RMBI 1020 Business Intelligence in Contemporary Society (2021-22 Spring Term)

General Information

-   3 Credits (Letter Graded)

-   Lecture + Lab (L2):   Fri   09:00am - 10:50am   Rm: LSK-G021
                  (L1):   Fri   11:00am - 12:50pm   Rm: LSK-G021

-   Teaching Mode: Face-to-Face + Zoom

-   Zoom Meeting IDs: See Canvas

-   Instructor: Prof. **Jean** WANG <jeanwang@ust.hk>   Rm: LSK 5050A (office hour by appointment)

-   TA: Miss **Adrienne** Y S LEE <imadrienne@ust.hk>   Rm: LSK 4065 (office hour by appointment)

Course Description

Business intelligence is a new discipline that comprises a set of theories, methodologies and processes to analyze business data with the aim of improving an organization's decision making, business planning and projection. The aim of this course is to introduce the business intelligence principles, various types of data analytics techniques, and discuss the effects of various social problems on the use of business intelligence. The course also focuses on an analysis of the strengths, limitations, and impacts of the use of business intelligence. The topics include business intelligence strategies, the power of social influence, data collection and management, confidentiality and privacy issues, and organizational and human behavioral changes. Also included are case studies of real business data analysis problems by employing data mining and statistics tools.

Objectives
The course will provide student with the ability:
-   To introduce and outline different types of business intelligence methods
-   To examine and describe how business intelligence methods can facilitate business decision making and improve the profitability of a company
-   To articulate the difficulties and complexities of developing and managing BI projects
-   To apply data analytics techniques on small datasets for a simple implementation of business intelligence

Teaching Schedule

The course will be offered under **Blended Learning mode**. Each week students **are expected to watch the lecture videos** online **before** attending the face-to-face classes. In classes, students will participate in group discussion and work on practical tasks of data analysis and business intelligence.

WK	Lecture Videos	Face-to-Face Class
1	*No online video*	*[Feb 4]* In-class Lecture - Introduction to Business Intelligence
2	Lec01 - Data Modeling and Storage	*[Feb 11]* Tut01 – Sales Report Generation by Excel PivotTable
3	Lec02 - Analytics Technologies Enabling Business Intelligence	*[Feb 18]* Tut02 – Combine Data from Multiple Sources by Excel PowerPivot
4	Lec03 - Excel Essentials for Business Data Analysis *Case Demo#1: Income Prediction from Census Data*	*[Feb 25]* Tut03 – Customer Preference Prediction by KNN Model
5	Lec04 - Business Data Analytics – Optimization *Case Demo#2: Blended Juice Production*	*[Mar 4]* Tut04 – Employee Scheduling by Excel Solver Optimization
6	Lec05 - Business Data Analytics – Correlation and Regression *Case Demo#3: Prediction of Pregnant Customers*	*[Mar 11]* Tut05 – Auction Competitiveness Prediction by Linear Regression Model
7	Lec06 - Business Data Analytics – Time Series Forecasting *Case Demo#4: Impact of Sep 11 on Air Traveling*	*[Mar 18]* Tut06 – Stock Price Prediction by Time Series Forecasting Model
8	Lec07 - Business Data Analytics – Clustering *Case Demo#5: Shopping Mall Market Segment*	*[Mar 25]* Tut07 – Flight Passenger Segmentation by K-Means Model
9	Lec08 - Business Data Analytics – Classification *Case Demo#6: Used Car Evaluation*	*[Apr 1]* Tut08 – Employee Satisfaction Classification by Decision Tree Model
10	Lec09 - Business Data Analytics – Association Rule Mining *Case Demo#7: Wine Recommendation*	*[Apr 8]* Tut09 – Cosmetic Product Recommendation by Association Rules Model
11	Lec10 - Business Data Analytics – Collaborative Filtering *Case Demo#8: Wine Recommendation*	*[Apr 22]* Tut10 – Movie Recommendation by Collaborative Filtering Model
12	*[Apr 29]* ***Group Presentation***	
13	*[May 6]* ***Group Presentation***	

Assessments and Weighting (subject to change)

- **Class Participation (10%):** week 2 to week 13 (CILO 1, 3, 4)
  This is an individual assessment. Students need to attend ALL face to face classes, answer short questions related to the video lectures, and participate in the group discussion. Participation in the group discussion will account for 5% and question answering will account for 5%.

- **Tutorial Exercises (20%):** week 2 to week 13 (CILO 2, 4)
  These are individual continuous assessments. Each week, students are given an Excel file with real-world business data and a series of instructions. Students are required to follow the instructions to complete the Excel file, in order to accomplish a specific business analysis task. After finishing, students need to submit their Excel file to present their findings.

- **Individual Assignment (10%):** week 4 to week 9 (CILO 1, 2, 3, 4)
  This is an individual assessment. Students need to conduct research and summarize their findings for a given set of BI-related questions. The questions include social impact of BI, obstacles and difficulties of BI implementation, organization cultural changes due to BI, and latest BI technologies and trends.

- **Group Project (20%):** week 10 to week 13 (CILO 1, 2, 3, 4)
  This is a group assessment. 3-4 Students form a group to conduct research and present their findings for a specific BI-related topic. Topics could be social analysis on the impact of BI or technical report on the latest BI development. Students are allowed to choose the topic of their own interest, subject to the instructor's approval.

- **End of Term Project / Final Examination (40%):** week 13 to week 14 (CILO 2, 3, 4)
  It is subject to the further notice from the University and the instructor.

Recommended Readings

Lecture Topic	Recommended Readings
Introduction to Business Intelligence	- Business Intelligence vs Analytics vs Big Data vs Data Mining http://blog.apterainc.com/business-intelligence-vs-analytics-vs-big-data-vs-data-mining - Seven Keys to a United BI Environment https://www.linkedin.com/pulse/part-iv-enterprise-business-intelligence-seven-keys-united-eckerson - Roundup Of Analytics, Big Data & BI Forecasts And Market Estimates, 2016 http://www.forbes.com/sites/louiscolumbus/2016/08/20/roundup-of-analytics-big-data-bi-forecasts-and-market-estimates-2016/#374a002e49c5 - Big Data Industry Predictions for 2017 https://insidebigdata.com/2016/12/21/big-data-industry-predictions-2017/
Data Modeling and Storage	- Data Warehouse Tutorial http://www.tutorialspoint.com/dwh/ - Introduction to Multidimensional Databases https://blogs.sap.com/2013/03/12/introduction-to-multidimensional-databases/

	- Benefits of a Multi-Dimensional Model http://www.oracle.com/technetwork/developer-tools/warehouse/benefits.pdf
Analytics Technologies Enabling BI	- The Four Types of Analytics – CI&T http://www.ciandt.com/card/four-types-of-analytics-and-cognition - Descriptive, Predictive, Prescriptive: Transforming Asset and Facilities Management with Analytics – IBM http://www-01.ibm.com/common/ssi/cgi-bin/ssialias?htmlfid=TIW14162USEN - Introduction to Data Visualization: Visualization Types http://guides.library.duke.edu/datavis/vis_types
Excel Essentials for Business Data Analysis	- Data Cleaning: Problems and Current Approaches http://betterevaluation.org/sites/default/files/data_cleaning.pdf - Difference Between Data Normalization and Data Structuring https://www.promptcloud.com/blog/Difference-Between-Data-Normalization-and-Data-Structuring
Business Data Analytics – Optimization	- Examples of Optimization Problems http://www.solver.com/examples-optimization-problems - Excel Solver Tutorial http://www.solver.com/excel-solver-tutorial-step-step-product-mix-example-excel http://www.hec.ca/en/cam/help/topics/optimization_with_excel.pdf
Business Data Analytics – Correlation and Regression	- MathIsFun.com: Correlation https://www.mathsisfun.com/data/correlation.html - Trendline Coefficients and Regression Analysis http://www.tushar-mehta.com/publish_train/data_analysis/16.htm - Regression Analysis http://isoconsultantpune.com/regression-analysis/
Business Data Analytics – Time Series Forecasting	- Time Series Methods http://www.prenhall.com/divisions/bp/app/russellcd/PROTECT/CHAPTERS/CHAP10/HEAD03.HTM - Forecast Tools http://www.hep.by/gnu/gnumeric/forecast-tools.shtml
Business Data Analytics – Clustering	- Cluster analysis for business http://analyticstraining.com/2011/cluster-analysis-for-business/ - K-Means Clustering (with animation) http://www.onmyphd.com/?p=k-means.clustering
Business Data Analytics – Classification	- Decision Tress in Machine Learning https://medium.com/towards-data-science/decision-trees-in-machine-learning-641b9c4e8052 - A Complete Tutorial on Tree Based Modeling from Scratch https://www.analyticsvidhya.com/blog/2016/04/complete-tutorial-tree-based-modeling-scratch-in-python/

	- How Decision Tree Algorithm Work? http://people.revoledu.com/kardi/tutorial/DecisionTree/how-decision-tree-algorithm-work.htm
Business Data Analytics – Market Basket Analysis	- Market Basket Analysis Using Big Data Analytics https://www.linkedin.com/pulse/gain-consumer-insight-market-basket-analysis-birendra-kumar-sahu - Association Rule Mining – Not Your Typical Data Science Algorithm https://www.mapr.com/blog/association-rule-mining-not-your-typical-data-science-algorithm
Data Visualization	- Which Chart or Graph is Right for You? – Tableau https://www.tableau.com/sites/default/files/media/which_chart_v6_final_0.pdf - How To Make Infographics (In a Nutshell) http://anna.vc/post/109238846197/how-to-make-infographics-in-a-nutshell - Data Storytelling: The Essential Data Science Skill Everyone Needs http://www.forbes.com/sites/brentdykes/2016/03/31/data-storytelling-the-essential-data-science-skill-everyone-needs
Big Data and BI	- Firing on All Cylinders: The 2017 Big Data Landscape http://mattturck.com/bigdata2017/ - Big Data vs. Business Intelligence http://www.element61.be/e/resourc-detail.asp?ResourceId=766 - Overview of Big Data Architecture https://www.mssqltips.com/sqlservertip/3133/big-data-basics--part-2--overview-of-big-data-architecture/ - Hadoop Illuminated (online book) http://hadoopilluminated.com/hadoop_illuminated/index.html