



Course Title: Applied Analytics in a World of Big Data
Program: Business Intelligence and Analytics (BI&A)
Course #: BIA 686
Instructor: Dr. Chris Asakiewicz

Catalog Description:

Business intelligence and analytics is key to enabling successful competition in today's world of "big data". This course focuses on helping students to not only understand how best to leverage business intelligence and analytics to become more effective decision makers, making smarter decisions and generating better results for their organizations. Students have an opportunity to apply the concepts, principles, and methods associated with four areas of analytics (text, descriptive, predictive, and prescriptive) to real problems in an application domain associated with their area of interest.

Course Objectives:

The course is designed to facilitate students' understanding of how to leverage BI&A in their organization. The course examines four critical areas of analytics, namely: text analytics, descriptive analytics, predictive analytics, and prescriptive analytics. Students learn how these types of analytics are used to address critical business issues, as well as how they can enable/drive organizations to conduct business in radically different and more effective/efficient ways. It covers the current and emerging issues of BI&A strategy and management, as well as the tactical, operational, and strategic responsibilities and roles of business executives in leveraging their BI&A resources.

- Text analytics seeks to turn unstructured data into information for analysis.
- Descriptive analytics aims to provide insight into what has happened
- Predictive analytics helps model and forecast what might happen.
- Prescriptive analytics seeks to determine the best solution or outcome among various choices, given the known parameters, as well as, suggest decision options for how to take advantage of a future opportunity or mitigate a future risk, and illustrate the implications of each decision option.



Additional learning objectives include:

An understanding of and a ability to apply a broad range of analytic techniques including optimization, conceptual data modeling, data warehousing and mining. This objective is assessed through a comprehensive exam comprising short questions supplied by instructors of all the courses that have been taken to date by each student. A passing grade must be obtained.

List of Course Outcomes:

After taking this course, the student will be able to:

- Analyze the impact of BI&A on the organization
- Understand how best to apply BI&A methods and techniques in addressing strategic business problems
- Understand the role of BI&A in helping organizations make better decisions
- Conduct an in-depth analysis of a strategic business problem
- Communicate the results of an in-depth analysis to both a technical and management audience

Prerequisites: Students should complete at least 5 courses in the BI&A curriculum before taking this course.

Grading Percentages: Class work **55%** Quiz **5%** Final Project **40%**

Students have an opportunity to apply the concepts, principles, and methods they have learned to making data-driven decisions using business intelligence and analytics. The course grade is based on the following assignments, mid-term, and final project deliverables.

Deliverable	Percent of Grade
BI&A Review Quiz	5
Case 1 Review	10
Case 2 Review	15
Project Proposal	5
Case 3 Review	10
Case 4 Review	15
Final Project	40
TOTAL	100



Assignments and Final Project:

At the beginning of the course, students will be tested on their knowledge of business intelligence and analytical concepts covered in previously taken courses in the curriculum. In addition to refreshing a student’s knowledge of key BI&A concepts from previous courses, the test fulfills the BI&A program’s AACSB Assurance of Learning Goal #3.

Students have an opportunity to work on four case study assignments associated with leveraging business intelligence and analytics. The case studies emphasize “best or leading” practice in better decision making in a specific business/industry domain. Case descriptions highlight a strategic application of analytics, namely: text analytics, descriptive analytics (business intelligence), predictive analytics (modeling), and prescriptive analytics (optimization, simulation, decision management). Each strategic application is framed within the context of a specific business problem associated with “big data” and its use in a particular area of the enterprise (e.g., Finance, Manufacturing, R&D, etc.).

Case Number	Enterprise Area	Problem Area
Case 1	Research	Text Analytics and Productivity Enhancement
Case 2	Development	Descriptive Analytics and Portfolio Management
Case 3	Sales and Marketing	Predictive Analytics and Strategy Effectiveness
Case 4	Operations	Prescriptive Analytics and Operations Management

The final project provides students with an opportunity to leverage the concepts, principals, and methods they have learned in solving a business problem associated with: Finance, Manufacturing, R&D, Human Resources, Customers, or Suppliers. Students must provide a brief abstract outlining their project area, and associated analysis plan and methodology. Students will present a poster outlining their project’s objectives, methodology, and results at the end of the course.

Textbook(s) or References

Primary References:

Robert Nisbet, et. al. (2009) Handbook of Statistical Analysis & Data Mining Applications. Elsevier/Academic Press. San Diego, California. ISBN: 978-0-12-374765-5.



Bart Baesens (2014) *Analytics in a Big Data World: The Essential Guide to Data Science and its Applications*, John Wiley & Sons, New York, New York. ISBN: 978-1-118-39270-1.

Supplemental Resources:

Thomas Davenport, et.al. (2010) *Analytics at Work*. Harvard Business School Press. Boston, Massachusetts. ISBN: 978-1-4221-7769-3.

Thomas Davenport, et. al. (2007) *Competing on Analytics: The New Science of Winning*. Harvard Business School Press. Boston, Massachusetts. ISBN: 978-1-4421-0332-6.

Steve LaValle, et. al. (2011) *Big Data, Analytics and the Path From Insights to Value*. MIT Sloan Management Review. Winter 2011, Vol. 52, No. 2.

David Boller (2010) *The Promise and Peril of Big Data*. The Aspen Institute, Washington, DC
Available at: http://www.thinkbiganalytics.com/uploads/Aspen-Big_Data.pdf

Syllabus:

Week	Topic	Material Covered	Readings	Assignments
1	Course Introduction and Overview	Overview of the strategic impact of business intelligence and analytics across key industries.	Big Data, Analytics and the Path From Insights to Value. MIT Sloan Management Review. Chapter 1, Analytics at Work. Chapter 1, "Big Data and Analytics", Analytics in a Big Data World.	
2	BI&A Framework	Discussion of key factors necessary in effectively leveraging BI&A, namely: <ul style="list-style-type: none"> • High Quality Data • Enterprise Orientation • Analytical Leadership • Strategic Targets • Analytical Talent 	Chapters 2-6, Analytics at Work. Chapters 7-8, "Data Mining Algorithms", Statistical Analysis and Data Mining. Chapter 2, "Data Collection, Sampling, and Pre-Processing", Analytics in a Big Data World.	
3	Text Analytics	Overview of text analytics and its use in the discovery	Chapter 9, "Text Mining", Statistical Analysis and Data	Case Study 1 – Applied Analytics in Research and



		<p>of facts, business rules, and relationships in unstructured data.</p> <p>Discussion of:</p> <ul style="list-style-type: none"> • Lexical Analysis • Pattern Recognition • Information Extraction • Natural Language Processing (NLP) • Machine Learning 	<p>Mining.</p>	<p>Development</p>
4	Descriptive Analytics	<p>Overview of descriptive analytics and its use in improving operations management.</p> <p>Discussion of:</p> <ul style="list-style-type: none"> • Data Modeling • Trend Analysis • Regression Analysis 	<p>Chapter 11, “Classification”, Statistical Analysis and Data Mining.</p> <p>Chapter 4, “Descriptive Analytics”, Analytics in a Big Data World.</p>	
5	Predictive Analytics	<p>Discussion of the use of predictive analytics to examine time series, evaluating past data and trends to predict future demands (level, trend, seasonality).</p>	<p>Chapters 12-13, “Prediction and Modeling”, Statistical Analysis and Data Mining.</p> <p>Chapter 3, “Predictive Analytics”, Analytics in a Big Data World.</p>	<p>Case Study 2 – Applied Analytics in Portfolio Management</p>
6	Prescriptive Analytics	<p>Discussion of prescriptive analytics to prescribe the best course of action for the future – optimization and simulation.</p>		
7	Quiz			<p>Project Proposal</p>
8	Analytics with Internal and External Processes	<p>Discussion of the key applications and analytical methods used in</p> <ul style="list-style-type: none"> • Finance • Manufacturing • R&D • Human Resources • Customers • Suppliers 	<p>Chapters 4-5, Competing on Analytics.</p> <p>Chapter 16, “Response Modeling”, Statistical Analysis and Data Mining.</p> <p>Chapter 8, “Example Applications”, Analytics in a Big Data World.</p>	



9	Managing Analytical Resources	Discussion of BI&A talent management.	Chapter 7, Competing on Analytics. Chapters 18-22, "Model Complexity and Use", Statistical Analysis and Data Mining.	Case Study 3 – Applied Analytics in Customer Intelligence
10	Ethics and "Big Data"	Discussion of the social and business implications of "Big Data"	Bollier (2010) "The Promise and Peril of Big Data" Aspen Institute Report.	
11	The Future of Analytical Competition	Discussion of the impact of technology, maturity, and strategy on future business performance.	Chapter 9, Competing on Analytics. Chapter 7, "Analytics: Putting it All to Work", Analytics in a Big Data World.	Case Study 4 - Applied Analytics in Operations Management
12	Final Project Analysis Plan	Present final project analysis plan for technical review.		
13	Final Project Results and Conclusions	Present analysis results and conclusions for technical review.		
14	Final Project Poster Session	Present final project poster for management review.		