BA in Management Program
Business Analytics Minor Program
Fall 2020
OPIM 390 – Introduction to Business Analytics

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Schedule: Mondays 8:40-10:30, Tuesdays 8:40-9:30 @ Zoom (Synchronously)
Office Hours: Send an email for an appointment on Zoom or Google Meet

Course Description:

As an introductory course to Business Analytics Minor Program, this course will cover topics on the conceptual framework of business analytics, various sectoral application areas, and a general introduction to analytical methods used. The course will also cover success stories from different sectors, where business analytics is applied, and big data analytics in general, including its application areas, as a new and emerging area of interest.

Course Objectives:

Business Analytics is the practice of using past business data and business experience in explorative, analytical, and methodological ways to make better business decisions. The main objective of this course is for the student to develop an in-depth understanding of the role of business analytics and computer-based information systems in direct support of managerial decision making. Specifically, at the end of this course, students should develop knowledge and hands-on skills about:
1. Business intelligence, business analytics (descriptive, predictive, and prescriptive), data science, big data, and decision support systems
2. Real-world data, data integrations, and data preprocessing
3. Descriptive statistics, data warehousing, and visual analytics
4. Data, text and web mining methodologies and enabling technologies
5. Big data tools and technologies

Learning Outcomes:

Upon successful completion of the course, the student should be able to:

1. Define business analytics and its role and contributions in decision making,
2. Describe methodological approaches to business analytics and their application contexts,
3. Use descriptive, predictive, and prescriptive analytics methods on business data under corresponding decision-making contexts,
4. Analyze a business case, select and apply an appropriate method to reach a business decision,
5. Understand the nature of big data and how it can be exploited to create value,
6. Use a leading at least one software package in data analytics.

Course Material:

Textbook:

We will be closely following the textbook given below. You are expected to read the chapters mentioned in the course outline before each session.

Jeffrey D. Camm; James J. Cochran; Michael J. Fry; Jeffrey W. Ohlmann, Business Analytics, 4th Edition, Cengage Learning, © 2021 (BA21 for short). (We are working on the availability of the E-Book through Homer Bookstore).

Software:

We will primarily mainly use Excel and R & RStudio for business analytics in this course. However, the students can use the following software packages in their cases and/or term projects *after getting the consent* of the instructor:

1. Tableau (for especially data visualization)
2. Gurobi (for optimization, especially with Python)
3. Cplex & OPL Studio (for optimization)
4. Pyhton

Optional Software:

KNIME (a free open source analytics platform – knime.org), SAS Visual Analytics, RapidMiner (a free open source analytics tool – rapidminer.com), Orange (a free open source analytics platform – orange.biolab.si), IBM SPSS Modeler with Text Analytics, Simio, Weka, Arena.

Case Studies:

Cases are used as real-world examples of the topics. There will be four case analyses to be prepared as a team. The teams can consist of up to three students (teams comprised of one student will also be allowed). The teams should work to address the issues raised in the case, clearly identify the problems to be studied, determine, and apply the necessary tools.

The details on the case studies are provided below:

Case 1	**Due:**	**Week 4**
	Case (Type):	Pelican Stores (Textbook Case)
	Subject:	Data Visualization (Chapter 3)
	Teamwork? (Grading):	Yes (Team)
Case 2	**Due:**	**Week 6**
	Case (Type):	Know Thy Customer (Textbook Case)
	Subject:	Descriptive Data Mining (Chapter 5)
	Teamwork? (Grading):	Yes (Team)
Case 3	**Due:**	**Week 10**
	Case (Type):	Grey Code Corporation (Textbook Case)
	Subject:	Predictive Data Mining (Chapter 9)
	Teamwork? (Grading):	Yes (Team)
Case 4	**Due:**	**Week 12**
	Case (Type):	To Be Announced
	Subject:	Optimization Models (Chapters 12 and/or 13)
	Teamwork? (Grading):	Yes (Team)

Reading Assignments:

Some additional articles and cases might be announced and used as real-world examples of the topics covered in class.

Optional Reading Materials:

Additional list of references:

– Sharda, R., D. Delen and E. Turban (2016) *Business Intelligence, Analytics, and Data Science: A Managerial Perspective* (4th Edition), Pearson.

– Bozkaya, B. and V.K. Singh (2015) *Geo-Intelligence and Visualization through Big Data Trends* (pp. 1-348). Hershey, PA: IGI Global.

– Baesens, B. (2014) *Analytics in a Big Data World: The Essential Guide to Data Science and its Applications*, John Wiley & Sons.

– Mayer-Schönberger, V. and K. Cukier (2014) *Big Data: A Revolution That Will Transform How We Live, Work, and Think*, Eamon Dolan/Mariner Books.

– Dean, J. (2014) *Big Data, Data Mining, and Machine Learning: Value Creation for Business Leaders and Practitioners*, John Wiley & Sons.

– Stubbs, E. (2014) *Big Data, Big Innovation,* John Wiley & Sons.

– Davenport, T. H. and J. G. Harris (2007) *Competing on Analytics: The New Science of Winning*. Harvard Business School Press.

– Witten, I. H., E. Frank, M. A. Hall and C. J. Pal (2016) *Data Mining: Practical Machine Learning Tools and Techniques* (4th Edition), Morgan Kaufmann.

Course Web:

The course syllabus, lecture slides, post-lecture recordings, in-class exercises and their solutions, and your grades will be posted on SUCourse+. Students are expected to visit SUCourse+ a couple of times each week.

For the midterm, cases, and term project, the Turnitin tool will be used. Sabanci University uses a very powerful web-based tool called Turnitin. Turnitin is the worldwide standard in online plagiarism prevention. It allows instructors to compare student papers against a database composed of millions of articles. Every paper you submit for the midterm, case analysis reports, and term project will be scanned by Turnitin, and results will be reflected in your grades.

Instructional Design:

The course will be taught using a blend of synchronous lectures, synchronous active learning through in-class exercises, case analysis reports, and term project prepared in teams.

The full powerpoint slides prepared for each chapter will be available to the students at the SUCourse+ site after each chapter is completely covered in the lectures. The links of the recorded synchronous teaching lectures will be provided on SUCourse+ after each class. These recordings aim to give the students the opportunity to review the material and learn at their own pace.

Synchronous lectures are also interactive via in-class exercises that are carried out by the students either individually or in groups. These assignments involve the use of advanced statistics, spreadsheet modeling, and coding in order to perform the corresponding business analytics tool. Note that the synchronous in-class exercises conducted in (random) breakout rooms will not be recorded. The solutions of the in-class exercises will also be posted on SUCourse+.

Cases are used as real-world examples of the business analytics tools covered, and the students are asked to submit four case analysis reports in teams consisting of 1-3 students.

Grading:

Participation:	5%
In-Class Exercises:	20%
Case Analysis Reports:	20%
Midterm:	20%
Term Project:	35%

Peer Evaluation in Teamwork

Students will be asked to provide an evaluation of the members of their team in the cases analysis. Each student will divide 100 points between the members of her team, including him/herself. This division should reflect that person's judgment of the contribution of the members of her team. The scores should not be merely functions of time spent by each member, but they should be measures of the "contribution;" their relative contribution to the idea generation, research, analysis, writing, oral presentation, report writing, etc. If the team was highly functional, and each member did what they committed themselves to, then the student can assign the same mark to each member of the team. If, on the other hand, some members of the team did not fulfill their commitments and did not contribute as much as the others, then points can be distributed unevenly.

The points submitted by all members of the team will be aggregated by the instructor. Every student will be given his/her aggregate peer evaluation, without disclosing the individual peer evaluations to the students.

In case there is no consensus among the team, for example, if three students divide the marks evenly and the fourth one divides them unevenly, then the instructor will use his/her judgment to assign peer evaluation marks--possibly after meeting with the members of the team.

In cases where there are conflicting marks, it is most likely that the instructor will meet with the team members and provide a mark based on an interview. For example, in a group of four, if Students A and B believe they did most of the work, and Students C and D believe otherwise, the team may be called in for an interview in order to be fair to everyone.

Past experience indicates that in most groups points will be distributed evenly. There will be a few groups where peer evaluations will play a role in the marks. The primary goal of this exercise is to avoid giving undeserved credit to individuals who did not help their teams. However, it is possible to have upwards adjustments of marks in case of students who have done more than what the group expected of them.

The peer evaluation will have a direct impact on your case analysis grades. To give a simple example, if the group mark is 20 out of 25, and if your peer evaluation indicates that your contribution was less than what was expected, then your case analysis grade mark will be less than 20 out of 25. There are no simple rules for adjustment.

Requirements:

Class Participation

Class participation includes regular class attendance and getting involved in the learning process during class hours. **The non-verbal participation** requires being promptly in class and engagement via complying with classroom policies and conduct. Points can be taken off for not complying with the classroom policies and conduct. **The verbal participation** involves contributing to class discussions positively and regularly and asking questions which cannot be possible without due preparation (hence quality, relevance, frequency, and timing will be accounted for). Reading the material to be covered and working out any problems that are suggested will prepare you for each class session.

In-Class Exercises

In-class exercises will be assigned during class hours. They may be group or individual exercises. These will be completed during class and submitted at the end of the class hour. Still, very few of them might be started in-class and submitted afterward at times to be announced by your instructor. You are expected to work on the assigned exercises by communicating with your classmates and the instructor through the Zoom Breakout Rooms. Although these in-class exercises will be graded, they are not quizzes but means to learn the topics actively during synchronous class hours. Students who are not physically present in the assigned Zoom Breakout Rooms will not receive grades from such exercises. In the case of glitches preventing the expected presence, students should inform the instructor immediately to find a solution.

Case Analysis

There will be four case assignments to be prepared as a team consisting of 1-3 students (see page 2). Students are free to form/change their teams in each case. Each case must show the names of all team members.

The teams should address the issues raised in the case, clearly identify the problems to be studied, determine, and apply the necessary business analytics tools. A case report will be prepared for each case explaining the decision-making problem at hand and the approach taken by the team to address the situation, presenting their analysis and recommendations. Each team should submit their report on SUCourse+ only once as a PDF file. For the sake of completeness, teams can additionally email their Excel or R Studio files to the instructor.

Midterm

There will be only one midterm in week 8. Additional details on the midterm will be posted as an announcement on SUCourse+ in week 7. Students are expected to follow these announcements on SUCourse+. There will be no makeup for the midterm. If you miss the midterm in the case of plausible excused absences (for health reasons, etc.), please get in touch with your instructor at your earliest convenience.

Term Project

The Term Project will be assigned in the second half of the semester. The project can be done in teams of no more than 3 students. The project will be about a real business case with real data where students will be expected to apply the concepts and techniques learned in class to data-driven decision making.

The teams will be expected to present their term project in week 14 and turn in the final report of their project during the first week of university-wide final exams. The final report of the term project must show the names of all team members. The teams should submit their final report through SUCourse+ only once as a PDF file. For the sake of completeness, teams can additionally email their Excel, R Studio or any other source files to the instructor.

Academic Honesty:

Learning is enhanced through cooperation, and as such, you are encouraged to work in groups, ask for and give help freely in all appropriate settings. At the same time, as a matter of personal integrity, you should only represent your own work as yours. Any work that is submitted to be evaluated in this class should be an original piece of writing, presenting your ideas in your own words. Everything you borrow from books, articles, or web sites (including those in the syllabus) should be properly cited. Although you are encouraged to discuss your ideas with others (including your friends in the class), it is important that you do not share your writing (slides, MS Excel files, reports, etc.) with anyone. Using ideas, text, and other intellectual property developed by someone else while claiming it is your original work is *plagiarism*. Copying from others or providing answers or information, written or oral, to others is *cheating*. Unauthorized help from another person or having someone else write one's paper or assignment is *collusion*. Cheating, plagiarism, and collusion are serious offenses that could result in an F grade and disciplinary action.

Specific to this course, it is important to know that submitting a computer file (e.g. Excel workbook or RStudio file) prepared by someone else, *even partially***, is cheating.** You may talk to others about assignments, but in the end, you should be doing all the work. It is important that you do not share your solutions as Excel files with anyone until it has been graded. Sharing your file with others could easily tempt them to submit part or all of it as their own. This would be cheating and, in most cases, easy to detect. Once you share your file with someone, it could easily be forwarded to a lot of students and some of whom could cheat or plagiarize. Plagiarism is a very serious misdeed that can result in a reduced grade or an F (for the assignment and/or the course). *Please pay utmost attention to avoid such accusation.*

Classroom Policies and Conduct

Sabancı BA in Management Program **values participatory learning**. Establishing the necessary social order for **a participatory learning environment requires that we all**:

- Start each fifty-minute class session on time. This involves coming to each class on time.
- Turn off all cell phones, tablets, laptops or other electronic devices unless they are used as part of the lecture.
- Do not leave and re-enter the class during each fifty-minute long lecture (of course glitch related exceptions are granted).
- Do not read anything in print or on the electronic devices other than the class material.
- Come prepared to make helpful comments and ask questions that facilitate your own understanding and that of your classmates. This requires that you complete the assigned readings for each session before the class starts.

Tentative Course Schedule:

Week 1	**Dates:**	**October 05-06, 2020**
	Topic:	Introduction
	Requirements:	Read Chapter 1 and install Excel.
Week 2	**Dates:**	**October 12-13, 2020**
	Topic:	Descriptive Statistics and Statistical Inference (as a review only)
	Requirements:	Read Chapter 2 and Chapter 6 (focus on Section 6.5).
		Install R, R Studio and libraries that will be announced on SUCourse+.
Week 3	**Dates:**	**October 19-20, 2020**
	Topic:	Data Visualization
	Requirements:	Read Chapter 3. Start Case 1 (see page 2 for details).
Week 4	**Dates:**	**October 26-27, 2020**
	Topic:	Spreadsheet Models
	Requirements:	Read Chapter 10
	Case 1 Due:	**Submission of the case analysis report on SUCourse+.**
Week 5	**Dates:**	**November 02-03, 2020**
	Topic:	Descriptive Data Mining
	Requirements:	Read Chapter 5. Start Case 2 (see page 2 for details).
Week 6	**Dates:**	**November 09-10, 2020**
	Topic:	Time Series and Forecasting
	Requirements:	Read Chapter 8
	Case 2 Due:	**Submission of the case analysis report on SUCourse+.**
Week 7	**Dates:**	**November 16-17, 2020**
	Topic:	Linear Regression
	Requirements:	Read Chapter 7 Check midterm details on SUCourse+.
Week 8	**Dates:**	**November 23-24, 2020, Wednesday**
	Topic:	Predictive Data Mining
	Requirements	Read Chapter 9
	Midtern:	**Details will be posted on SUcourse+ in Week 7.**
Week 9	**Dates:**	**November 30-December 01, 2020**
	Topic:	Predictive Data Mining (Continued)
	Requirements	Read Chapter 9. Start Case 3 (see page 2 for details).
Week 10	**Dates:**	**December 07-08, 2020, Wednesday**
	Topic:	Linear Optimization Models
	Requirements:	Read Chapter 12.
	Case 3 Due:	**Submission of the case analysis report on SUCourse+.**
Week 11	**Dates:**	**December 14-15, 2020, Wednesday**
	Topic:	Integer Optimization Models
	Requirements:	Read Chapter 13. Start Case 4 (see page 2 for details).
Week 12	**Dates:**	**December 21-22, 2020**
	Topic:	Monte Carlo Simulation
	Requirements:	Read Chapter 11.
	Case 4 Due:	**Submission of the case analysis report on SUCourse+.**
Week 13	**Dates:**	**December 28-29, 2020**
	Topic:	Decision Analysis
	Requirements:	Read Chapter 15.
Week 14	**Dates:**	**January 04-05, 2021**
	Term Project	**Presenting your term project. Submission of presentation file on SUCourse+.**
	Presentations:	**Listening to the other term project presentations.**
Final Exam Week 1:		**Specific Date To Be Announced**
	Requirement:	**Submission of the final report of the term project through SUCourse+.**