

PREDICTIVE ANALYTICS AND DATA MINING

MKTG 630, Spring 2018

Predictive Analytics and Data Mining. Predictive analytics and data mining can be used to seek out increasingly small patterns in the data (patterns that could not have been seen just a few years ago) to better understand a company's products, channels, partners, customers (down to the behaviors of an individual customer), and more.

INSTRUCTOR: Dr. Wil Stanton

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OFFICE HOURS: Monday and Wednesdays 12:30 AM - 1:30 am and Wednesdays 5:00 - 6:30 I may also be around outside of my scheduled office hours. If you need to see me and you can't make it during my scheduled office hours, contact me and so a time can be set up for us to meet (or if you're in the neighborhood, just stop by -- if I'm in, my door is usually open).

TIME/PLACE: **To accommodate full-time, part-time, on-campus, and students at a distance, the course will be part synchronous and part asynchronous.** Monday, from 5:00 – 6:15 p.m., will be a hybrid/synchronous delivery in KH215. All students, whether face-to-face or at a distance, are expected to attend. If you are unable to attend the synchronous sessions, you should not enroll in this course as you will not be able to fully participate as required. Wednesday, from 5:00 – 6:15 p.m., will be lab time. There will be asynchronous assignments that can be done during this time in KH215 or at any other time before the assignment is due in the D2L Dropbox. On Wednesdays, while in the lab, I will provide a live synchronous connection to those at a distance who may want to participate, have questions or need assistance.

REQUIRED TEXT: None –White papers, industry papers, and course related readings will be provided throughout the semester.

COMPUTER: All students in the MBA program are required to have a computer (see http://catalog.radford.edu/preview_program.php?catoid=39&poid=4294&returnto=1481) that: (a) runs a Windows Operating System (Windows 8 or higher), (b) has Microsoft Office 2016 installed – you can download this for free as a Radford University student – see <https://www.radford.edu/content/it/home/it-support/software/general-software/office-365.html>. This is also a requirement for this course. If you have a Mac and you do not wish to set it up to run Windows, you will need to (1) use computer labs on the Radford University campus, (2) borrow a laptop that meets these requirements, or (3) purchase a laptop that meets these requirements. If you are taking this course from an off-campus location, you will also need internet access to participate in the synchronous sessions as well as utilize the software in the virtual lab environments. The course will utilize both a virtual lab and the SAS cloud. You are expected to download some software to your computer to fully and properly apply the powerful capabilities of the predictive analytics and data mining software utilized in this course.

EXPECTATIONS: Students enrolling in MKTG 630 must be able to:

- Use basic information technology tools (e.g., spreadsheets, word processors, web browsers, e-mail readers, presentation packages, etc.);
- Demonstrate an ability and a willingness to learn the course content;
- Behave in a professional manner; and
- Work effectively with other class members both on campus and at a distance.

PREREQUISITES: Graduate Standing, familiarity with basic business statistical tools, and of course, tenacity and a desire to learn.

ABOUT THE INSTRUCTOR:

I hold an MBA in Marketing Research, a Masters of Decision Sciences with an emphasis in applied statistics, and a Ph.D. in Decision Sciences with an emphasis in applied statistics focused on strategic decision making under varying conditions of competitive and economic uncertainty. I also have a minor in Marketing with related fields of Economics and Quantitative Methods. I have published two books and 48 refereed scholarly research journal articles and conference proceedings.

I am a passionate advertising, marketing analytics and decision science professional with 45 years of experience in higher education, research and consulting. My research and consulting have been focused in the areas of ad testing, consumer behavior/insights, A/B testing, competitive analysis, business intelligence, market segmentation, product/brand development; and instructional pedagogy. I have applied advanced predictive analytics and data mining techniques using SAS and SAS Enterprise Miner, SPSS and SPSS Modeler, and other tools to bring about positive and innovative solutions to business problems and the optimization of business decisions. Among the statistical tools that I regularly use for supervised and unsupervised analyses of Big Data include cluster analysis; CHAID; C&RT; neural networks; ANOVA, MANOVA, multiple regression; logistic regression; discriminant analysis; uplift and churn models; simulations; data visualization; data mapping; and ensemble models.

I have been a full-time member of the graduate faculty at Oklahoma State, Auburn, Old Dominion, and Radford universities. Courses I have taught during my career include doctoral research methods; predictive modeling; data mining; advanced marketing strategy; competitive intelligence; consumer behavior; advertising strategy, new product development; and marketing research.

I have taught courses, seminars, and served as a consultant in marketing research and data analytics to multinational corporations. Included among these are NASA, Warner Lambert International; Pepsi Cola; AT&T; AT&T International; AT&T-Paradyne; Lucent Technologies; Procter and Gamble; IBM; Coca Cola Domestic and International; Telefonos de Mexico (TELMEX); Clorox; Ortho Pharmaceutical (International); Nations Bank; Texize; Del Monte; R.J. Reynolds; and Kodak Domestic and International. I have also served as the Associate Director of Quantitative Analysis at Burke International Research Corporation and as a staff consultant to both Burke International and Sophisticated Data Research, Inc.

FOUNDATIONS FOR THIS COURSE

This course supports the mission, vision and learning outcomes sought for all MBA students in the College of Business and Economics at Radford University:

Vision and Mission of the College of Business and Economics:

Our vision is to be recognized for challenging minds, cultivating talents and connecting people in a technology-rich learning environment.

Our mission is to provide an active learning environment that develops analytical and innovative business professionals for a dynamic global economy.

Employer Expectations: This course also supports the needs and expectation of employers when hiring college graduates.¹ Specifically, this course will focus on the needs of employers in the following areas:

Intellectual and practical skills, specifically

- The ability to communicate effectively, orally and in writing
- Critical thinking and analytical reasoning skills
- The ability to analyze and solve complex problems
- Teamwork skills and the ability to collaborate with others in diverse group settings
- The ability to innovate and be creative
- The ability to locate, organize and evaluate information from multiple sources
- The ability to work with numbers and understand statistics

BACKGROUND FOR THE COURSE

Data is the unstoppable train barreling down on businesses. Companies are witnessing an exponential growth in data and find they are ill prepared to turn the data into meaningful information for management decision making. In 2009, an estimated 800,000 petabytes of data existed worldwide, but today, there is 1.2 trillion gigabytes of digital data – and the amount of data is growing exponentially. With so much raw data, organizations urgently need tools and employees who know how to use them to effectively and efficiently extract actionable information to help optimize business decisions.

But, Big Data alone nets a company nothing. It is how the data are mined, models built, and predictions made that separate the truly successful world-class companies from the wannabes.

Analytics to the rescue!! Analytics is both an art and a science to discover and understand historical patterns in a company's data to predict and improve business performance under forecasted environmental, economic, and competitive conditions.

Companies want employees that understand the business domain in which decisions are to be made and depth and breadth of understanding of the analytical tools necessary for decision optimization. But, the reality is: the demand for individuals grounded in Analytics, particularly in Data Mining and Predictive Analytics, far exceeds the supply of graduates.

The U.S. Bureau of Labor Statistics predicts that there will be a 24 percent increase in demand for professionals with management analysis skills over the next eight years, and McKinsey Global Institute Predicts there will be a shortage of talent necessary for organizations to take advantage of Big Data. By 2018, the United States alone could face a shortage of 140,000 to 190,000 people with deep analytical skills as well as 1.5 million managers and analysts with the know-how to use the analysis of big data to make effective decisions. On August 27, 2017 (at 12:15 p.m.) there were a total of 162,545 jobs advertised on LinkedIn and, of those, more than 91,374 were for entry-level (people with a baccalaureate degree and limited experience) or associate level (graduate degree or 3-5 years of experience) as is shown in the table below:

¹ "Employers' Views On College Learning In The Wake Of The Economic Downturn: A Survey Among Employers," Conducted On Behalf Of The Association Of American Colleges And Universities, Hart Research Associates, January 2011.

Analytics U.S. Position Ads on LinkedIn*

Area of Analytics	Entry or Associate**	All Levels
All Analytics Position Ads	91,374	162,545
Financial Analytics	32,862	65,837
Digital/Web Analytics	24,336	48,429
Data Analytics	18,866	33,950
Media Analytics	14,370	27,259
Healthcare Analytics	15,117	25,384
HR/Talent Analytics	11,182	24,208
Marketing Analytics	12,109	20,498
Supply Chain Analytics	8,384	17,461
Social Media Analytics	8,904	15,978
Pricing Analytics	4,577	9,753
Credit Analytics	4,684	8,754
Business Analytics	3,083	6,285
Fraud Analytics	2,346	3,755

*Data Captured at 12:15 p.m. on Aug 27, 2017

**Associate Level generally requires 3-5 years of experience
or an MBA or other Advanced Degree

Note: All of the items in yellow are marketing-related areas

NEED FOR THE COURSE

The growing global utilization of Big Data to assist in strategically positioning corporations for competitive advantage results in an expectation that a new employee holding an MBA be able to apply predictive analytics and data mining tools and techniques to solve strategic business problems. At no time has there been a greater need for quantitatively skilled and analytically minded managerial expertise. This need is being evidenced in a transformation of MBA programs across the country and around the globe. Universities are beginning to offer graduate courses or entire MBA programs focused on preparing graduates fully grounded in business principles, but who also possess the analytical skills to develop better decision models and create more accurate predictions from the stores of Big Data. Companies are collecting more data than ever before. In the past, they were kept in different systems that were unable to talk to each other, such as finance, human resources or customer management. Now the systems are being linked, and companies are using Data Mining techniques to get a complete picture of their operations—"a single version of the truth," as the industry likes to call it. Data Mining and Predictive Analytics is the process of finding patterns in data that can be used to help optimize business decisions and is becoming the bedrock of a new generation of companies and the individuals who lead them. Data Mining and Predictive Analytics has come to be essential to preparing new MBA students to assume leadership roles in an emerging data-driven decision-making environments.

The table below displays employer demand from the Corporate Recruiters Survey² which is a product of the Graduate Management Admission Council® (GMAC®), and the owner of the Graduate Management Admission Test® (GMAT®), for recent graduate business hires by job function and job level placement within each function. In 2017, 71 percent of employers indicated they will fill marketing and sales positions with a recent MBA or other specialized business master's graduate. Data analytics was second place in the list of job functions employers most seek to fill in 2017, with 69 percent of employers planning to hire recent graduates to occupy these roles (up from 51% in 2015).

² **Corporate Recruiters Survey 2017 – Survey Report**, Graduate Management Admission Council (GMAC), (2015)
<http://www.gmac.com/market-intelligence-and-research/research-library/employment-outlook/2017-corporate-recruiters-survey-report.aspx>

2017 Employer Demand for Graduate Business Hires*

Job Function	Companies Worldwide	Fortune Global 100	Fortune Global 500	Publicly Traded	Start-Up	Family-Owned
Marketing	71%	94%	84%	81%	72%	79%
Finance	71%	94%	86%	84%	66%	80%
Business Development	71%	91%	84%	78%	80%	73%
Data Analytics	69%	92%	81%	75%	71%	71%
Consulting	66%	73%	73%	62%	64%	63%
Operations/Logistics	65%	93%	80%	76%	66%	78%
Accounting	65%	86%	70%	66%	63%	69%
IT/Systems	65%	85%	74%	71%	64%	74%
General Management	64%	88%	82%	73%	61%	76%
Human Resources	61%	90%	79%	73%	48%	75%
Investment Banking	50%	65%	57%	56%	57%	61%

* Percentages in columns do not sum to 100 due to multiple selections

According to the GMAC report, “The demand for new hires skilled in data analytics has grown notably in recent years. The burgeoning interest in a field that has come to be known as ‘big data’ is gaining a strong foothold in companies worldwide as well as in higher education. Data analytics was consistently in high demand in the United States (where it was tied for first with Marketing and Finance) as well as in other regions (see table below).

Function Demand by Region*

Job Function	Companies Worldwide	United States	Asia-Pacific	Europe	Latin-America
Marketing	71%	68%	84%	72%	74%
Finance	71%	68%	74%	82%	75%
Business Development	71%	67%	88%	71%	77%
Data Analytics	69%	68%	79%	68%	68%
Consulting	66%	66%	80%	59%	66%
Operations/Logistics	65%	60%	83%	65%	77%
Accounting	65%	60%	84%	67%	69%
IT/Systems	65%	61%	81%	68%	70%
General Management	64%	65%	77%	51%	58%
Human Resources	61%	53%	88%	61%	73%
Investment Banking	50%	46%	76%	51%	52%

* Percentages in columns do not sum to 100 due to multiple selections

Historically, companies have hired graduates trained in statistical or quantitative methods who use tools such as Excel, SQL, SAS or SPSS to manipulate data and create decision models from databases. The problem is that such hires often lack an understanding of fundamental business decisions and the key drivers of consumer purchase behavior. Companies today seek a new breed of graduates -- MBA graduates fully grounded in business principles, but who also possess the analytical skills to develop better decision models and create more accurate predictions of customers’ response to business decisions. Analytics drives organizational insights. Insights lead to greater understanding of customers and markets; that understanding yields innovative products and services, better customer targeting, improved pricing, and superior growth in both revenue and profits. That’s why today’s companies are viewing Analytics and employees who can create and use them as essential for creating Value.



GOALS AND OBJECTIVES OF THIS COURSE

In completing this course, students will be able to:

- recommend the appropriate Predictive Analytics and Data Mining techniques for a variety of business decision problems;
- apply the processes of Predictive Analytics and Data Mining for formulating business objectives, data selection, preparation, and partition to successfully design, build, evaluate and implement analytic models for a variety of practical business applications;
- analyze large datasets typical in today's corporate setting using SAS, SAS Enterprise Guide, and SAS Enterprise Miner advanced Data Mining software;
- apply predictive models such as classification and decision trees, neural networks, regressions, association analysis, and link analysis, to typical corporate Big Data;
- interpret analyses produced by advanced analytical procedures and explain the results to better inform management decision-making;
- apply Knowledge Discovery processes across all stages of data mining including domain understanding, data collection and selection, data cleaning and transformation, dimensionality reduction, pattern discovery, evaluation, and knowledge extraction;
- apply data mining techniques to segmentation, classification, predictive modeling, association analysis, and sequential pattern discovery;
- gain hands-on experience with industry standard predictive analytic and data mining software including SAS, SAS Enterprise Guide, and SAS Enterprise Miner;
- determine which predictive analytics and data mining tool to use as well as understand the similarities and differences, which options affect the models most and how to verify and validate models;
- acquire skills in text analytics, text mining and sentiment analytics by understanding the "sentiment" conveyed in the vast and ever-increasing amount of unstructured, user-generated text from sources such as online reviews, tweets, forums, blogs, and internal customer data;
- develop and apply ensemble methods to leverage the power of multiple, complementary models to deliver additional business insight to ensure long-term competitiveness;
- explore the applications of predictive analytics and data mining through a "hands-on" process where you will develop understanding mainly through conducting application projects and presenting results in such areas as: advertising/media; banking; customer acquisition and CRM; education; finance; fraud detection; healthcare; law enforcement; personnel/HR; political/politics; real estate; retail; sports; and web/Internet shopping.

ANALYTICAL TECHNIQUES COVERED

This semester we will explore various analytical techniques applied to predictive analytics and data mining. We will cover a few preliminaries before moving aggressively into Data Mining and Predictive Modeling (PM) including Exploratory Data Analysis (EDA). A Decision Scientist must be fully grounded in the tools, techniques, assumptions, identification of violations of assumptions, consequences of violating assumption, etc. BEFORE beginning any Data Mining or Predictive Modeling effort - particularly if the effort is focused on Big Data Applications. So, we will begin with a review of some basic statistical tools and then move into more advanced and more complex algorithmic processes. Predictive Analytics and Data Mining are not as simple as introductory statistics courses may have led you to believe, i.e., EDA and PM cannot be accomplished using only t-test, correlation, and regression analyses - and normality rarely exists.

The techniques listed here are the ones planned for the semester, but the actual ones covered will depend on time, your abilities, and your desire to explore techniques specifically focused on your career goals.

However, Data Mining and Predictive Analytics are only part of the solution. Analytic insights gained must be put to work and used properly to aid in optimizing business decisions. This course covers Predictive Analytics and Data Mining methods for both private and public sectors enterprises, but, as this is an MBA course, the analytic procedures covered will be used as a means to an end; with the end being better and more efficient decision-making. The procedure covered during the 14 weeks of spring semester will include (to the extent possible):

- Scales of Measurement and Choosing the Correct Analytical Technique
- Distributional Assumptions and Descriptive Statistics
- Cross-Tabulation
- Difference in Means and Proportions, T-test, Chi-square, F-test, and other test of significance
- Analysis of Variance
- Correlation and Regression
- Logistic Regression
- Cumulative Gains and Lift Charts and Other Visual Aids For Measuring Model Performance
- Factor Analysis and Principal Components Analysis
- Cluster Analysis
- Classification and Regression Trees, e.g., CHAID

Training and Validation datasets range between 25,000 and 100,000 records. A final comprehensive case is integral to this course.

TEACHING PHILOSOPHY FOR THIS COURSE

This is an MBA course designed to assist you in effectively contributing to your organization as a business professional. Of course, as a student in Radford University's College of Business and Economics' MBA program, you must be a responsible student. Therefore, I will expect you to attend the synchronous class having completed all required assignments and fully prepared to actively engage in your education.

Everything we do in this class is designed to help you become and think like an MBA qualified business professional – and to feel comfortable working in, and contributing to, data-driven decision making. In organizations today, there are many roles associated with using data to optimize decisions. One of these roles is referred to as a Data Scientist. Typically, these are individuals who have backgrounds in computer science, statistics, and mathematics. They most often reside in a central data nucleus to ensure that common standards, methods, and tools are used for the collection and management of data. Data Scientists are fully grounded in CS, statistics, and mathematics, and have a primary focus on the data, but they often lack the business acumen to apply analytics in a way to optimize business decisions.

"It's not like we could solve the problem if we had more computer scientists in data analytics. The fact of the matter is we need marketing people who know big data analytics. We need marketing people who know big data analytics. We need health care people who know big data analytics."³

Today, organizations need business professionals not only fully grounded in one or more business disciplines but also have knowledge and appreciation for how data analytics contributes positively to decision making. Today's managers may not do the analytics, but they need to know how to bring the right team together to face complex problems; capable of translating analytics findings into common business terminology; creative storytellers; and skilled in creating actionable tactics and strategies based upon analytics.

³ As Demand for Big Data Analysts Grows, Schools Rush to Graduate Students with Necessary Skills, Steven Overly, The Washington Post, (September 15, 2013).
http://www.washingtonpost.com/business/capitalbusiness/as-demand-for-big-data-analysts-grows-schools-rush-to-graduate-students-with-necessary-skills/2013/09/13/afbabf3e-1a66-11e3-82ef-a059e54c49d0_story.html

The current mission of the College of Business and Economics is to provide an active learning environment that develops analytical and innovative business professionals for a dynamic global economy. In support of the mission, Goal 2 of the current strategic plan states:

To enhance the analytical strength of RU graduates, the COBE will drive programs that are mobile, cloud-based, collaborative, agile and integrated. We will increase student access to certifications in key areas and provide active experiences for analyzing data in our disciplines

Instead of, or in addition to, a centralized Data Scientist function, more businesses are relying on Decision Sciences and Decision Analytics to make key strategic decisions across all facets of business.

Decision Sciences

The Decision Sciences Institute and its *Decision Sciences Journal* and the *Decision Sciences Journal of Innovative Education* are now embracing Analytics as a full partner in the critical areas of business decision making. They state, "We are particularly interested in Analytics as an emerging synthesis of sophisticated methodology and large data systems used to guide managerial decision making in an increasingly complex business environment."⁴ Thus, Decision Sciences, a standalone academic discipline since the late 60s, has taken on a broader philosophical meaning, "the application of advanced statistical, analytical, mathematical, technological, and behavioral approaches to all areas and disciplines of business." It is important to understand that these areas, e.g., statistics, mathematics, analytics, are a **means-to-an-end** and not an end in themselves. The end is optimal data-driven and data-informed decisions.

Decision Sciences are collaborative and rely on more than a single branch of knowledge including disciplines within business, statistics, technology, and behavioral sciences to enable better decisions. Decision Sciences contribute to addressing business problems occurring in an uncertain economic and competitive environment; problems that are ill-defined and shifting and where the factors affecting the problem are not completely understood.

Decision Sciences focus on an interdisciplinary investigation of managerial decision making in the recognition that important decisions take place in a range of critical business areas, including Accounting, Economics, Finance, Information Systems, International Business, Logistics, Management, Marketing, Operations, Production and the Supply Chain⁵.

In this course, I will focus on Decision Sciences rather than Data Science, as this is a course to prepare business professionals to understand the importance of analytics to business decision making. I will also focus the interpretation of the analytics within the context of business disciplines, with primary emphasis in this class, on marketing, as that is the discipline in which I am grounded.

I will not ask you to simply memorize information and then recite it back. Instead, I will expect you to internalize the principles, concepts, and theories of Analytics and then use those actively in every synchronous class and every class assignment. Because not all students learn in the same ways, I will utilize a variety of teaching methods including synchronous lectures, case studies, readings, assignments, and exams. I will emphasize critical thinking and analytical reasoning in all materials covered; and will expect a professional level of oral and written communication from you. As this is an MBA class, I will use Socratic questioning to foster learning; and more importantly to help you learn about the exponentially growing Analytics world and its impact on global industries. Thinking is driven not by answers but by asking questions, so I will focus on tools to help you reason through Predictive Analytics and Data Mining issues and problems demonstrating that the subject matter of this course is highly interrelated with that of other business subjects.

⁴ Source: *ibid*.

⁵ Source: Decision Sciences Journal [http://onlinelibrary.wiley.com/journal/10.1111/\(ISSN\)1540-5915/homepage/ProductInformation.html](http://onlinelibrary.wiley.com/journal/10.1111/(ISSN)1540-5915/homepage/ProductInformation.html)

COURSE SOFTWARE

In this course, you will be using Excel, Base SAS via SAS Studio, SAS Enterprise Guide, and SAS Enterprise Miner. The SAS software will all be available on the SAS cloud or in the lab in KH 215 if you are on or near campus.

ASSIGNMENTS

To reinforce key course concepts, each student will be involved in content-related assignments and exercises. As you can see from the percentage of the course grade, these assignments are critically important to your grade in the course.

Please note that while I have no problem with students discussing homework assignments and helping each other with problems (as this is part of the learning process as well), the work turned in must be your work. Simply copying another student's work or re-running their code is unacceptable and in violation of the RU Honor Code. If I suspect that there is an honor code violation, I will assign a grade of zero (0) for that assignment. Any subsequent violations will be handled in accordance with the university honor code system.

Generally, I will expect a copy of your synchronous work to be submitted to the D2L dropbox at the conclusion of each Monday class. You can expect to have a homework or asynchronous assignment required to be submitted at the beginning of each class on Mondays.

All assignments are due at the date and time specified - **no late assignments will be accepted for credit**. While I encourage you to do any missed assignments for your own learning (and because some assignments build upon earlier assignments), you cannot make-up missed assignments for credit. Because of the nature of the course, there will be no additional or extra credit assignments to increase your grade.

READINGS, VIDEOS, POWERPOINT PRESENTATIONS, AND TUTORIALS: As stated above, there is no required textbook for this course. However, that does not mean that there will be no readings or other similar work assigned. The fields of Predictive Analytics and Data Mining are evolving so quickly, most text are out of date before they appear in print. Therefore, contemporary articles from industry leaders, industry white papers, SAS support materials, journal articles, PowerPoint presentations, videos, and YouTube tutorials will be assigned to build the foundation knowledge necessary for this course.

EXAMINATIONS

There will be two exams during the semester: a mid-term and a final. Both exams will be take-home that will consist of a written portion and an applications portion. Since the exams are take-home, you will be able to use your notes, readings, etc. Please note, however, that take-home exams meet the same honor code requirements as in-class exams and you may not collaborate with others on the exam. You will be given a minimum of 7 days to complete each exam.

END OF SEMESTER PRESENTATION

In addition to the final exam, I will give you a dataset to analyze based on a set of management needs. Each of you will be required to prepare an executive PowerPoint presentation including graphics, findings, and executive recommendations. As your audience will be executives, managerial language and implications will be required. While research, multivariate statistical analyses, and the application of very state-of-the-art industry software will lay the foundation, management only wants actionable findings and recommendations. Because the students in the course are geographically dispersed, you will need to record a voice over as a part of your PowerPoint since these presentations will not take place during class. I will post each student's presentation and executive summary to D2L so you will be able to learn from each other – and evaluate each other. After all, competition is an integral and essential part of business.

STUDENT ENGAGEMENT, PARTICIPATION, AND PROFESSIONALISM

Your final class engagement grade for the semester will be based on a review of your synchronous class participation and overall professionalism for the semester. In order to reinforce key course concepts, you will be also be expected to complete and submit content-related assignments and exercises.

COURSE EVALUATION, GRADING & IMPORTANT DATES: You will be evaluated on your knowledge of Predictive Analytics and Data Mining concepts as well as your ability to apply that knowledge effectively to typical business issues, situations, problems and opportunities. Your performance will be evaluated by several means including: examinations; in- and out-of- class assignments; Final Individual Executive Summary and Presentation; and your engagement, participation and professionalism during the semester. Specifically, the weights assigned to each of these performance measures (as well as the associated dates) are:

- Submitted Assignments (25%)
- Student Engagement, Participation, and Professionalism (5%)
- Mid-Term Exam (25%)
- Final Individual Executive Presentation (20%)
- Final Exam (25%)

Your final grade will be strictly determined as follows:

93 – 100	A
90 – 92.99	A-
87 – 89.99	B+
83 – 86.99	B
80 – 82.99	B-
70 – 79.00	C
Below 70	F

SEMESTER SCHEDULE

NOTE: topics, readings and dates are approximate and may change. If unexpected circumstance result in the need to make adjustments to the syllabus at any time during the semester, I will inform you. It is your responsibility to keep track of scheduled assignments and examinations, any changes in these dates, material covered in the class, and all other announcements. I will post any changes to the course D2L site.

Course Schedule

Week Beginning	Topic	Comments
Monday 15 January	Introductory Material, Scales of Measurement	Martin Luther King Day – No Classes – Pre first day assignment available on D2L – To be completed prior to Monday 22 January Register for the course SAS OnDemand Account and download/install SAS Enterprise Guide to your computer as you will need this for the first synchronous class – instructions to be posted. Asynchronous Assignment will be posted to D2L and is due in D2L dropbox by 5:00 p.m. on 22 January
Monday 22 January	Distributional Assumptions and Descriptive Statistics using SAS and Choosing the Correct Analytical Techniques	Weekly Assignment(s) due by 5:00 p.m.
Monday 29 January	Cross Tabulations, Differences in Means and Proportions, T-test, F-test, Chi-Square, and others Using SAS	Weekly Assignment(s) due by 5:00 p.m.
Monday 5 February	Analysis of Variance	Weekly Assignment(s) due by 5:00 p.m.
Monday 12 February	Correlation and Regression	Weekly Assignment(s) due by 5:00 p.m.
Monday 19 February	Factor Analysis and Principal Components	Weekly Assignment(s) due by 5:00 p.m.
Monday 26 February	Cluster Analysis	Weekly Assignment(s) due by 5:00 p.m.
Monday 5 March	No Class	Spring Break
Monday 12 March	Logistic Regression	Take Home Mid-Term due by 5:00 p.m.
Monday 19 March	Cumulative Gains and Lift Charts and Other Visual Aids For Measuring Model Performance	Weekly Assignment(s) due by 5:00 p.m.
Monday 26 March	Introduction to SAS Enterprise Miner (EM) Accessing Prepared Data	Weekly Assignment(s) due by 5:00 p.m. p.m.
Monday 2 April	Introduction to Predictive Modeling: Predictive Modeling Fundamentals and Decision Trees using EM	Weekly Assignment(s) due by 5:00 p.m.
Monday 9 April	Introduction to Predictive Modeling: Regressions using EM	Weekly Assignment(s) due by 5:00 p.m.
Monday 16 April	Introduction to Pattern Discovery– cluster analysis and market basket analysis using EM	Weekly Assignment(s) due by 5:00 p.m.
Monday 23 April	Comparing EM models – model fit statistics, profit matrices, and ensemble models Take Home Final Exam Discussed and Posted to D2L	Executive Powerpoint Presentation due by 5:00 p.m.
Monday 30 April	Final Exam Day	Take Home Final-Term due by 5:00 p.m.

See University Academic Calendar for other important dates for AY 2017-18

<https://www.radford.edu/content/registrar/home/registration-information/academic-calendar.html>