

UNIVERSITY OF
LOUISVILLE[®]

COLLEGE OF BUSINESS

Introduction to R MSBA 605 Fall 2018

Instructor	Andrew Wright
Contact information	Office: College of Business, Room 304 Office Phone: (502) 852-6098 Email: andrew.wright@louisville.edu
Office hours	By appointment

II. Course Information	
Class time / Room	TBD
Required texts	Guttag, John. Introduction to Computation and Programming Using Python: With Application to Understanding Data Second Edition. MIT Press, 2016. ISBN: 9780262529624.
Course Description	This course introduces the essential general programming concepts and techniques to a data analytics audience without prior programming experience. The goal is to equip the students with the necessary programming skill to be successful in the other courses in the MSBA program. Examples are drawn from the problems and programming patterns often encountered in data analysis. It will use a commonly used in analytics programming language such as Python.
Prerequisites	Good standing in MSBA program
Learning Objectives	<ul style="list-style-type: none"> • Introduction to Programming Languages • Python Basics • Variables and Data Types • Control Structures • Repetition Structures • Functions and Modules • Strings • Graphics • Lists • File Input and Output • Dictionaries

Learning Outcomes	<ul style="list-style-type: none"> • use Python interactively • execute a Python script at the shell prompt • use Python types, expressions, and None • use string literals and string type • use Python statements (if...elif..else, for, pass, continue, . . .) • understand the difference between expressions and statements • understand assignment semantics • write and call a simple function • utilize high-level data types such as lists and dictionaries • understand the difference between mutable and immutable types • write a simple class and access methods and attributes • import and utilize a module • read from and write to a text file • understand interpreter and compilers: CPython, PyPy, Cython • see demonstration of IDE's: IDLE, IPython, IPython Notebook, hosted environments • understand the role of package managers: easy_install, pip • understand what NumPy does and what SciPy is (are?) • learn about resources for learning Python3
Final drop	Please contact the MSBA Office

III. Evaluation		
Grading scale	97.0 - 100 : A+ 93.0 - 96.9 : A 90.0 - 92.9 : A- 87.0 - 89.9 : B+ 83.0 - 86.9 : B 80.0 - 82.9 : B- 77.0 - 79.9 : C+ 73.0 - 76.9 : C 70.0 - 72.9 : C- 67.0 - 69.9 : D+ 63.0 - 66.9 : D 60.0 - 62.9 : D- 00.0 - 59.9 : F	
Grading scheme	<i>Grading component</i>	<i>Weighted grading percentage</i>
	Class participation	10%
	Individual Assignments	40%
	Class Exercises	20%

	Tests	30%
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IV. Schedule		
Week	Date	Topic
1	TBD	General Introduction to Python and the class. Using the command interpreter and development environment. Kick-off tutorial Finding and using the documentation. Getting help.
2	TBD	Introduction to git and GitHub Basic data types. Functions: definition and use, arguments, block structure, scope, recursion Modules and import Conditionals and Boolean expressions
3	TBD	Sequences: Strings, Tuples, Lists Iteration, looping and control flow. String methods and formatting
4	TBD	Dictionaries, Sets and Mutability. Files and Text Processing
5	TBD	Exceptions Testing List and Dict Comprehensions
6	TBD	Advanced Argument passing Lambda Functions as Objects
7	TBD	Classes Class instances Methods
	Time Permitting	Multiple inheritance Properties Special methods Emulating built-in types
8	TBD	• Final Project
Changes in the syllabus		Syllabus is subject to change. In particular the order of topics to be presented may change.

V1. Student Responsibilities / College and University Issues

University of Louisville student conduct and responsibilities	This course will abide by University of Louisville student conduct and responsibilities with regards to ethics and related issues: http://louisville.edu/dos/students/policies-procedures/student-handbook.html#codeofstudentconduct
College of Business student conduct and responsibilities	This course will abide by College of Business student conduct and responsibilities with regards to ethics and related issues: http://business.louisville.edu/students/college-of-business-academic-dishonesty-policy
Religious holiday conflict policy	http://louisville.edu/diversity/resources/work-restricted-holy-day-policies-calendar.html
University policy on equal access	http://louisville.edu/disability/policies-procedures
<u>Title IX/Clery Act Notification</u>	<p>Sexual misconduct (including sexual harassment, sexual assault, and any other nonconsensual behavior of a sexual nature) and sex discrimination violate University policies. Students experiencing such behavior may obtain confidential support from the PEACC Program (852-2663), Counseling Center (852-6585), and Campus Health Services (852-6479). To report sexual misconduct or sex discrimination, contact the Dean of Students (852-5787) or University of Louisville Police (852-6111).</p> <p>Disclosure to University faculty or instructors of sexual misconduct, domestic violence, dating violence, or sex discrimination occurring on campus, in a University-sponsored program, or involving a campus visitor or University student or employee (whether current or former) is not confidential under Title IX. Faculty and instructors must forward such reports, including names and circumstances, to the University’s Title IX officer.</p> <p>For more information, see the Sexual Misconduct Resource Guide (http://louisville.edu/hr/employeerelations/sexual-misconduct-brochure).</p>

UNIVERSITY OF
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 COLLEGE OF BUSINESS

Introduction to Linear Algebra with Applications MSBA 610 Fall 2018
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Instructor	Jeffrey L. Hieb
Contact information	Office: JB Speed 118 Telephone: 502-852-0465 Email: jeff.hieb@louisville.edu
Office hours	By appointment

II. Course Information	
Class time / Room	TBD
Required texts	Linear Algebra, Edited by Katrina Glaeser and Travis Scrimshaw First Edition. Davis California, 2013. Link to textbook
Course Description	Linear Algebra for Engineering is a 2 credit hour course offered by the Department of Engineering Fundamentals. Elimination and LU -factorization, dimension, rank, and nullspace, linear mappings, orthogonality, least squares, eigentheory, diagonalizability, and systems of linear differential equations.
Prerequisites	Good standing in the MSBA program.
Learning Objectives	<ol style="list-style-type: none"> 1. For a given $m \times n$ system of linear equations <ol style="list-style-type: none"> a. Write the coefficient matrix, A, and the augmented matrix, $[A \bar{b}]$, for the system, b. Use elementary row operations to systematically (one pivot column at a time) reduce A or $[A \bar{b}]$ to row echelon form (REF). (notation: $A \sim U$ or $[A \bar{b}] \sim [U \bar{c}]$) c. Reduce a matrix U in row echelon form to reduced row echelon form (RREF) R or similarly reduce row echelon form augmented matrix $[U \bar{c}]$ to reduced row echelon form $[R \bar{d}]$, d. Solve a given system of linear equations using Gaussian Elimination, i.e. reduce $[A \bar{b}] \sim [U \bar{c}]$ then solve the equivalent system using backward

	<p style="text-align: center;">substitution; or using Gauss-Jordan reduction, i.e. reduce $[A \bar{b}]$ to $[R \bar{d}]$ and solve the equivalent system by inspection.</p> <ol style="list-style-type: none"> 2. Given $[U \bar{c}]$, in REF or $[R \bar{d}]$ in RREF form, found from reducing the system of equations $[A \bar{b}]$, <ol style="list-style-type: none"> a. determine the rank of the coefficient matrix A b. determine if the system is consistent or inconsistence, c. if the system is consistent, identify the lead variables and the free variables d. if the system is consistent, explain why the system has a unique solution or find number of parameters in the system's general solution. 3. Determine whether a given vector \bar{x} is in the span of given set of vectors $\{\bar{v}_1, \dots, \bar{v}_k\}$, if it is, write \bar{x} as a linear combination of $\{\bar{v}_1, \dots, \bar{v}_k\}$. 4. Given a set of vectors from \mathcal{R}^n determine if the set of vectors is linearly independent. 5. Show that a given set of vectors is a basis for \mathcal{R}^n. 6. Reduce a spanning set for a subspace to a basis for the subspace. 7. Find the dimension of a subspace of \mathcal{R}^n. 8. Given a mapping, show that it is linear, or give a counterexample to show that it is not. 9. For a given linear mapping, find its domain, codomain, and standard representing matrix. 10. For a given linear mapping L and vector \bar{v}, determine if \bar{v} is in the range of L, if it is, describe all vectors \bar{x} such that $L(\bar{x}) = \bar{v}$. 11. For a given matrix A, find a basis for the rowspace and the columnspace, 12. Find the bases for the range and nullspace (kernel) of given linear mapping L 13. For given matrix A, find its rank, nullity, the number of the variables and dimension of the solutions space of the homogeneous system $A\bar{x} = \bar{0}$. 14. For a given square matrix, find its inverse or state why the matrix is singular. 15. For a given square linear system $A\bar{x} = \bar{b}$ use A^{-1} to solve the system. 16. Prove that a given subset is a subspace of the given vector space, or give a counterexample to show that it is not. 17. Determine whether a given set of vectors forms a basis for given vector space or subspace. 18. Find a basis for the span of a given set of vectors. 19. Determine the dimension of a given vector space or subspace. 20. Given a basis \mathcal{B} for a vector space or subspace V and a given vector \bar{v} in V, find $[\bar{v}]_{\mathcal{B}}$, the coordinate vector of \bar{v} with respect to basis \mathcal{B}.
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21. For a given **basis** \mathcal{B} find the **change of coordinate matrix**, P , from basis \mathcal{B} to the **standard basis** for the vector space, and the **change of coordinate matrix**, S , from **the standard basis** for the vector space to basis \mathcal{B} .
22. Find $[L]_{\mathcal{B}}$, the representing matrix for a given **linear mapping** with respect to a given basis \mathcal{B} ,
23. Find the matrix for a given linear mapping with respect to given bases \mathcal{B} and \mathcal{C} , ${}_c[L]_{\mathcal{B}}$.
24. Use ${}_c[L]_{\mathcal{B}}$ to find $[L(\bar{v})]_{\mathcal{C}}$, the **linear mapping** of vector \bar{v} with respect to basis \mathcal{C} , given $[\bar{v}]_{\mathcal{B}}$, the **coordinate vector** of \bar{v} with respect to basis \mathcal{B} .
25. Find the **determinant** of a given diagonal, elementary, triangular, or 2×2 matrix by inspection. Find $|A_{3 \times 3}|$ using **cofactor expansion** or by using elementary row operations.
26. Find **eigenvalues** and corresponding **eigenspaces** for a given 2 by 2 or 3 by 3 matrix.
27. Determine the **algebraic** and **geometric multiplicities** for given **eigenvalues and vectors** of a given matrix.
28. Determine if a given matrix is **diagonalizable**; if it is, find its **diagonalization**.
29. For a given **Markov matrix**, determine the **invariant** (or fixed) **state** corresponding to $\lambda = 1$.
30. Solve a **homogeneous system of first-order linear differential equations** using eigentheory.
31. Determine whether a given set of vectors is **orthogonal**; if it is, find the corresponding **orthonormal set** and **change of coordinate matrix** P .
32. Determine if a given matrix A is an **orthogonal matrix** by calculating $A^T A$
33. Given an **orthonormal basis** \mathcal{B} and vector \bar{w} , find $[\bar{w}]_{\mathcal{B}}$, the coordinate of \bar{w} with respect to basis \mathcal{B} ,
34. Given \bar{b} and **orthogonal** or **orthonormal vectors** $\bar{v}_1, \bar{v}_2, \dots, \bar{v}_n$ in R^m , find the **projection matrix** P and the projection of \bar{b} onto the subspaces spanned by $\bar{v}_1, \bar{v}_2, \dots, \bar{v}_n$.
35. Given **linearly independent vectors** $\{\bar{a}_1, \bar{a}_2, \dots, \bar{a}_k\}$ in R^n , use the **Gram-Schmidt** process to get **orthonormal vectors** $\{\bar{q}_1, \bar{q}_2, \dots, \bar{q}_k\}$ such that $Span(\{\bar{q}_1, \bar{q}_2, \dots, \bar{q}_k\}) = Span(\{\bar{a}_1, \bar{a}_2, \dots, \bar{a}_k\})$
36. For a given **inconsistent** and **over-determined** linear system, $A\bar{x} = \bar{b}$, find some or all of:
 - a. the **least squares solution**,
 - b. the **projection vector**, $\bar{p} = \mathit{proj}_{R(A)} \bar{b}$,
 - c. the **projection matrix** P ,
 - d. the **residual vector**, $\mathit{perp}_{R(A)} \bar{b}$.
37. Given n and a table of data with m data points (x_i, y_i) , find the best **least squares** fit by a polynomial of degree n .

	<p>38. Compute inner products, norms, $proj_{\bar{x}} \bar{y}$ and $perp_{\bar{x}} \bar{y}$ for a given inner product space V.</p> <p>39. Given \bar{v} and orthogonal or orthonormal vectors $\bar{v}_1, \bar{v}_2, \dots, \bar{v}_n$ in inner product space V, find the projection of \bar{v} onto the subspace spanned by $\bar{v}_1, \bar{v}_2, \dots, \bar{v}_n$.</p> <p>40. Given linearly independent vectors from an inner product space, use Gram-Schmidt to find an orthonormal basis for their span.</p> <p>41. Approximate a given continuous function on $[-\pi, \pi]$ by a trigonometric polynomial of degree n.</p>
Learning Outcomes	<ul style="list-style-type: none"> • Students can define and explain through illustration Basis, dimension, span, reduce row echelon form, vector spaces and subspaces, linear transformation, linear dependence and linear independence, determinant, Eigenvector/values, orthonormal, and least squares solution. • Students can illustrate and explain the significance of Gaussian Elimination, Gram-Schmidt Orthonormalization, diagonalization and • Students can formulate or recognize linear systems and use linear algebra to examine, analyze or solve the system. • Students have adequate experience with the foundations in Linear Algebra to be prepared to extend their knowledge further through independent reading and research.
Final drop	Please contact the MBA Office

III. Evaluation		
Grading scale	97.0 - 100 : A+ 93.0 - 96.9 : A 90.0 - 92.9 : A- 87.0 - 89.9 : B+ 83.0 - 86.9 : B 80.0 - 82.9 : B- 77.0 - 79.9 : C+ 73.0 - 76.9 : C 70.0 - 72.9 : C- 67.0 - 69.9 : D+ 63.0 - 66.9 : D 60.0 - 62.9 : D- 00.0 - 59.9 : F	
Grading scheme	<i>Grading component</i> Lesson Assignments	<i>Weighted grading percentage</i> 10%

	Homework	40%
	Class Activities	20%
	Tests	50%

IV. Schedule		
Week	Date	Topic
1	TBD	• Introduction and course overview
2	TBD	• Review of vectors, including \mathbb{R}^n , and vector arithmetic including dot product. Linear combination of two vectors.
3	TBD	• Solving Systems of linear equations, Gaussian Elimination
4	TBD	• Matrix Arithmetic and Matrix Algebra
5	TBD	• Vector Spaces, subspaces, Basis and Dimension
6	TBD	• Linear Combinations, linear dependence, linear independence
7	TBD	• Linear Functions, Linear Mappings and Linear transformations
8	TBD	• Mid Term Exam
9	TBD	• Determinants
10	TBD	• Eigen theory
11	TBD	• Applications of Eigen theory
12	TBD	• Inner product spaces
13	TBD	• Least Squares Solutions.
14	TBD	• Gram-Schmidt Orthonormalization
15	TBD	• Singular Value Decomposition
16	TBD	• FINAL
Changes in the syllabus		Syllabus is subject to change. In particular the order of topics to be presented may change.

V1. Student Responsibilities / College and University Issues	
University of Louisville student conduct and responsibilities	This course will abide by University of Louisville student conduct and responsibilities with regards to ethics and related issues: http://louisville.edu/dos/students/policies-procedures/student-handbook.html#codeofstudentconduct
College of Business student conduct and responsibilities	This course will abide by College of Business student conduct and responsibilities with regards to ethics and related issues: http://business.louisville.edu/students/college-of-business-academic-dishonesty-policy
Religious holiday conflict policy	http://louisville.edu/diversity/resources/work-restricted-holy-day-policies-calendar.html

<p>University policy on equal access</p>	<p>http://louisville.edu/disability/policies-procedures</p>
<p><u>Title IX/Clery Act Notification</u></p>	<p>Sexual misconduct (including sexual harassment, sexual assault, and any other nonconsensual behavior of a sexual nature) and sex discrimination violate University policies. Students experiencing such behavior may obtain confidential support from the PEACC Program (852-2663), Counseling Center (852-6585), and Campus Health Services (852-6479). To report sexual misconduct or sex discrimination, contact the Dean of Students (852-5787) or University of Louisville Police (852-6111).</p> <p>Disclosure to University faculty or instructors of sexual misconduct, domestic violence, dating violence, or sex discrimination occurring on campus, in a University-sponsored program, or involving a campus visitor or University student or employee (whether current or former) is not confidential under Title IX. Faculty and instructors must forward such reports, including names and circumstances, to the University’s Title IX officer.</p> <p>For more information, see the Sexual Misconduct Resource Guide (http://louisville.edu/hr/employeerelations/sexual-misconduct-brochure).</p>

UNIVERSITY OF
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COLLEGE OF BUSINESS

Introduction to R MSBA 615 Fall 2018

Instructor	Jose M. Fernandez
Contact information	Office: College of Business, Room 159 Office Phone: (502) 852-4861 Email: jose.fernandez@louisville.edu
Office hours	By appointment

II. Course Information	
Class time / Room	TBD
Required texts	There is no required textbook for this course. However, I will provide a list on-line resources here Cookbook for R Quick R
Course Description	Welcome to Introduction to Programming with R! This course provides an intensive, hands-on introduction to the R programming language. You will learn the fundamental skills required to acquire, manage, transform, manipulate, and visualize data in a computing environment that fosters reproducibility.
Prerequisites	Basic Statistics
Learning Objectives	<ul style="list-style-type: none"> • Provide an introduction to programming in R. • Perform your data analysis in a literate programming environment • Import and manage structured and unstructured data • Manipulate, transform, and summarize your data • Methodically explore and visualize your data • Develop your own functions
Learning Outcomes	<ul style="list-style-type: none"> • You will be able to import and export data into the R statistical software. • You will be able to apply basic statistical functions to your data. • You will be able to write custom functions, scripts, and reports. • You will be able to create visualization including interactive charts to describe the data.

Final drop	Please contact the MBA Office
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III. Evaluation		
Grading scale	97.0 - 100 : A+ 93.0 - 96.9 : A 90.0 - 92.9 : A- 87.0 - 89.9 : B+ 83.0 - 86.9 : B 80.0 - 82.9 : B- 77.0 - 79.9 : C+ 73.0 - 76.9 : C 70.0 - 72.9 : C- 67.0 - 69.9 : D+ 63.0 - 66.9 : D 60.0 - 62.9 : D- 00.0 - 59.9 : F	
Grading scheme	<i>Grading component</i>	<i>Weighted grading percentage</i>
	Class participation	10%
	Individual Assignments	40%
	Class Exercises	20%
	Tests	30%

IV. Schedule		
Week	Date	Topic
1	TBD	Intro to R <ul style="list-style-type: none"> • Installing R and Rstudio • R Markdown and workflow management • Creating Presentations in Rstudio
2	TBD	Importing and Exporting Data, Data Exploration <ul style="list-style-type: none"> • Data frames • Matrices • Lists • Vectors • Logical operators • Factors

3	TBD	Basic summary stats <ul style="list-style-type: none"> • How to generate basic summary stats • Writing simple custom functions • The apply function family • Grouping and aggregating datasets by factors • More dplyr ! • Brief introduction to the data.table package
4	TBD	Exploratory Data Analysis <ul style="list-style-type: none"> • Advancing your visualizations with ggplot2 • dplyr for data transformation • Boxplots - yes please - show those data points! • Histograms • Scatter Plots
5	TBD	Writing Functions <ul style="list-style-type: none"> • Writing custom functions to improve data analysis and reproducibility <ul style="list-style-type: none"> ○ Specifying custom output of functions ○ Optional arguments ○ if else statements • Why and when to write a loop • Why and when to avoid writing a loop <ul style="list-style-type: none"> ○ for loops ○ while loops ○ using repeat and replicate
6	TBD	<ul style="list-style-type: none"> • Interactive Data Visualization
7	TBD	<ul style="list-style-type: none"> • Building Shiny apps
	Time Permitting	Web Scrapping in R
8	TBD	<ul style="list-style-type: none"> • Final Project
Changes in the syllabus		Syllabus is subject to change. In particular the order of topics to be presented may change.

V1. Student Responsibilities / College and University Issues	
University of Louisville student conduct and responsibilities	This course will abide by University of Louisville student conduct and responsibilities with regards to ethics and related issues: http://louisville.edu/dos/students/policies-procedures/student-handbook.html#codeofstudentconduct
College of Business student	This course will abide by College of Business student

conduct and responsibilities	conduct and responsibilities with regards to ethics and related issues: http://business.louisville.edu/students/college-of-business-academic-dishonesty-policy
Religious holiday conflict policy	http://louisville.edu/diversity/resources/work-restricted-holy-day-policies-calendar.html
University policy on equal access	http://louisville.edu/disability/policies-procedures
<u>Title IX/Clery Act Notification</u>	<p>Sexual misconduct (including sexual harassment, sexual assault, and any other nonconsensual behavior of a sexual nature) and sex discrimination violate University policies. Students experiencing such behavior may obtain confidential support from the PEACC Program (852-2663), Counseling Center (852-6585), and Campus Health Services (852-6479). To report sexual misconduct or sex discrimination, contact the Dean of Students (852-5787) or University of Louisville Police (852-6111).</p> <p>Disclosure to University faculty or instructors of sexual misconduct, domestic violence, dating violence, or sex discrimination occurring on campus, in a University-sponsored program, or involving a campus visitor or University student or employee (whether current or former) is not confidential under Title IX. Faculty and instructors must forward such reports, including names and circumstances, to the University's Title IX officer.</p> <p>For more information, see the Sexual Misconduct Resource Guide (http://louisville.edu/hr/employeerelations/sexual-misconduct-brochure).</p>

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Data Analytics I MSBA 620 Fall 2018
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Instructor	Dr. Sandeep Goyal
Contact information	Office: 301 College of Business Telephone: 502-852-4780 Fax: 502-852-4799 Email: Sandeep.Goyal@louisville.edu
Office hours	By appointment

II. Course Information	
Class time / Room	TBD Classroom: TBD
Required texts	<i>Statistics for Management and Economics</i> by Gerald Keller You may get either the 11 th edition (ISBN-10: 1337093459), 10 th edition (ISBN-10: 1285425456), or the 9 th edition (ISBN-10: 0538477490) of the textbook. Used textbooks are okay. You <u>do not</u> need any access code to work on exercises or homework problems. Other resources to be provided by the instructor such as data files and additional problems/cases.
Course description	Organizations and individuals create and collect massive amounts of data with relative ease. Much of this data are usually meaningless until they are analyzed for trends, patterns, relationships, and other useful information. Therefore, organizations are increasingly interested in employees that have the knowledge, skill, and experience in systematically analyzing a wide-variety of data using advanced statistical tools to improve decision-making. This course provides a hands-on learning experience using powerful statistical tools that can be leveraged

	to work with structured data and generate business knowledge. This course covers basic principles, such as working with different types of data, to more sophisticated techniques, such as predictive modeling, time-series analysis, and growth modeling. A review of necessary statistical concepts will be provided as needed. Extensive use of a leading statistical tool such as SAS or SPSS is expected. A review of necessary statistical concepts will be provided as needed. Other than the prerequisite MBA 602 (Decision Analysis), no prior statistical or technical knowledge is required for this course.
Prerequisites	MSBA 6XXX Introduction to Statistical Packages
Learning objectives	<ul style="list-style-type: none"> • Coverage of a wide range of statistical procedures • Review of descriptive statistics • Review of correlation and simple regression • Working with interval and categorical data • Comparing samples and populations • Comparing variance across samples and populations • One-way chi-squares • Data transformations • Multiple regression • Logistic regression • Analysis of variance
Learning Outcomes	<ul style="list-style-type: none"> • Solve common analytical business problems • Think systematically if and how data can help make better-informed decisions • Use business analytical tools; and • Have had hands-on experience mining and analyzing data.
Final drop date	Please contact the MBA Office
Required software	Microsoft Excel SPSS (your instructor will provide access to SPSS)
Other utilities	You would be required to bring a Windows or a Mac laptop. Have access to high speed internet for assignments.

III. Evaluation			
Grading scale	A	>=93	Exceptional work
	A-	91-92	Very good
	B+	87-90	Above average
	B	83-86	Average
	B-	80-82	Below Average
	C+	78-79	Barely Acceptable
	F	<78	Unacceptable
Grading scheme	<i>Grading component</i>		<i>Weighted grading percentage</i>
	Final exam		25%

	Individual assignments & quizzes	40%
	In-class group exercises	25%
	Attendance	10%

IV. Schedule

Notes:

1. This course does not require a review of the mathematical calculations in the page numbers listed below. Primary focus is Excel and SPSS output and its interpretation
2. This schedule may change

Week	Topic	Session Activity
		Additional readings may be added for more information
1	Analytical Fundamentals Review	<ul style="list-style-type: none"> ○ Types of data 11th edition: Section 2.1; pages 13-18 10th edition: Section 2-1; pages 13-20 9th edition: Section 2.1; pages 13-20 ○ Graphical techniques to describe a set of interval data 11th edition: Section 2.3; pages 30-48 10th edition: Section 3-1; pages 44-57 9th edition: Section 3.1; pages 44-57
2	Analytical Fundamentals Review	<ul style="list-style-type: none"> ○ Normal distribution 11th edition: Section 8.2; pages 259-276 10th edition: Section 8-2; pages 266-277 9th edition: Section 8.2; pages 270-281 ○ Other continuous distributions 11th edition: Section 8.4; pages 281-294 10th edition: Section 8-4; pages 287-299 9th edition: Section 8.4; pages 291-304
3	Analytical Fundamentals Review	<ul style="list-style-type: none"> ○ Sampling distribution of the mean 11th edition: Section 9.1; pages 296-308 10th edition: Section 9-1; pages 302-312 9th edition: Section 9.1; pages 308-320 Other suggested readings: ○ Measures of central location 11th edition: Section 4.1; pages 97-105 10th edition: Section 4-1; pages 95-104 9th edition: Section 4.1; pages 98-107 ○ Measures of variability 11th edition: Section 4.2; pages 106-114 10th edition: Section 4-2; pages 105-111 9th edition: Section 4.2; pages 108-114 ○ Measure of linear relationship 11th edition: Section 4.4; pages 124-138 10th edition: Section 4-4; pages 123-127 and 4-4f; page 137

		9th edition: Section 4.4; pages 126-130
4	Estimation	<ul style="list-style-type: none"> ○ Sampling distribution of the mean 11th edition: Section 9.1; pages 296-308 10th edition: Section 9-1; pages 302-312 9th edition: Section 9.1; pages 308-320
5	Estimation	<ul style="list-style-type: none"> ○ Concepts of estimation 11th edition: Sections 10.1 and 10.2; pages 322-338 10th edition: Section 10-1; pages 325-338 9th edition: Section 10.1; pages 336-349
6	Estimation	<ul style="list-style-type: none"> ○ Hypotheses testing 11th edition: Sections 11.1 and 11.2; pages 345-367 10th edition: Section 11-1; pages 348-366 9th edition: Section 11.1; 361-379
7	Estimation	<ul style="list-style-type: none"> ○ Inference about a population 11th edition: Section 12.1; pages 382-395 10th edition: Sections 12-1 and 12-2; pages 386-392 and 401-406 9th edition: Sections 12.1 and 12.2; pages 399-405 and 413-419
8		Mid-term exam I
9	Comparing Populations	<ul style="list-style-type: none"> ○ Independent samples 11th edition: Section 13.1; pages 439-460 10th edition: Section 13-1; pages 438-452 9th edition: Section 13.1; pages 449-463
10	Comparing Populations	<ul style="list-style-type: none"> ○ Matched pairs 11th edition: Section 13.3; pages 464-476 10th edition: Section 13-3; pages 467-475 9th edition: Section 13.3; pages 475-483
11		Mid-term exam 2
12	Regression Analysis	<ul style="list-style-type: none"> ○ Regression Analysis 11th, 10th, and 9th edition: Chapters 16 and 17
13	Introduction to SPSS	Introduction to SPSS GUI
14	Working with Data	<p>Manipulating Data</p> <ul style="list-style-type: none"> -Importing data -Selecting cases -Computing variables

15	Working with Data	Manipulating Data -Recoding variables -Missing values
16	Wrap-up	Advanced Regression Concepts review Practice exam review Final Exam

Changes in the syllabus	Syllabus is subject to change. In particular the order of topics to be presented may change.
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V1. Student Responsibilities / College and University Issues	
University of Louisville student conduct and responsibilities	This course will abide by University of Louisville student conduct and responsibilities with regards to ethics and related issues: http://louisville.edu/dos/students/policies-procedures/student-handbook.html#codeofstudentconduct
College of Business student conduct and responsibilities	This course will abide by College of Business student conduct and responsibilities with regards to ethics and related issues: http://business.louisville.edu/students/college-of-business-academic-dishonesty-policy
Religious holiday conflict policy	http://louisville.edu/diversity/resources/work-restricted-holy-day-policies-calendar.html
University policy on equal access	http://louisville.edu/disability/policies-procedures
Title IX/Clery Act Notification	Sexual misconduct (including sexual harassment, sexual assault, and any other nonconsensual behavior of a sexual nature) and sex discrimination violate University policies. Students experiencing such behavior may obtain confidential support from the PEACC Program (852-2663), Counseling Center (852-6585), and Campus Health Services (852-6479). To report sexual misconduct or sex discrimination, contact the Dean of Students (852-5787) or University of Louisville Police (852-6111). Disclosure to University faculty or instructors of sexual misconduct, domestic violence, dating violence, or sex discrimination occurring on campus, in a University-sponsored program, or involving a campus visitor or University student or employee (whether current or former) is not confidential under Title IX. Faculty and instructors

	<p>must forward such reports, including names and circumstances, to the University's Title IX officer.</p> <p>For more information, see the Sexual Misconduct Resource Guide (http://louisville.edu/hr/employeerelations/sexual-misconduct-brochure).</p>
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UNIVERSITY OF
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COLLEGE OF BUSINESS

Storytelling with Data MSBA 625 Fall 2018
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Instructor	Kristen Lucas
Contact information	Office: Room 375, COB Telephone: 502-852-4786 Fax: 502-852-4799 Email: kristen.lucas@louisville.edu
Office hours	TBD

II. Course Information	
Class time / Room	TBD
Required texts	<p>Nussbaumer Knaflic, C. (2015). <i>Storytelling with data: A data visualization guide for business professionals</i>. Hoboken, NJ: Wiley.</p> <p>Evergreen, S. D. G. (2018). <i>Presenting data effectively: Communicating your findings for maximum impact</i>. Thousand Oaks, CA: SAGE.</p> <p>Duarte, N. (2014). <i>Slidedoc: Spread ideas with effective visual documents</i>. Palo Alto, CA: Duarte. Available at: http://www.duarte.com/slidedocs/</p> <p>Additional articles, videos, blogs, and resources will be posted on the course Blackboard page.</p>
Course Description	<p>This course is a business presentations course specifically designed for professionals in the field of business analytics. Throughout the semester, you will develop your ability to organize, visualize, and present data-driven messages that are professional, clear, concise, and persuasive. By the end of the course, you will enhance your ability to communicate with and about data in multiple business and professional contexts: formal individual presentations, team-based presentations, and informal one-on-one and small group interactions.</p>

Prerequisites	Students should have working knowledge of Microsoft Word, Excel, and PowerPoint. Students also should be able to operate a webcam and upload video files.
Learning Objectives	<ul style="list-style-type: none"> • To provide an introduction to storytelling with data • To introduce principles of effective communication with data • To provide opportunities to practice, get feedback, and refine skills and abilities in communicating with data
Learning Outcomes	<p>At the end of the course, you will be able to:</p> <ul style="list-style-type: none"> • Present yourself professionally in diverse business communication contexts (e.g., presentations, group discussions, informal interactions, etc.) • Explain data and analyses in ways that are clearly understood by receivers • Provide concise explanations that quickly get to the point without losing important context or content • Demonstrate mastery at being data-driven by (a) translating data and analyses into a narrative that provides context for your message AND (b) creating informative, clutter-free data visualizations to support your message • Make persuasive recommendations that convince receivers to adopt a particular belief or take a course of action
Final drop	Please contact the MBA Office

III. Evaluation		
Grading scale	97.0 - 100 : A+ 93.0 - 96.9 : A 90.0 - 92.9 : A- 87.0 - 89.9 : B+ 83.0 - 86.9 : B 80.0 - 82.9 : B- 77.0 - 79.9 : C+ 73.0 - 76.9 : C 70.0 - 72.9 : C- 67.0 - 69.9 : D+ 63.0 - 66.9 : D 60.0 - 62.9 : D- 00.0 - 59.9 : F	
Grading scheme	Communication Challenges (5 @ 20)	100

	Presentation 1	100
	Presentation 2	100
	Team Presentation	100
	Team Slidedoc	100
	In-Class Participation	50
	TOTAL	550

IV. Schedule		
Week	Date	Topic
1	TBD	<ul style="list-style-type: none"> • Intro to storytelling with data • Communication strategy • Goals-oriented • Receiver-centric
2	TBD	<ul style="list-style-type: none"> • Receiver analysis • Clarity strategies (level of complexity, metaphor, jargon, etc.) • Organizing your speech with stories • Organizing elements (thesis statements, transitions, signposts, etc.)
3	TBD	<ul style="list-style-type: none"> • Professionalism in presentations • Beginning delivery skills (speech stance, vocal clarity)
4	TBD	<ul style="list-style-type: none"> • Presentation 1
5	TBD	<ul style="list-style-type: none"> • Assertion evidence design principles
6	TBD	<ul style="list-style-type: none"> • Data Visualization Basics • Data displays • Decluttering
7	TBD	<ul style="list-style-type: none"> • Data Visualization for Persuasion • Telling stories with numbers • Dot plots, trend analyses
8	TBD	<ul style="list-style-type: none"> • Presentation 2
9	TBD	<ul style="list-style-type: none"> • Writing workshop • Bottom-line up front, data displays for print, etc.
10	TBD	<ul style="list-style-type: none"> • Slide Docs
11	TBD	<ul style="list-style-type: none"> • Narrative basics • Plot, arc, characters
12	TBD	<ul style="list-style-type: none"> • Narrative persuasion • Receiver standpoint analysis • Persuasive elements (clinchers, emotion, etc.)
13	TBD	<ul style="list-style-type: none"> • Advanced delivery skills (movement, gestures, vocal emphasis)
14	TBD	<ul style="list-style-type: none"> • Unify and Present • Team Delivery

		<ul style="list-style-type: none"> • Answering Q &A
15	TBD	<ul style="list-style-type: none"> • Team Presentation
16	TBD	<ul style="list-style-type: none"> • FINAL
Changes in the syllabus		Syllabus is subject to change. In particular the order of topics to be presented may change.

V1. Student Responsibilities / College and University Issues	
University of Louisville student conduct and responsibilities	<p>This course will abide by University of Louisville student conduct and responsibilities with regards to ethics and related issues:</p> <p>http://louisville.edu/dos/students/policies-procedures/student-handbook.html#codeofstudentconduct</p>
College of Business student conduct and responsibilities	<p>This course will abide by College of Business student conduct and responsibilities with regards to ethics and related issues:</p> <p>http://business.louisville.edu/students/college-of-business-academic-dishonesty-policy</p>
Religious holiday conflict policy	http://louisville.edu/diversity/resources/work-restricted-holy-day-policies-calendar.html
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COLLEGE OF BUSINESS

Data Management MSBA 630 Spring 2019

Instructor	Jeff Guan
Contact information	Office: 302 College of Business Telephone: 502-852-7154 Fax: 502-852-4799 Email: j0guan01@louisville.edu
Office hours	By appointment

II. Course Information	
Class time / Room	TBD
Required texts	<i>A Guide to SQL, 9th Edition</i> Philip J. Pratt Mary Z. Last Publisher: Cengage See more at: http://www.cengage.com/search/productOverview.do?N=14+4294922239+4294958274&Ntk=P_EPI&Ntt=174740579317283745095282311925140475&Ntx=mode%2Bmatchallpartial Other materials/resources, such as articles, case studies, and websites, will be provided by the instructor.
Course Description	This course provides an introduction to issues, principles, and technologies of modeling and using organizational data. It covers concepts and skills for developing, accessing, and administering relational databases, and formulating and executing complex queries. It also discusses the role of data management technologies and practices in an organizational setting and how such technologies and practices may impact business strategy, business processes, and organizational structure. This course has a strong hands-on component. The course will make extensive use of a leading relational database management software and structured query language (SQL).
Prerequisites	Good standing in the MSBA program.

Learning Objectives	<ul style="list-style-type: none"> • Provide an introduction to data and data management in an organization. • Introduce the typical environment for structured business data: the relational database system. • Introduce basic relational database modeling concepts and techniques. • Provide an extensive coverage of the structured query language (SQL). • Provide an extensive exposure to a leading database management system (DBMS) such as Microsoft SQL Server. • Provides an introduction to business intelligence and data warehousing. • Discuss fundamental issues in data governance.
Learning Outcomes	<ul style="list-style-type: none"> • You will understand the relevance and role of databases to what you do at work. • You will be able to understand the model of a reasonably complex relational database. • You will be able to design simple relational databases and make changes to an existing relational database. • You will be able to write SQL queries to perform tasks such as data retrieval and other common types of database work. • You will be able to participate in the processes that involve the overall management of the availability, usability, integrity, and security of the data employed in an enterprise. • You will be able to contribute a business intelligence project either from a data perspective or a more managerial perspective.
Final drop	Please contact the MBA Office

III. Evaluation		
Grading scale	97.0 - 100.0 : A+ 93.0 - 96.9 : A 90.0 - 92.9 : A- 87.0 - 89.9 : B+ 83.0 - 86.9 : B 80.0 - 82.9 : B- 77.0 - 79.9 : C+ 73.0 - 76.9 : C 70.0 - 72.9 : C- 67.0 - 69.9 : D+ 63.0 - 66.9 : D 60.0 - 62.9 : D- 00.0 - 59.9 : F	
Grading scheme	<i>Grading component</i>	<i>Weighted grading percentage</i>
	Class participation	5%

	Individual Assignments	50%
	Quizzes	30%
	Final	15%

IV. Schedule for Section 01		
Week	Date	Topic
1		Introduction to Class, Chapters 1 and 2
		Chapters 2 and 3
2		Chapter 3
		Chapter 3
3		Chapter 3
		Chapter 4
4		Chapter 4
		Chapter 4
5		Chapter 5
		Chapter 5
6		Test 1 on Chapters 1-4
		Chapter 6
7		Chapter 6
		Chapter 7
8		Fall Break—No Class
		Chapter 7
9		Chapter 7
		Chapter 8
10		Chapter 8
		Test 2 on Chapters 5-7
11		Chapter 8
		Chapter 8
12		Chapter 8
		Chapter 13
13		Chapter 13
		Chapter 13
14		Chapter 14
		Thanksgiving Holiday—No Class
15		Chapter 14
		Chapter 14
16		Chapter 14
		Review
FINAL		TBD

IV. Schedule		
Week	Date	Topic

1	06/02 6pm— 9:30pm	<ul style="list-style-type: none"> • Introduction to Class • Chapters 1 and 2 of the textbook
2	06/05 6pm— 9:30pm	<ul style="list-style-type: none"> • Chapters 2 and 3 • Quiz 1 on relational database modeling
3	06/09 6pm— 9:30pm	<ul style="list-style-type: none"> • Chapters 3 and 4 • Quiz 2 on simple queries
4	06/16 6pm— 9:30pm	<ul style="list-style-type: none"> • Chapters 4 and 5 • Quiz 3 on complex queries
5	06/23 6pm— 9:30pm	<ul style="list-style-type: none"> • Chapter 6 • Final Test

Changes in the syllabus	Syllabus is subject to change. In particular the order of topics to be presented may change.
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V1. Student Responsibilities / College and University Issues	
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College of Business student conduct and responsibilities	This course will abide by College of Business student conduct and responsibilities with regards to ethics and related issues: http://business.louisville.edu/students/college-of-business-academic-dishonesty-policy
Religious holiday conflict policy	http://louisville.edu/diversity/resources/work-restricted-holy-day-policies-calendar.html
University policy on equal access	http://louisville.edu/disability/policies-procedures
<u>Title IX/Clery Act Notification</u>	<p>Sexual misconduct (including sexual harassment, sexual assault, and any other nonconsensual behavior of a sexual nature) and sex discrimination violate University policies. Students experiencing such behavior may obtain confidential support from the PEACC Program (852-2663), Counseling Center (852-6585), and Campus Health Services (852-6479). To report sexual misconduct or sex discrimination, contact the Dean of Students (852-5787) or University of Louisville Police (852-6111).</p> <p>Disclosure to University faculty or instructors of sexual misconduct, domestic violence, dating violence, or sex discrimination occurring on campus, in a University-sponsored program, or involving a campus visitor or University student or employee (whether current or former) is not confidential under Title IX. Faculty and instructors must forward such reports, including names and circumstances, to the University's Title IX officer.</p> <p>For more information, see the Sexual Misconduct Resource Guide (http://louisville.edu/hr/employeerelations/sexual-misconduct-brochure).</p>

UNIVERSITY OF
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COLLEGE OF BUSINESS

<p>Data Analytics II MSBA 635 Spring 2019</p>
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Instructor	Dr. Sandeep Goyal
Contact information	Office: 301 College of Business Telephone: 502-852-4780 Fax: 502-852-4799 Email: Sandeep.Goyal@louisville.edu
Office hours	By appointment

II. Course Information	
Class time / Room	TBD Classroom: TBD
Required texts	<p><i>Business Analytics: Data Analysis & Decision Making</i> by S. Christian Albright and Wayne L. Winston</p> <p>You may get either the 6th edition (ISBN-13: 978-1305947542) or the 5th edition (ISBN-13: 978-1133629603) of the textbook.</p> <p>Used textbooks are okay. You <u>do not</u> need any access code to work on exercises or homework problems.</p> <p>Other resources to be provided by the instructor such as data files and additional problems/cases.</p>
Course description	<p>The volume of data generated every day continues to grow exponentially. Being able to mine the available data for information is now a fundamental skill sought by organizations. This course builds on the Introduction to Business Analytics course by introducing more advanced topics in analytics. This course challenges and teaches students how to use powerful statistical tools (e.g., SmartPLS, SAS, and SPSS) to handle data that come in a variety of forms and sizes in more complex, less structured business situations. Students will participate in</p>

	extensive hands-on work solving realistic business problems. This course may guide students with handling advanced regression analysis that deals with real-life models and interaction variables, time series analysis, and topics such as PLS path modeling. After taking this course, students should: (1) Approach business problems data-analytically; (2) Think systematically whether and how data can help make better-informed decisions; (3) Be able to interact competently with business analytical tools; and (4) Have a had hands-on experience mining data. A review of necessary statistical concepts will be provided as needed. Other than the prerequisite MBA 680 (Business Analytics I), no prior statistical or technical knowledge is required for this course.
Prerequisites	MSBA 6XX Data Analytics 1
Learning objectives	<ul style="list-style-type: none"> • Coverage of a wide range of statistical procedures • Review of correlation and simple regression • Working with interval and categorical data • One-way chi-squares • Data transformations • Multiple regression • Logistic regression • Analysis of variance
Learning Outcomes	<ul style="list-style-type: none"> • Solve common analytical business problems • Think systematically if and how data can help make better-informed decisions • Use business analytical tools; and • Have had hands-on experience mining and analyzing data.
Final drop date	Please contact the MBA Office
Required software	SPSS (your instructor will provide access to SPSS)
Other utilities	You would be required to bring a Windows or a Mac laptop. Have access to high speed internet for homework assignments.

III. Evaluation			
Grading scale	A	>=93	Exceptional work
	A-	91-92	Very good
	B+	87-90	Above average
	B	83-86	Average
	B-	80-82	Below Average
	C+	78-79	Barely Acceptable
	F	<78	Unacceptable
Grading scheme	<i>Grading component</i>		<i>Weighted grading percentage</i>
	Final exam		35%

	Individual assignments & quizzes	25%
	In-class group exercises	35%
	Attendance	5%

IV. Schedule

Notes:

3. This course does not require a review of the mathematical calculations. Primary focus is SPSS output and its interpretation
4. This schedule may change

Week	Topic	Session Activity
		Additional readings may be added for more information
1	Advanced Regression Analysis	Review of linear/multiple regression
2	Advanced Regression Analysis	Regression with categorical independent variables
3	Working with Time	Time-series analysis
4	Working with Time	Time-series analysis
5	Analytical decision making I	Logistic Regression
6	Analytical decision making I	Working with 2-way and 3-way interactions
7	Mid-Term Exam	
8	Analytical decision making II	Guest Speaker: A novel predictive model for identifying members at High Risk of Falling
9	Analytical decision making II	Step-wise Regression; experimental design
10	Analytical decision making II	Autocorrelation; Multicollinearity
11	Predictive Modeling	Forecasting
12	Predictive Modeling	Forecasting
13	Predictive Modeling	Growth modeling
14	Predictive Modeling	Growth modeling
15	Analytical decision making II	Review
16	Wrap-up	Final Exam

Changes in the syllabus	Syllabus is subject to change. In particular the order of topics to be presented may change.
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UNIVERSITY OF
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COLLEGE OF BUSINESS

Decision Models
MSBA 640
Spring 2019

Instructor	Andrew Manikas
Contact information	Office: 373 College of Business Telephone: 502-852-4869 Fax: 502-852-4799 Email: andrew.manikas@louisville.edu
Office hours	By appointment

II. Course Information	
Class time / Room	TBD
Required texts	An Introduction to Management Science – Quantitative Approaches to Decision Making, 14 th Edition, by Anderson, Sweeney, Williams Camm, Cohran, Fry, and Ohlmann
Course Description	This course trains students to turn real-world problems into mathematical and spreadsheet models and to use such models to make better managerial decisions. This is a hands-on course that focuses on modeling business problems, turning them into spreadsheet models and using tools like Solver to obtain solutions to these managerial problems. The course focuses on two classes of models: optimization and simulation. The application areas are diverse and they originate from problems in finance, marketing and operations. We cover problems such as how to optimize a supply chain and how to price products when faced with demand uncertainty. Topics covered include linear and linear integer programming, nonlinear programming and evolutionary solver, simulation and optimization, multi-period linear programming and Monte Carlo simulation.
Prerequisites	MSBA 6xx Data Analysis I
Learning Objectives	<ul style="list-style-type: none"> • Learn how to turn real-world problems into formulations • Be able to set up constraint based problems in Excel • Be familiar with the various Solver methods to optimize problems • Understand the implications of the results of solved decision models
Learning Outcomes	<ul style="list-style-type: none"> • You will understand how to define and structure real-world problems into mathematical constraint formulations and objective functions

	<ul style="list-style-type: none"> • You will be able to specify your stated models in a spreadsheet tool (specifically, Excel) • You will understand how to trouble-shoot on-converging models • You will be familiar with the various Solver algorithms and their appropriate uses
Final drop	Please contact the MBA Office

III. Evaluation		
Grading scale	97.0 - 100 : A+ 93.0 - 96.9 : A 90.0 - 92.9 : A- 87.0 - 89.9 : B+ 83.0 - 86.9 : B 80.0 - 82.9 : B- 77.0 - 79.9 : C+ 73.0 - 76.9 : C 70.0 - 72.9 : C- 67.0 - 69.9 : D+ 63.0 - 66.9 : D 60.0 - 62.9 : D- 00.0 - 59.9 : F	
Grading scheme	<i>Grading component</i>	<i>Weighted grading percentage</i>
	Class participation	10%
	Individual Assignments	20%
	Class Exercises	30%
	Tests	40%

IV. Schedule		
Week	Date	Topic
1	TBD	<ul style="list-style-type: none"> • Introduction to decision models • Turning story problems into constraints and objectives
2	TBD	<ul style="list-style-type: none"> • Linear programming, graphical method
3	TBD	<ul style="list-style-type: none"> • Sensitivity analysis
4	TBD	<ul style="list-style-type: none"> • Marketing and Finance Applications
5	TBD	<ul style="list-style-type: none"> • Operations Management Applications
6	TBD	<ul style="list-style-type: none"> • Supply Chain Models
7	TBD	<ul style="list-style-type: none"> • Logistics Models
8	TBD	<ul style="list-style-type: none"> • Integer Linear Programming
9	TBD	<ul style="list-style-type: none"> • Nonlinear Optimization Models

10	TBD	• Inventory Models – Ordering and Production
11	TBD	• Inventory Models – Single Period
12	TBD	• Queuing Models
13	TBD	• Simulation
14	TBD	• Decision Analysis
15	TBD	• Multicriteria Decisions (Goal Programming)
16	TBD	• FINAL
Changes in the syllabus		Syllabus is subject to change. In particular the order of topics to be presented may change.

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	For more information, see the Sexual Misconduct Resource Guide (http://louisville.edu/hr/employeerelations/sexual-misconduct-brochure).
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UNIVERSITY OF
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COLLEGE OF BUSINESS

Data Mining MSBA 645 Spring 2019

Instructor	Jozef Zurada
Contact information	Office: Room 306, COB Telephone: 502-852-4681 Fax: 502-852-4799 Email: jmzura01@exchange.louisville.edu
Office hours	By appointment

II. Course Information	
Class time / Room	TBD
Required texts	K.S. Sarma, Predictive Modeling with SAS® Enterprise Miner™: Practical Solutions for Business Applications, 3 rd Edition, 2017. Link to textbook
Course Description	Data mining draws on statistics, artificial intelligence and machine learning to discover novel, interesting and actionable relationships and patterns in large and complex datasets. This course will introduce the student to the fundamentals of data mining, including methodology, data preparation, commonly used predictive models, supervised and unsupervised learning, model comparison and evaluation, and mining of unstructured data such as text. While the emphasis is on solving realistic business problems, the course will also provide a brief background for the various models and techniques introduced in the course. The course follows a learn-by-doing approach in which the student will complete assignments using real world datasets. A leading data-mining tool such as SAS Enterprise Miner will be used extensively in this course.
Prerequisites	MSBA 6xx Data Analysis I
Learning Objectives	<ul style="list-style-type: none"> • Provide an introduction to data mining. • Introduce a sound methodology for data mining processes • Introduce basic techniques in data preparation, variable selection, and variable transformation. • Introduce the fundamentals in predictive modeling, clustering, and classification in a data-mining context.

	<ul style="list-style-type: none"> • Introduce several basic predictive modeling algorithms such as decision tree and neural network. • Introduce supervised learning and unsupervised learning. • Introduce predictive modeling using unstructured data such as text. • Provide in-depth exposure to a leading data-mining tool such as SAS Enterprise Miner.
Learning Outcomes	<ul style="list-style-type: none"> • You will understand the relevance and role of data mining in a business context. • You will be able to apply a commonly accepted methodology to create an analytics solution using data mining techniques. • You will be able to contribute to the analysis and design of a reasonably complex data-mining project for a practical business problem. • You will be able to interpret and assess the typical output of a data-mining model.
Final drop	Please contact the MBA Office

III. Evaluation		
Grading scale	97.0 - 100 : A+ 93.0 - 96.9 : A 90.0 - 92.9 : A- 87.0 - 89.9 : B+ 83.0 - 86.9 : B 80.0 - 82.9 : B- 77.0 - 79.9 : C+ 73.0 - 76.9 : C 70.0 - 72.9 : C- 67.0 - 69.9 : D+ 63.0 - 66.9 : D 60.0 - 62.9 : D- 00.0 - 59.9 : F	
Grading scheme	<i>Grading component</i>	<i>Weighted grading percentage</i>
	Class participation	10%
	Individual Assignments	40%
	Class Exercises	20%
	Tests	30

IV. Schedule		
Week	Date	Topic
1	TBD	<ul style="list-style-type: none"> • Introduction to data mining • Introduction to SAS Enterprise Miner

2	TBD	• Preprocessing in Data Mining
3	TBD	• Techniques for Data Exploration, Machine Learning
4	TBD	• Data Preparation
5	TBD	• Variable Selection and Transformation
6	TBD	• Introduction to Data Clustering
7	TBD	• Decision Tree
8	TBD	• Decision Tree
9	TBD	• Neural Network Models
10	TBD	• Neural Network Models
11	TBD	• Classification and Prediction
12	TBD	• Additional Data Mining Models (Memory-based Reasoning and Support Vector Machine, Ensemble)
13	TBD	• Model Comparison and Evaluation
14	TBD	• Models for Unstructured Data
15	TBD	• Models for Unstructured Data
16	TBD	• FINAL
Changes in the syllabus		Syllabus is subject to change. In particular the order of topics to be presented may change.

V1. Student Responsibilities / College and University Issues	
University of Louisville student conduct and responsibilities	This course will abide by University of Louisville student conduct and responsibilities with regards to ethics and related issues: http://louisville.edu/dos/students/policies-procedures/student-handbook.html#codeofstudentconduct
College of Business student conduct and responsibilities	This course will abide by College of Business student conduct and responsibilities with regards to ethics and related issues: http://business.louisville.edu/students/college-of-business-academic-dishonesty-policy
Religious holiday conflict policy	http://louisville.edu/diversity/resources/work-restricted-holy-day-policies-calendar.html
University policy on equal access	http://louisville.edu/disability/policies-procedures
<u>Title IX/Clery Act Notification</u>	Sexual misconduct (including sexual harassment, sexual assault, and any other nonconsensual behavior of a sexual nature) and sex discrimination violate University policies. Students experiencing such behavior may obtain confidential support from the PEACC Program (852-2663), Counseling Center (852-6585), and Campus Health Services (852-6479). To report sexual misconduct or sex discrimination, contact the Dean of Students (852-5787) or

	<p>University of Louisville Police (852-6111).</p> <p>Disclosure to University faculty or instructors of sexual misconduct, domestic violence, dating violence, or sex discrimination occurring on campus, in a University-sponsored program, or involving a campus visitor or University student or employee (whether current or former) is not confidential under Title IX. Faculty and instructors must forward such reports, including names and circumstances, to the University's Title IX officer.</p> <p>For more information, see the Sexual Misconduct Resource Guide (http://louisville.edu/hr/employeerelations/sexual-misconduct-brochure).</p>
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UNIVERSITY OF
LOUISVILLE[®]

COLLEGE OF BUSINESS

Data Mining and Business Analytics with R
MSBA 650
Spring 2019

Instructor	Jose M. Fernandez
Contact information	Office: College of Business, Room 159 Office Phone: (502) 852-4861 Email: jose.fernandez@louisville.edu
Office hours	By appointment

II. Course Information	
Class time / Room	TBD
Required texts	Data Mining and Business Analytics with R by Johannes Ledolter Use R (Recommended free text)
Required Software	<ul style="list-style-type: none"> • We require the R Statistical Software, which is powerful and free. R can be downloaded at the link below: http://www.cran.r-project.org/ • Rstudio is a free platform for both writing and running R, available at www.rstudio.org. Some students find it friendlier than basic R. • We do not assume that you have used R in a previous class. I will provide limited software instruction, in-class demonstration, and code to accompany lectures and assignments. However, this is not a class on R. Like any language, R is only learned by doing. You should install R as soon as possible and familiarize yourself with basic operations. • Students can become proficient in a few weeks. Some manuals are very helpful to learn R, e.g., http://cran.r-project.org/manuals.html • Additional resources: (a) Tutorials at data.princeton.edu/R are fantastic (and there are many others out there). (b) Youtube intros to R, e.g. the series from Google Developers.
Course Description	The course presents advance business analytics using R. The concepts learned in this class should help you identify opportunities in which business analytics can be used to improve performance and support important decisions. It will teach you important tools that can be used to transform data into high-impact business decisions. Lastly, it

	<p>should make you alert to the ways that analytics can be used — and misused — within an organization.</p> <p>Course topics include a review of basic statistical ideas, numerical and graphical methods for summarizing data, linear regression, logistic regression, classification, decision trees, factor models, clustering, and other emerging data analytics methods. The course presents real-world examples where a significant competitive advantage has been obtained through large-scale data analysis. Examples include advertising, eCommerce, finance, health care, marketing, and revenue management. The ultimate goal is, of course, help to make better business decisions using advanced analytics.</p>
Prerequisites	Introduction to R; Data Analytics I and II
Learning Objectives	<ul style="list-style-type: none"> • Provide an introduction to parallel computing in R. • Perform data analysis with binary, censored, and count data • Classification Models, Principal Component, Text Mining • Introduction to supervised machine learning and classification models with R • Methods for handling big data with R
Learning Outcomes	<ul style="list-style-type: none"> • You will be able to import and export large databases into the R statistical software. • You will learn advanced methods estimate categorical variables such as logistic regression and Bayesian models. • You will be able to run R programs in parallel both on a local machine or a computer cluster.
Final drop	Please contact the MBA Office

III. Evaluation		
Grading scale	97.0 - 100 : A+ 93.0 - 96.9 : A 90.0 - 92.9 : A- 87.0 - 89.9 : B+ 83.0 - 86.9 : B 80.0 - 82.9 : B- 77.0 - 79.9 : C+ 73.0 - 76.9 : C 70.0 - 72.9 : C- 67.0 - 69.9 : D+ 63.0 - 66.9 : D 60.0 - 62.9 : D- 00.0 - 59.9 : F	
Grading scheme	<i>Grading component</i>	<i>Weighted grading percentage</i>

	Class participation	10%
	Individual Assignments	40%
	Class Exercises	20%
	Tests	30%

IV. Schedule		
Week	Date	Topic
1	TBD	<ul style="list-style-type: none"> Review of Linear Regression and Nonparametric Regression
2		<ul style="list-style-type: none"> Difference in Differences Regression Discontinuity Propensity Score Matching
3	TBD	Latent Choice Variables <ul style="list-style-type: none"> Logistic Regression Multinomial Logistic Regression
4	TBD	Censored Data <ul style="list-style-type: none"> Tobit Sample Selection: Heckman
5		Count Data <ul style="list-style-type: none"> Ordered Logit Poisson Regression
6	TBD	Classification Models <ul style="list-style-type: none"> Nearest Neighbor K-means Bayesian Prediction Models
7	TBD	More Classification Models <ul style="list-style-type: none"> Decision Trees
8 - 9	TBD	Text as Data: Text Mining and Sentimental Analysis
10-11	TBD	Parallel Computing
12	TBD	Case Study 1
13	TBD	Case Study 2
14	TBD	Final Exam
Changes in the syllabus		Syllabus is subject to change. In particular the order of topics to be presented may change.

V1. Student Responsibilities / College and University Issues	
University of Louisville student	This course will abide by University of Louisville student conduct and responsibilities with regards to ethics and related issues:

conduct and responsibilities	http://louisville.edu/dos/students/policies-procedures/student-handbook.html#codeofstudentconduct
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Marketing Analytics MSBA 655 SUMMER 2019

I. Professor / Instructor	
Instructor	Associate Professor Robert Carter
Contact information	Office: 187 College of Business Telephone: 502-852-4851 - but best way to reach me is email E-mail: robert.carter@louisville.edu
Office hours	By appointment.

II. Course Information	
Class time / Room	TBD
Recommended text <i>(there are no required texts)</i>	<u>Data-Driven Marketing: The 15 Metrics Everyone in Marketing Should Know</u> , by Mark Jeffery, John Wiley & Sons, Inc., 2010
Course Description	<p>Marketing is the business function that involves the development of strategies designed to create, build, and sustain value for the firm’s customers. As part of this process, the marketing function entails identifying customers’ needs and wants, selecting appropriate customer segments for targeting the firm’s marketing efforts, and developing marketing programs and new products that satisfy customers’ needs – all while simultaneously contributing to firm performance goals (e.g., profits).</p> <p>However, marketing theory is only the starting point. For example, you have no doubt heard about the importance of identifying your target market and customizing a product/message for this audience. But, given a spreadsheet of data, how do you actually determine the target market?</p> <p>The use and analysis of data to guide your marketing decisions is the focus of this course; and in turn, develops your ability to be an effective manager and decision maker.</p>
Learning Objectives	Upon completion of this course, students should be able to:

	<ol style="list-style-type: none"> 1. To estimate marketing metrics such as trial rate, repeat rate, market share, and share of requirements from complex marketing data sets 2. Apply the RFM framework to identify target groups 3. Be able to use data reduction techniques (i.e. factor analysis) to create perceptual maps of brands in a category 4. Use multinomial logit models to develop discrete choice models to predict brand purchasing 5. To use different statistical packages (XL, SPSS, SAS) to address complex marketing issues 6. Communicate your complex analyses and recommendations in a manner that aids the understanding of the audience (<i>integration</i>).
Prerequisites	MSBA Data Analytics I, MSBA Data Analytics II
Software Required	Students will need to have access to both SPSS and SAS for this course
Final Drop	Please contact the MSBA Office
Teaching / Pedagogy	The teaching in this class will include a variety of approaches: traditional lecture (from power point slides), class discussion, computer lab, and database case studies.

III. Evaluation		
Grading scheme	Case #1: Targeting I	100
	Case #2: Targeting II	100
	Case #3: Factor Analysis & Perceptual Map	200
	Case #4: MNL and Discrete Choice	200

	Group Presentation (Last Session)	200
	Class Participation	200
	Total Points	1000
Grading scale	Point Range	Tentative Grade
	940 points or more	A
	900 to 939	A-
	870 to 899	B+
	840 to 869	B
	800 to 839	B-
	770 to 799	C+
	740 to 769	C
	700 to 739	C-
	670 to 699	D+
	640 to 669	D
	600 to 639	D-
	599 points or less	F
Blackboard	Blackboard will be used to communicate with students. Please be sure to check blackboard on a weekly basis or more often.	

IV. Schedule		
Date	Topic	Comments
Session #1	Marketing Theory and Strategy Targeting I (XL) Case #1 Set Up	Review Key Marketing Terms, and be prepared to discuss in class
Session #2	Targeting II (XL and SPSS) Propensity Models Case #2 Set Up	Case #1: Targeting I - Demographics
Session #3	Perceptual Map Factor Analyses (SPSS) Case #3 Set Up	Case #2: Targeting II - RFM and Propensity Models
Session #4	Multinomial Logit Models and Discrete Choice (SAS) Case #4 Set Up	Case #3: Factor Analysis and Positioning
Session #5	Special Topic such as conjoint or application of time series methods to marketing problems	Case #4: Discrete Choice
Session #6	Group Presentations	NA

V. Additional Work Details	
Class Participation	<p>The goal of each class period will be to understand key concepts pertaining to a given topic. In achieving this objective, class format will be varied and will include lecture, discussion, and in-class exercises (including analyses of cases). Given the above format, students should expect to be drawn into class discussion. The level and success of these discussions will directly depend on the willingness of everyone to actively participate. I value quality over quantity in grading participation and respecting your classmates is paramount – academic misconduct of any form will not be tolerated during discussions or any other form of classroom dynamics. Grading of this component will be based on my perception of your performance in both voluntary and directed participation.</p> <p><u>General Grading Scale for Class Participation (per class):</u></p> <ul style="list-style-type: none"> 0 – Absent from class. 30 – Present but does not participate. 32 – Participates with basic information such as case facts. 34 – Offers an opinion or asks/answers a basic question. 36 – Engages in a meaningful discussion with other members of the class. 38 – Shares an analysis using data or evidence from the case or reading. 40 – Provides meaningful insight into a problem or asks a question that is instrumental in advancing the class in its understanding of the case. <p>You can miss up to ONE session for work or weather related reasons, and receive the average of the other participation scores, less 10 points. If you have questions, please see me.</p>
Group Presentation	<p>Instead of a final exam, student groups will present their data analysis and corresponding marketing recommendations.</p>

VI. Student Responsibilities / College and University Issues	
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Religious holiday conflict policy	http://louisville.edu/diversity/resources/work-restricted-holy-day-policies-calendar.html
University policy on equal access	http://louisville.edu/disability/policies-procedures
Severe weather	In case of severe weather classes may be cancelled up to a certain time of day. Please check the U of L website or call the University Information Center (852-5555). You can sign up for UofL Alerts at http://louisville.edu/alerts if you wish to receive text messages regarding cancelled or delayed classes.
Title IX/Clery Act Notification	<p>Sexual misconduct (including sexual harassment, sexual assault, and any other nonconsensual behavior of a sexual nature) and sex discrimination violate University policies. Students experiencing such behavior may obtain confidential support from the PEACC Program (852-2663), Counseling Center (852-6585), and Campus Health Services (852-6479). To report sexual misconduct or sex discrimination, contact the Dean of Students (852-5787) or University of Louisville Police (852-6111).</p> <p>Disclosure to University faculty or instructors of sexual misconduct, domestic violence, dating violence, or sex discrimination occurring on campus, in a University-sponsored program, or involving a campus visitor or University student or employee (whether current or former) is NOT confidential under Title IX. Faculty and instructors must forward such reports, including names and circumstances, to the University's Title IX officer.</p> <p>For more information, see the Sexual Misconduct Resource Guide (http://louisville.edu/hr/employeerelations/sexual-misconduct-brochure).</p>