BUS 310: Business Analytics II

Fall 2018 Course Syllabus

Syllabus for fall 2018
Course: Business Analytics II (Bus 310-014), Time & Day: 4:30 PM – 7:10 PM, Thursday @ Krug Hall 210.

Instructor: Mohammad Kabir Jamal
E-mail: mjamal2@gmu.edu, Office Hours: By appointment only. Course GTA Ms. Siva "Swetha" Yalamanchili has walk-in office hour from 10 AM to 11AM Monday. She can be found at the ISOM Lobby, ENT 150.

Prerequisites:
1. BUS 210 or equivalent with a grade of C or better
2. Essential and expected knowledge: Proficiency in elementary algebra and geometry. Familiarity with recent versions of MS Word, PowerPoint, and Excel. Deficiencies in any of these areas should be self-remediated.

University Catalog Description:
This course introduces the concepts of modeling relationships contained in data and the use of linear models to make predictions in business. Topics include estimation, hypotheses testing, statistical inference, analysis of variance and linear regression techniques. The course also introduces students to fundamentals of linear programming to solve optimization problems in business.

Undergraduate program learning goals (those in bold will be addressed in this class):

1. Our students will be competent in their discipline.
2. Our students will be aware of the uses of technology in business.
3. Our students will be effective communicators.
4. Our students will have an interdisciplinary perspective.
5. Our students will be knowledgeable about global business and trade.
6. Our students will recognize the importance of ethical decisions.
7. Our students will be knowledgeable about the legal environment of business.
8. Our students will be knowledgeable about team dynamics and the characteristics of effective teams.
9. Our students will understand the value of diversity and the importance of managing diversity in the context of business.
10. Our students will be critical thinkers.

This syllabus is subject to change. Any changes to this syllabus will be formally announced in Blackboard
Approach to Learning:
This course examines the use of business analytics for understanding and analyzing business problems and for supporting business decision-making. It is geared for the business professional engaged in decision making or decision support. The emphasis is on business applications, and not mathematics. Students will possess an adequate level of proficiency in and comfort with spreadsheet software. The format will be lectures and hands-on exposure to data analytics tools, including complex Excel options. Discussions and questions are highly encouraged.

Required Text:


- There are many options that exist for a used copy, e-book, or rental through a third party such as Amazon or through the publisher at [www.cengage.com](http://www.cengage.com)

Computer/Software/Email:

Access to the internet and a computer is required. Many of the course material will be online in our Blackboard course. Communication will be via Blackboard and/or your GMU e-mail only. I will only respond to GMU e-mails and will not respond to e-mails written on a private account.

The latest version of Microsoft Excel will be used in this class. Microsoft Excel is available for download for GMU students. It is your responsibility to make sure your laptop meets the required standards. Refer to the School of Business laptop policy at [http://business.gmu.edu/media/com_managedlists/72/Laptop-Requirements-AY1718.pdf](http://business.gmu.edu/media/com_managedlists/72/Laptop-Requirements-AY1718.pdf)

You are required to bring a laptop to class with Excel.

Methods of Student Evaluation:

Students will be evaluated based on homework, quizzes, exams, and class activities.

**Grading – Total 400 points**

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Homework</td>
<td>100</td>
<td>(25%)</td>
</tr>
<tr>
<td>Exam 1 and Exam 2</td>
<td>200</td>
<td>(50%)</td>
</tr>
<tr>
<td>Final Exam</td>
<td>100</td>
<td>(25%)</td>
</tr>
</tbody>
</table>

**CELL PHONES MUST BE TURNED OFF DURING CLASS**

**Note: DISRUPTIVE BEHAVIOR WILL NOT BE TOLERATED**

Course Grade
Syllabus Fall 2018
1. Students must be officially registered in this section to receive a grade. It is the sole responsibility of the student to verify their own registration status. (I will not verify your registration.) Specifically, you will not receive a grade if your name does not appear on the official class list. (Don’t wait until the end of the semester to be surprised.) Registration problems should be directed to either the School of Business Academic Advisors or the Registrar’s Office.

2. Disputes about a grade on assignments/exams/quizzes must be submitted in writing within a week after the grade has been posted.

3. The final letter grade is assigned objectively and strictly according to the TOTAL scores of all exams, and homework assignments.

4. Final course letter grade assignments:

<table>
<thead>
<tr>
<th>COURSE TOTAL</th>
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</tr>
</thead>
<tbody>
<tr>
<td>388.00 to 400</td>
<td>A+</td>
<td>320.00 to 331.99</td>
<td>B-</td>
</tr>
<tr>
<td>372.00 to 387.99</td>
<td>A</td>
<td>308.00 to 319.99</td>
<td>C +</td>
</tr>
<tr>
<td>360.00 to 371.99</td>
<td>A-</td>
<td>280.00 to 307.99</td>
<td>C</td>
</tr>
<tr>
<td>348.00 to 359.99</td>
<td>B+</td>
<td>240.00 to 279.99</td>
<td>D</td>
</tr>
<tr>
<td>332.00 to 347.99</td>
<td>B</td>
<td>0 to 239.99</td>
<td>F</td>
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</tbody>
</table>

When turning in ANY assignment, you should not copy another student's response or submit somebody else's work as your own. You are encouraged to work together. However, make sure all responses are written in your own words and that every file submitted is your own file created by you.

George Mason University takes violations of the Honor Code seriously. You should take a moment to look at the last two pages of the syllabus to see the School of Business' sanctions for violations. There isn't a "slap on the wrist" or a "warning". The sanctions for a first offense are very serious even on homework.

EXAMS: Exam dates are –
- Exam 1: Oct 11
- Exam 2: Nov 15
- Final: Dec 13

No make-up exams will be given except in Documented Emergency. Each will involve a mix of mechanical skills and conceptual reasoning. The best possible preparation for them is regular attendance and completion of assigned homework and reading.

Attendance:
Class attendance is essential part of learning for this course. If you have to miss any lectures, you are responsible for obtaining any information given in the class. I will take attendance on random days.

Homework & Class Work:
Students are expected to read relevant sections of the textbook prior to attending class. Written homework will be graded. Due dates will be given in class, and are on posted on Blackboard. Late assignments will not be accepted.

Disability:
Syllabus Fall 2018
All academic accommodations due to disability must be arranged through the Office of Disability Services (ODS). If you are a student with a disability and you require academic accommodations, please contact ODS at 703-993-2474. I will cooperate fully with the ODS to accommodate a student’s special needs.

Sequence Course Objectives for both BUS210 and BUS 310:
- Understand how managers use business analytics to formulate and solve business problems
- Prepare to be a strategic business partner in an organization
- Think critically about whether and how data can improve business performance, create opportunities, and/or create risks

Additional Specific Course Objectives for BUS 310
- Understand the processes needed to analyze business data
- Make data driven decisions by using analytic tools such as estimation and hypothesis testing
- Gain skills to analyze business problems using more advanced functions in Excel
- Integrate statistics and management science to cover a variety of useful analytical methods
- Gain a basic understanding of linear optimization through an introduction to prescriptive analytics.

Course Topics:
1. Data Driven Decisions
   a. Measuring Response
      i. Sampling and Sampling Distributions
      ii. Estimation Theory
   b. Comparing Results
      i. Hypothesis Testing
   c. Data analysis and statistical functions in Excel
2. Introduction to Predictive Analytics
   a. Regression
   b. Inference within Regression
   c. Simple and Multiple Regression
   d. Data analysis and statistical functions in Excel
3. Introduction to Prescriptive Analytics
   a. Linear Optimization
   b. Model Development and Excel Solver

Case Studies:
Chapter 8 Case Problem: Employee Retention at D&Y
Chapter 9 Case Problem: Removing Vioxx from the Market
Chapter 10 Case Problem: Investing for Retirement
Chapter 11 Case Problem: Heating Oil at Dupree Fuels Company
Chapter 13 Case Problem: Shelby Shelving

Syllabus Fall 2018
<table>
<thead>
<tr>
<th>Week/Date</th>
<th>Chapter Reference</th>
</tr>
</thead>
</table>
| Week-1/Aug 30 | Chapter 7  
- Sample random sample using Excel (Section 7-3a)  
- Sampling Error (7-4a)  
- Sampling Distribution of the Sample mean (7-4c)  
- The Central Limit Theorem (7-4d) |
| Week-2/Sept 6 | Chapter 8  
- Estimating the Population mean using z Statistic (sigma known)  
- Estimating the Population mean using the t Statistic (sigma unknown)- sections (8-2a, and 8-3) |
| Week-3/Sept 13 | Chapter 8  
- Estimating the population proportion (8-5)  
- Sample size selection - section 8-9  
- Case 8.2 Employee Retention at D & Y |
| Week-4/Sept 20 | Chapter 9  
- Hypothesis Testing; Section 9-2 Concepts in hypothesis testing  
- 9-2a Null and Alternative Hypotheses, 9-2b one-tailed vs. two-tailed tests  
- 9-2a Types of errors, 9-2d significance level and rejection region  
- 9-2e P-values; 9-3 hypothesis tests for a population mean  
- 9-4a hypothesis tests for a population proportion |
| Week 5/Sept 27 | Catch up  
- Chapter 9  
- 9-4b Hypothesis tests for differences between two population means  
- 8-7a Confidence interval for the difference between means |
| Week 6/Oct 4 | Chapter 9  
- 9-4b Hypothesis tests for two related populations  
- 9-4d Hypothesis tests for differences between population proportions  
- 9-4e Hypothesis test for equal population variances |
| Week 7/Oct 11 | Exam-1 See blackboard for more info. |
| Week 8 /Oct 18 | Chapter 19 ANOVA  
- Section 19-1 & 19-2 Hypothesis tests, multiple comparisons, and model assumptions |
| Week 9/Oct 25 | Chapter 10  
- Section 10-1: Introduction, 10-2: Scatter Plot, 10-3: Correlations  
- 10-4: Simple Linear Regression  
- Case study: Housing Price Structure (will covered after multiple regression)  
Chapter 11  
- Section 11-3b: Hypothesis Tests for the Regression Coefficients  
- 11-8: Model Assumptions |
| Week 10/Nov 1 | Chapter 10  
- Section 10-5: Multiple Regression  
Chapter 11  
- Section 11-9: Prediction |
| Week 11/Nov 8 | Chapter 10  
- section 10-6a Dummy Variables  
Chapter 11  
- section 11-7 Outliers |
| Week 12/Nov 15 | Exam-2 See blackboard for more info. |
| Week 13/Nov 22 | No Class – Thanksgiving holiday |
| Week 14/ Nov 29 | Chapter 13 Introduction to Optimization Modeling  
- Section 13-1 Introduction, 13-2 Introduction to Optimization  
- 13-3 A Two-Variable Product Mix Model, 13-4a Solver's Sensitivity Report  
- 13-6 Infeasibility and Unboundedness |
| Week 15/ Dec 6 | Chapter 13  
- Case study Shelby Shelving  
Wrap up |
| Dec 13 | Final Exam See blackboard for more info. |
## School of Business Recommendations for Honor Code Violations

**Approved May 2016**

### UG-Freshman Students

<table>
<thead>
<tr>
<th>Type of Violation</th>
<th>First Offense</th>
<th>Second Offense</th>
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</thead>
<tbody>
<tr>
<td><strong>Plagiarism</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Failure to cite/attribute sources</td>
<td>A 10% reduction in the final course grade; referral to the Writing Center; and Academic Integrity Seminar completion</td>
<td>An F in the class; referral to the Writing Center; Academic Integrity Seminar completion; termination from the School of Business; and at least one semester suspension or expulsion</td>
</tr>
<tr>
<td>2. Representing someone else’s work as the student’s own (e.g., copying and pasting)</td>
<td>An F in the class; referral to the Writing Center; and Academic Integrity Seminar completion</td>
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<tr>
<td><strong>Cheating</strong></td>
<td></td>
<td></td>
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<td>1. On a minor assignment (e.g., homework, quizzes)</td>
<td>A 10% reduction in the final course grade; and Academic Integrity Seminar completion</td>
<td>An F in the class; Academic Integrity Seminar completion; termination from the School of Business; and at least one semester suspension</td>
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<td>2. Cheating on a major assignment or exam, submitting course work from another course as original work</td>
<td>An F in the class; and Academic Integrity Seminar completion</td>
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<td><strong>Lying</strong> (e.g., providing fraudulent excuse documents, falsifying data)</td>
<td>An F in the class; and Academic Integrity Seminar completion</td>
<td>An F in the class; Academic Integrity Seminar completion; termination from the School of Business; and at least one semester suspension</td>
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<td><strong>Egregious Violation</strong> (e.g., stealing an exam; submitting coursework from another class as original work across multiple courses; lying to an employer about academic performance, false identification or posing as another, in person or online)</td>
<td>An F in the Class; Academic Integrity Seminar completion; termination from the School of Business; and at least one semester suspension</td>
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Note: The Academic Integrity Seminar used by Office of Academic Integrity costs $100.
## School of Business Recommendations for Honor Code Violations

**Approved May 2016**

### UG-Non Freshman Students (including transfer students)

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<td>pasting)</td>
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<td>2. Cheating on a major assignment or exam, submitting course work from another course as original work</td>
<td>An F in the class; and Academic Integrity Seminar completion, and at least one semester suspension</td>
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<td>An F in the class, Academic Integrity Seminar completion; termination from the School of Business; and at least one year suspension</td>
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