School: Howe School of Technology Management
Course Title: Applied Analytics in a World of Big Data
Program(s): Business Intelligence and Analytics (BI&A)
Proposed Course #: BIA 686

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.

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 40% Mid-term 20% 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.

<table>
<thead>
<tr>
<th>Deliverable</th>
<th>Percent of Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>BI&amp;A Review Test</td>
<td>5</td>
</tr>
<tr>
<td>Case 1 Review</td>
<td>10</td>
</tr>
<tr>
<td>Case 2 Review</td>
<td>10</td>
</tr>
<tr>
<td>Mid-term Exam</td>
<td>15</td>
</tr>
<tr>
<td>Case 3 Review</td>
<td>10</td>
</tr>
<tr>
<td>Case 4 Review</td>
<td>10</td>
</tr>
<tr>
<td>Final Project</td>
<td>40</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

**Assignments and Final Project:**

At the beginning of the course, students will be tested on their knowledge of BI&A 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.).

<table>
<thead>
<tr>
<th>Case Number</th>
<th>Enterprise Area</th>
<th>Problem Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case 1</td>
<td>R&amp;D</td>
<td>Text Analytics and Productivity Enhancement</td>
</tr>
<tr>
<td>Case 2</td>
<td>Finance</td>
<td>Descriptive Analytics and Portfolio Management</td>
</tr>
<tr>
<td>Case 3</td>
<td>Sales and Marketing</td>
<td>Predictive Analytics and Strategy Effectiveness</td>
</tr>
<tr>
<td>Case 4</td>
<td>Manufacturing</td>
<td>Prescriptive Analytics and Operations Management</td>
</tr>
</tbody>
</table>

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.

International students may use this 3-credit course as the basis for an application for curriculum practical training (CPT).

Criteria to be used in deciding whether to approve or deny the student's request for CPT enrollment are as follows:

1. Has the student located a "real job" with a successful business that is in Business Analytics, and will he/she be adequately supervised by a qualified individual?
2. Does the job use and/or develop the student's technical skills to an extent similar to the use/development that would occur in a 3-credit on-campus course?
3. Is the necessary time commitment realistic so that the student can perform adequately on the job and also in any classes that he/she may be taking at the same time?
4. Is the job experience likely to broaden the student's horizons, either by helping him/her to continue his/her business analytics education in a more informed manner, or by increasing the student's technical ability and understanding of the needs of US employers, or both?

Answers to these questions must be sufficiently positive to warrant approval of the CPT. The name, title, and contact information of the supervising individual, and a description of the job, must be provided on the application form.
Credits: X 3 credits

For Graduate Credit toward Degree or Certificate
X Yes

Textbook(s) or References

Primary References:


Mode of Delivery X Class ☐Online ☐Modules ☐Other

Program/Department Ownership: BI&A

When first offered: Spring 2013

Department Point of Contact and Title: Chris Asakiewicz, Professor

Date approved by individual school and/or department curriculum committee: October 10, 2012

Sample Syllabus:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Material Covered</th>
<th>Readings</th>
<th>Assignments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Course Introduction and Overview</td>
<td>Overview of the strategic impact of business intelligence and analytics across key industries.</td>
<td>Big Data, Analytics and the Path From Insights to Value, MIT Sloan Management Review.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Chapter 1, Analytics at Work.</td>
<td></td>
</tr>
</tbody>
</table>


<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
</table>
| 2 | BI&A Framework | Discussion of key factors necessary in effectively leveraging BI&A, namely:  
• High Quality Data  
• Enterprise Orientation  
• Analytical Leadership  
• Strategic Targets  
• Analytical Talent | Chapters 2-6, Analytics at Work. |
| 3 | Text Analytics | Overview of text analytics and its use in the discovery of facts, business rules, and relationships in unstructured data.  
Discussion of:  
• Lexical Analysis  
• Pattern Recognition  
• Information Extraction  
• Natural Language Processing (NLP)  
• Machine Learning | Case Study 1 – Applied Analytics in Research and Development |
| 4 | Descriptive Analytics | Overview of descriptive analytics and its use in improving operations management.  
Discussion of:  
• Data Modeling  
• Trend Analysis  
• Regression Analysis | |
| 5 | Predictive Analytics | Discussion of the use of predictive analytics to examine time series, evaluating past data and trends to predict future demands (level, trend, seasonality). | Case Study 2 – Applied Analytics in Portfolio Management |
| 6 | Prescriptive Analytics | Discussion of prescriptive analytics to prescribe the best course of action for the future – optimization and simulation. | |
| 7 | Mid-term | | |
| 8 | Analytics with | Discussion of the key | Chapters 4-5, Competing on |
|   | **Internal and External Processes** | **Applications and analytical methods used in**  
|   |   | • Finance  
|   |   | • Manufacturing  
|   |   | • R&D  
|   |   | • Human Resources  
|   |   | • Customers  
|   |   | • Suppliers  
|   |   | Analytics.  
| 9 | **Managing Analytical Resources** | Discussion of BI&A talent management.  
| 9 |   | Chapter 7, Competing on Analytics.  
| 9 |   | Case Study 3 – Applied Analytics in Customer Intelligence  
| 10 | **Ethics and “Big Data”** | Discussion of the social and business implications of “Big Data”  
| 11 | **The Future of Analytical Competition** | Discussion of the impact of technology, maturity, and strategy on future business performance.  
| 11 |   | Chapter 9, Competing on Analytics.  
| 11 |   | Case Study - Applied Analytics in Supply Chain Optimization  
| 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.  