MGMT-553 Big Data Management
Spring 2016 Course Syllabus
Moravian College (3/14/16 – 5/7/16)
Campus: Bethlehem, PA

Instructor	Amit Kar	Course Code	MGMT-553 HA
Office	Benigna Hall 211	Office Hours	By appointment
Class Room, Time	PPHAC 117 Saturdays 9:00 am -12:00 noon	Course Name	Supply Chain Management Technology
Phone	610-861-1400	Fax	610-861-1466
Email	Meank01@moravian.edu, mamrin2001@yahoo.com	Credits	3
Blackboard	http://blackboard.moravian.edu		

Course Description:

This course covers fundamental issues in large-scale data management. The course examines issues related to data organization, representation, access, storage, and processing. Discussion includes open source and commercial solutions, with special attention being paid to large distributed database systems and data warehousing. The course introduces technologies and modeling methods for large-scale, distributed analytics.

General Description:

The course explores how data is increasingly the single biggest determinant of staying relevant and competitive in businesses. Data is seen as the continuum from not available, accessible or adequate to a deluge requiring storage and management techniques that pose their own challenges. Classical database management systems as well as business intelligence (BI) methods are studied vis-à-vis the phenomena of Big Data. Traditional, proven technologies for modeling, querying, updating, storing, etc. are challenged in the face of increasing data – and why organizations may ignore that to their detriment. New approaches are discussed. Changing business paradigms – from manufacturing to retail and ecommerce in various industries – in the context of Big Data challenges and opportunities are studied.

Student Learning Objectives (SLOs):

After completing this course, students will be able to

1. To develop a broad understanding of how data is influencing the lives of individuals and business entities.
2. To be able to identify the different kinds of data published or subscribed to within an enterprise – and how it is used.
3. To distinguish between operational or transactional data and that needed for different kind of analytics or insights
4. To understand what Big Data is and how it is challenging established norms of managing or accessing that data in the enterprise.
5. To appreciate that Big Data is characterized based on one or more of the *velocity*, *variety* or *volume* aspects of the data originating inside or outside an enterprise.
6. To get a perspective of Big Data from the point of view of growing businesses that struggle with basic operational data.

Program Learning Objectives Related to This Course:

Students may expect to gain knowledge and skills in the following Bloom Category SLOs, as defined for the Moravian MBA:

{1, 2, 3, 4, 5, 10, 18, 19, 20, 21, 25, 26, 27, 29, 35}

Text and Articles:

Title	Author	Publisher	ISBN	Year
Big Data – Principles and best practices of scalable real-time data systems	Nathan Marz, James Warren	Manning Publications Co.	ISBN: 9781617290343	2015

Optional Information Sources:

Reference Texts:

Title	Author(s)	Publisher	ISBN	Reeves Library Ref	Year
Best practices in data cleaning: a complete guide to everything you need to do before and after collecting your data	Jason W. Osborne			H62.O82	2013
Management of Information Technology	Carroll W. Frenzel, John C. Frenzel	Thomson Course Technology	0-619-03417-3		2004
Multilevel analysis: an introduction to basic and advanced multilevel modeling	Tom A.B. Snijders			QA278. S645	2012
Data Mining: Practical Machine Learning Tools and Techniques – 3rd Edition (The Morgan Kaufman Series in Data Management Systems)	Ian H. Witten, Eibe Frank, Mark A. Hall	Morgan Kaufman	13-9780123748560	QA76.9. D343 W58	2011
Predictive Analytics Using Oracle Data Miner	Brendan Tierney	McGraw-Hill Higher Education – Oracle Press	9780071821674		2014
IBM SPSS Modeler Cookbook	Keith McCormick, Dean Abbott, Meta S. Brown, et al	Packt Publishing	13: 978-1-84968-546-7		2013
Predictive Analytics for Human Resources	Fitz-enz, J. & Mattox II, J.	Wiley	13: 978-1118893678		2014
NoSQL Distilled	Pramod J. Sadalage, Martin Fowler	Addison Wesley	13: 978-0-321-82662-6		2013
Data Analysis with Open Source Tools	Philipp K. Janert	O'Reilly	978-0-596-80235-6		2010
Quantitative Analysis for Management 9e	Barry Render, Ralph M. Stair, Michael E. Hanna	Pearson-Prentice Hall	978-0-13-153688-5		2006
Cluster Analysis and Data	King, R. S.	Mercury	13:978-		2014

Mining: An Introduction.		Learning & Information	1938549380		
Clinical Problem Lists in the Electronic Health Record	Wright, A. (Ed.)	Apple Academic Press	13:978-1771880916		2014
Data Science for Business	Foster Provost & Tom Fawcett	O'Reilly	978-1-449-36132-7		2013
Social Data Analytics: Collaboration for the Enterprise	Krishnan, K. & Rogers, S. P.	Morgan Kaufman	13: 978-0123971869		2014
Dictionary of statistics & methodology: a nontechnical guide for the social sciences	W. Paul Vogt			HA17. V64	2011
Introduction to Management Science- Tenth Edition	Bernard W. Taylor III	Prentice Hall	978-0-13-606436-7		2010
Linear Programming, – 4th Edition	S. Gass	McGraw-Hill, New York			1975
Data Smart: Using Data Science to Transform Information into Insight	John W. Foreman	John Wiley & Sons	13: 978-1118661468		1986
Database system concepts	Silberschatz, A., Korth, H., & Sudarshan, S.	McGraw Hill Education	13: 978-0073523323		2011
Business Driven Information Systems - Second Edition	Baltzan & Phillips	McGraw Hill - Irwin	978-0-07-337673-8		2009

Recommended Readings:

Being a topic that impacts a vast area and requiring study of fundamentals, etc. no single text can do justice to it all. Students are encouraged to consult any other available literature. Following are good reference texts:

1. The Theory of Relational Databases, David Maier – Computer Science Press 1983; ISBN 0-914894-42-0
2. An Introduction to Database Systems, C. J. Date – Vol I – 4th Edition - Addison Wesley 1985; ISBN 0-201-14201-5
3. An Introduction to Database Systems, C. J. Date – Vol II – Addison Wesley 1986; ISBN 0-201-14474-3
4. Management Models and Industrial Applications of Linear Programming – A. Charnes and W. W. Cooper, New York: John Wiley & Sons, 1961
5. Python for Data Analysis, Wes McKinney – O'Reilly 2012; ISBN 978-1-449-31979-3
6. Knowledge maturity as a means to support decision making during product-service systems development projects in the aerospace sector, By: Christian Johansson, Ben Hicks, Andreas C. Larsson and Marco Bertoni, http://onlinelibrary.wiley.com/doi/10.1002/pmj.20218/abstract
7. Operations Research, An Introduction – H. A. Taha - New York, Macmillan 1987

Unless specified the Reference or Recommended reading texts may not be available in the Reeves library. However, librarians may be able to put in a request to obtain them over inter-library loan. In any case, there is no expectation for students to have these texts in their possession.

The Recommended Readings and Reference Texts, noted above, are suggestions. These are not all inclusive – particularly considering the dynamics of this ever-growing field. Students are encouraged to identify and share with the class any additional material that is relevant and would enhance the learning.

Online resource in the Reeves library is also available to the students at: http://home.moravian.edu/public/reeves/articles/index.htm. However, in some cases only an abstract, instead of the entire text, may be available for viewing. Students may, however, be able to request to obtain an article of interest through the library.

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Course Outline (tentative):

Date	Topic	Required Reading
3/19/16	Introductions, Orientation, Overview: Data is ubiquitous, and getting big? Enterprise Geology 101 *Data* – What fuels the Enterprise; *Capital*: What sustains the Enterprise *Enterprise*: Organic entity that publishes and subscribes to data – Aspects vs Perspectives in an Enterprise - What, Who, Where, Why, How, When Forming Teams Enterprise Systems Architecture Our changing [and increasingly connected] world – with new products, new users, new ways to market – Big Data Analytics: Big Data 1.0 to Big Data 2.0	Reference, Research
3/26/16	Enterprise - the epi-center of the Information Supply Chain Where's the data? Is it digital or accessible? If you can't measure it – why are you doing it? Structured data is first priority! Collaboration with Content Management for the 3D Enterprise – Structured vs. Unstructured Data; Internal vs. External Data Database Management Systems – Types, history; Genesis of Relational Database Systems Entities and relationships, tuples, attributes Structured Query Language (SQL) Master Data Management; OLTP vs. OLAP; BI, Data Warehouse, Data Mart	Reference, Research
4/2/16	Mining the enterprise Predictive Modeling for analytics Data Mining Basics, top DM applications, e.g. SAS, SPSS, Oracle, Teradata. The case for Big Data systems *Individual project presentations.*	Text: Ch 1, Reference, Research
4/9/16	Big Data Systems – Lambda Architecture*; Individual project, Team Project presentations.*	Text: Ch 1, Reference, Research
4/16/16	Individual project/Team Project presentations.	Text Ch 2, Reference, Research
4/23/16	Individual project/Team Project presentations.	Text Ch 3, 4 Reference, Research
4/30/16	Individual project/Team Project presentations.	Text: Ch 5, Reference, Research
5/7/16	Team Project Presentations	

Assignments

Homework:

There will be a case study, with questions at the end and an independent set of questions. Students may have the option to choose from one of two case studies to work on. Answers are submitted in writing. Instructor may exercise the option to have one or two students present the case study answers to the class.

Individual Project:

The individual project will be on technology use in any area of Big Data. It can be any one of the following:

1. Explanation of a problem, possible solution approaches considered and choice – with justification – on the best solution.
2. A research or white paper.
3. Engaging the class in determining – at a high level - solution approaches to a problem.

All of the above will require a 15-20 min presentation in class. Options 1 or 2 will additionally require a written paper. The written paper shall be 7-10 pages of double-spaced, 10-12 size font type. Hard and soft copies of the paper and the presentation documents are required to be submitted. See below for format and style guidelines.

Option 3 will first require a presentation of the problem and its attendant issues. Ideally, a written document may be distributed in advance to allow sufficient time so people may come prepared with questions, comments or ideas for a meaningful class discussion. The problem is posted on Blackboard so offline discussions may continue. The observations and inferences from the class discussion are reported in class at the final presentation and documented in the paper to be handed in. Hard and soft copies of the paper and the presentation documents are required to be submitted. A hard copy is required for the instructor before each presentation. A hard copy of the final paper is required at the time of the final presentation.

If a problem encountered in the student's workplace is the subject of the project, names and references of companies or individuals are not to be disclosed. Fictitious names and situations are to be used for the purpose of (in-depth) problem discussion.

Work on each individual project is expected to enhance the collective learning experience of the class. The purpose is to stimulate class discussion around a student's chosen topic. About 5-10 minutes time will be set aside for Q&A, after each presentation. Another student will serve as scribe noting class comments/responses. These notes are handed over to the presenter, who may use that information to prepare the final write-up. Active participation in Q&A is important. A small portion of the grade on this project will depend on this. That means the rest of the class will be assessed on the kind of questions, comments they make on the material presented.

All written papers are to be handed over to the instructor by the last class meeting in hard copy and electronic form. Thus, earlier a student makes the presentation the longer the available time to produce the final document. Preferably the presentations are evenly distributed between the 2nd and 5th class meetings.

Written Paper – Style Guide:

All written papers, submitted for a grade, must meet the following guidelines:

- Individual Project paper Options 1 or 2, Length: 7-10 pages of double-spaced, size font type
- Individual Project paper Option 3, Length: 2-3 pages
- Font size: 10-12; Font Type: Times New Roman, or similar
- Formal writing style is expected in a document with structure that affords readability – regardless of chosen option
- Content must start with an **Introduction** section, and end with a **Conclusion** section. In between these two sections maybe several sections to discuss the problem, solution approaches – and would constitute the body of the paper
- All sections must have numbered headings and levels, as appropriate

- Table of Contents must specify page numbers at least at the Level 1 Heading of the Section numbers. [Hint: use MS-Word]
- Individual Project paper Option 1, e.g. White or Research Paper must carry an Abstract that precedes the entire document. The Abstract summarizes the content of the paper in no more than two paragraphs.
- The White or Research Paper must state current status of the situation/problem investigation/research, etc., and cite references in literature, e.g. professional journals, conference publications, etc.
  - ✓ References in body of document will call out numbers, of the particular document refered
  - ✓ All references, are numbered and listed in a "Bibliography" section at the end of the document
  - ✓ The format of the annotated reference is thus: "<Name of article>, <Author(s) name(s) by Last name, first, middle name initials>,<Name, Year, Month, etc. of Publication (or ISBN in case of book)>, <Page numbers>

Guidelines will be elaborated further in class. Authoring of documents using MS-Word is strongly recommended for convenience in maintaining the style formats, suggested.

Hard and soft copies of the papers and the presentation documents are required to be submitted when presenting.

Individual project papers must be submitted no later than May 2, 2016. Late submissions will be penalized @ 10% for each day late. The instructor reserves the right not to accept work submitted more than a week late.

Team Project:

Please see accompanying document about The Moravian Engine Company. This will require research, analysis with individual and team-coordinated presentations on the 3rd and last class meetings. Do feel free to ask questions for clarifications or, to help understand the scope of the problem to be addressed. The kind of questions you get clarification on will help develop your individual proposals that would provide the solution approach to be discussed and agreed on at the 2nd class meeting.

Grading Summary:

Grade Allotment		Grade Distribution			
Class Participation	15%	**Range**	**Grade**	**Range**	**Grade**
Homework	20%				
Individual Project	30%	93-100%	A	76-79%	C+
Team Project Final	35%	90-92%	A-	70-75%	C
		86-89%	B+	65-69%	D
		80-85%	B	64% or below	F

Other Important Information

Academic Honesty:

Moravian College's policy as stated in the Academic Policy Manual holds. Except for the team project, all individual work must indeed be just that. Plagiarism is strongly discouraged, and should not be attempted. In written submissions, students are required to provide references to published material wherever appropriate. Reference material can be texts, journals, conference proceedings or documents found on the internet.

Please be sure to follow all copyright laws in using any material for this course.

Attendance:

This is a graduate level class that will be especially intense due to its compressed duration. Students are encouraged not to miss any class. The class meets once a week, with a significant amount of material being covered at each meeting, and building on itself. A student that misses two classes in a row should talk to the instructor as soon as possible. There will be two excused absences for business or personal reasons.

Blackboard:

The course will be set up in Blackboard. After the course is made available, the students will register themselves with their name, preferred email address, etc.

Students are requested to visit http://home.moravian.edu/public/cit/_help/blackboard/index.htm to familiarize themselves on how the Blackboard may be used for communications during the term of the course. Instructor announcements, course documents will be posted on the Blackboard from time to time. Students will be expected to use the Blackboard's "Discussion Board" and "Virtual Class Room" features for communicating and planning for the Team Project.

A prerequisite for using the Blackboard is a login ID. Students should get college computer network account logins at the earliest opportunity at the Comenius Center. For any questions on using the Blackboard, please email bbadmin@moravian.edu, or call Ron Szabo at 610-625-7986.

Students are expected to actively participate in class and weekly Blackboard discussions and other assignments. Participation is defined as working actively within the assigned group(s), adding to the discussion of in-class activities whether role play debriefing, case analysis, or learning opportunities in the classroom, and posting responses to and questions for discussion threads assigned in Blackboard, as appropriate.

It is critical to note that participation in Blackboard discussion threads means posting at least four days per week. A post must be substantial in nature. That is, posting "I agree" as a response to another's posting does not count as participation. Posted comments must be substantive so as to further the discussion being conducted. Posting questions that raise important issues in the thread or ask for clarification of a posting are equally valid.

Canceled Classes

Class maybe cancelled due to weather or for some other reason. In the case of cancellation, the instructor will post an announcement on Blackboard to inform students of the cancellation. It is the student's responsibility to check Blackboard prior to each class to determine if class is canceled.

Copyrights

Only the copyright holder has the right to make copies of books, articles, cases, software, and other copyrighted material. Anyone else (you, the reader) must have the copyright holder's permission to make copies unless the item being copied falls under the fair use proviso or is a work in the public domain. You must get permission from the copyright holder to make any copies legally of any copyrighted material.

Disabilities:

If you wish to request accommodations in this class for a disability contact the Academic Support Center located in the lower level of Monocacy Hall, or by calling 610-861-1401 (1401 on campus). Accommodations cannot be provided until authorization is received from the Academic Support Center.

e2Campus

In the event of an emergency the system called e2Campus allows Moravian College to send text messages to the cell phones of registered members of the campus community with information about what is happening and/or what precautions should be taken. Up to two cell phone numbers and two e-mail addresses per user may be registered. This service is an integral part of the College's emergency response system. If you are not already registered on the system, please do so as soon as possible. To register for e2Campus visit http://intranet.moravian.edu/e2campus/index.asp from a computer on Moravian's campus.

Expectation of Students:

Normal classroom decorum and professional behavior conducive to learning are expected of students whether physically in the classroom, in (project) team meetings or online communication via Blackboard, Email, etc. Participation in class discussions is encouraged. However, engaging in side conversations or using cell phones, pagers or other communication devices when class is in session, is to be avoided unless related to the topic at hand.

Grading Judgment:

It is within the purview of the instructor to apply qualitative judgment in determining grades for an assignment or for a course.

Inclement Weather

In the case of inclement weather, the instructor will post a message on Blackboard to inform students if the class is canceled. It is the student's responsibility to check Blackboard prior to each class period for cancellations due to inclement weather.

Inclusion

Moravian College is a welcoming community that embraces and values the diversity of all members of the campus community. We acknowledge the uniqueness of all individuals, and we seek to cultivate an environment that respects, affirms, and defends the dignity of each member of the community. Moravian College complies with all federal and state laws regarding nondiscrimination in recruitment, admission, and employment of students, faculty, and staff.

You may wonder what that statement means. For the purposes of this class, the statement means that all persons, regardless of actual or perceived race, color, sex, religion, ancestry, genetic information, national origin, sexual orientation, gender identity or expression, familial status, marital status, age, mental or physical disability, use of guide or support animals and/or mechanical aids have an equal opportunity to participate and learn in this class and are to be treated equally in an inclusive and supportive manner.

In other words, in this class we all promote a culture of inclusion that welcomes and supports people of varying backgrounds, different viewpoints, experiences, talents, and ideas. By respecting and valuing these differences we can make problem solving and decision making multi-dimensional leading to more learning and better outcomes for all, including project clients.

Behaviors such as those listed in the table below will lead to an inclusive classroom culture.

Behavior	Description
Listening to understand	Listening with an open mind to fully understand all aspects of a situation
Seeing multiple points of view	Understanding that our perspective is not the only one when looking at a situation, issue, or person
Giving and receiving feedback	Inviting and giving feedback
Enhancing inclusion	Helping others feel included and involved
Addressing inappropriate behavior	Acknowledging inappropriate behavior; communicating expectations and consequences for repeated behavior.

Source: MIT Human Resources, Diversity & Inclusion, http://hrweb.mit.edu/diversity/affirmative-action-plan-admins/resources

Syllabus Status:

This syllabus and the course contents are subject to change at the discretion of the instructor. Changes will be made, however, only after discussion with students in the class.

Workload:

Students can expect to work at least 2.5 hours on average outside of class in reading, preparation and project activities for each hour of class time.