered and any requests to unethically "adjust" grades will be reported to the University as an incident of academic dishonesty. Students are encouraged to check their grades often and are responsible for all deadlines.

Course Policies
1. Homeworks – Various homeworks will be assigned this semester. Each homework will prepare the student in exercising their analytical skills and demonstrate material mastery.

2. Exams – Three exams including a comprehensive final will be administered covering all material disseminated through the assigned readings as well as what was discussed in class. Exams are designed to measure the student’s knowledge of the material as well as their ability to use these skills in an efficient manner. Examinations may consist of multiple choice questions or application problems.

3. Class Participation – Class Participation points will be scored by the quantity of quality discussion a student contributes regarding relevant technology-related articles. The maximum points that can be earned is ten.

4. 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 email proof of attendance) will receive credit. Upcoming meetings and events can be found on Canvas. Online webinars will be accepted.

5. Make-up exams will be granted at the discretion of the instructor. Make-ups will be given only under extremely unusual circumstances, will be different from exams given during the regular class time and may be penalized up to 50% of the grade. Permission for a makeup exam must be obtained PRIOR to the regular exam and must include written documentation of the student’s absence.
6. Missed Classes, Tests/Quizzes and Assignments – Students who miss class are responsible for getting missed materials and lecture information on their own time from their peers. Any tests/quizzes and/or assignments due during the student's documented absence will be due by 5pm of the day of their return with no penalty.

7. 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.

8. The Harvard CS50 Regret Clause – If you commit some act that is not reasonable but bring it to the attention of the course’s heads within 72 hours, the course may impose local sanctions that may include an unsatisfactory or failing grade for work submitted, but the course will not refer the matter for further disciplinary action except in cases of repeated acts. Below are rules of thumb that (inexhaustively) characterize acts that the course considers reasonable and not reasonable. If in doubt as to whether some act is reasonable, do not commit it until you solicit and receive approval in writing from the course’s heads. Acts considered not reasonable by the course are handled harshly. If the course refers some matter for disciplinary action and the outcome is punitive, the course reserves the right to impose local sanctions on top of that outcome that may include an unsatisfactory or failing grade for work submitted or for the course itself. The course ordinarily recommends exclusion (i.e., required withdrawal) from the course itself.

**Reasonable**

- Communicating with classmates about problem sets’ problems in English (or some other spoken language), and properly citing those discussions.
- Discussing the course’s material with others in order to understand it better.
- Helping a classmate identify a bug in their code at office hours, elsewhere, or even online, as by viewing, compiling, or running their code after you have submitted that portion of the pset yourself. Add a citation to your own code of the help you provided and resubmit.
- Incorporating a few lines of code that you find online or elsewhere into your own code, provided that those lines are not themselves solutions to assigned problems and that you cite the lines’ origins.
- Reviewing past semesters’ tests and quizzes and solutions thereto.
- Sending or showing code that you’ve written to someone, possibly a classmate, so that they might help you identify and fix a bug.
- Submitting the same or similar work to this course that you have submitted previously to this course.
- Turning to the course’s heads for help or receiving help from the course’s heads during the quizzes or test.
- Turning to the web or elsewhere for instruction beyond the course’s own, for references, and for solutions to technical difficulties, but not for outright solutions to problem set’s problems or your own final project.
- Whiteboarding solutions to problem sets with others using diagrams or pseudocode but not actual code.
- Working with (and even paying) a tutor to help you with the course, provided the tutor does not do your work for you.

**Not Reasonable**

- Accessing a solution to some problem prior to (re-)submitting your own.
- Accessing or attempting to access, without permission, an account not your own.
• Asking a classmate to see their solution to a problem set’s problem before (re-)submitting your own.
• Discovering but failing to disclose to the course’s heads bugs in the course’s software that affect scores.
• Decompiling, deobfuscating, or disassembling the staff’s solutions to problem sets.
• Failing to cite (as with comments) the origins of code or techniques that you discover outside of the course’s own lessons and integrate into your own work, even while respecting this policy’s other constraints.
• Giving or showing to a classmate a solution to a problem set's problem when it is they, and not you, who is struggling to solve it.
• Looking at another individual's work during the quizzes or test.
• Manipulating or attempting to manipulate scores artificially, as by exploiting bugs or formulas in the course’s software.
• Paying or offering to pay an individual for work that you may submit as (part of) your own.
• Providing or making available solutions to problem sets to individuals who might take this course in the future.
• Searching for or soliciting outright solutions to problem sets online or elsewhere.
• Splitting a problem set’s workload with another individual and combining your work.
• Submitting (after possibly modifying) the work of another individual beyond the few lines allowed herein.
• Submitting the same or similar work to this course that you have submitted or will submit to another.
• Submitting work to this course that you intend to use outside of the course (e.g., for a job) without prior approval from the course’s heads.
• Turning to humans (besides the course’s heads) for help or receiving help from humans (besides the course’s heads) during the quizzes or test.
• Viewing another’s solution to a problem set’s problem and basing your own solution on it.
**Tentative Course Schedule and Assignments:**
Scheduled dates may vary depending on the pace of the class.

<table>
<thead>
<tr>
<th>Date</th>
<th>Concept</th>
<th>Assignment Due</th>
<th>Quizzes</th>
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<tbody>
<tr>
<td>Jan 11</td>
<td>Introduction to Business Intelligence</td>
<td>Arnyg Analytical</td>
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<td>Jan 13</td>
<td>A Data Science Overview</td>
<td>Learning Quizzes I &amp; II</td>
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<td>Jan 18</td>
<td>Basic Statistics Overview</td>
<td>Patterns and Me</td>
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<td>Jan 20</td>
<td>Using Excel for Statistics</td>
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<td>Jan 25</td>
<td>Introduction to R</td>
<td>RBN Art</td>
<td>Chapter 1, 2</td>
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<td>Jan 27</td>
<td>Linear Regression</td>
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<td>Chapter 3</td>
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<td>Feb 1</td>
<td>Polynomial and Multiple Regression</td>
<td>R Basics</td>
<td>Chapter 4</td>
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<td>Feb 3</td>
<td>Time-Series Analysis</td>
<td>Multiple Regression</td>
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<td>Feb 8</td>
<td>Measures of Correlation</td>
<td>Stock Smoothing</td>
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<td>Feb 10</td>
<td>Analysis of Variance (ANOVA)</td>
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<td>Feb 15</td>
<td>Clean and Analyze Data</td>
<td>Midterm I</td>
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<td>Feb 17</td>
<td>Data Visualization</td>
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<td>Feb 22</td>
<td>Visualization with R</td>
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<td>Feb 24</td>
<td>Optimization and Linear Programming</td>
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<td>Mar 1</td>
<td>LP Exercises</td>
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<td>Mar 3</td>
<td>LP Exercises Presentation</td>
<td>Linear Programming</td>
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<td>Mar 8</td>
<td>No Classes – Spring Break</td>
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<td>Mar 10</td>
<td>No Classes – Spring Break</td>
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<td>Mar 15</td>
<td>Logistic Regression and Binary Classification</td>
<td>Chapter 7, 8</td>
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<td>Mar 17</td>
<td>Introduction to Data Mining</td>
<td>Midterm II</td>
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<td>Mar 22</td>
<td>Clustering and kNN</td>
<td>Chapter 9, 15</td>
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<td>Mar 24</td>
<td>Decision Trees</td>
<td>Chapter 13</td>
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<td>Mar 29</td>
<td>Naive Bayes</td>
<td>Chapter 10</td>
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<td>Mar 31</td>
<td>Genetic Algorithms</td>
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<td>Apr 5</td>
<td>Neural Networks</td>
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<td>Apr 7</td>
<td>Support Vector Machines</td>
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<td>Apr 12</td>
<td>Machine Learning Exercises</td>
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<td>Apr 14</td>
<td>Text Analytics</td>
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<td>Apr 19</td>
<td>Project Work Day</td>
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<td>Apr 21</td>
<td>Research Talk – Classes Choice</td>
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