Course Syllabus

Edit

QMB 6305-030: Managerial Decision Analysis

INSTRUCTOR: Prof. Wolfgang Jank

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Office Hours: please make an appointment with me.

University Course Description: A study of the general concepts of interval estimation, hypothesis testing, correlation and multiple regression with an emphasis on applications, concepts and interpretation of results. See also usfweb.usf.edu/academic-programs/details/prefix/QMB/code/6305

Course Pre-reqs: NA

Course Purpose: The practice of business is changing. Due to increasing desktop computing power and companies amassing massive amounts of data, business decisions made by companies are becoming more and more data based. This holds in many sectors, but in particular in banking, insurance, investment, retailing, eCommerce and direct marketing. Because of this new approach to business, companies are in need of people with a new set of computational skills. There is also an increasing notion that in order to stay competitive, managers need to be re-equipped with long-lost analytical skills. Related success stories include companies such as Google, Amazon, Netflix, AT&T, Harrah's, Capital One or the Boston Red Sox. And the reason that these few companies are so successful is that they have access to a pool of people with special analytical skills and tools, tools that are related to the exploration and analysis of business data.

Student Learning Outcomes: In this course, you will learn basic analytical principles that can guide a manager in making complex decisions. A good decision uses sound reasoning and takes into account all of the relevant data that is available at the time the decision is to be made. In order to arrive at a good decision, a manager must be able to:

- Identify an underlying analytical *structure* in a seemingly complex and amorphous decision problem
- Understand the *trade-offs* involved in the decision

- Understand the role of *uncertainty* and *risk* in the decision-making process
- Analyze available *data* to understand *relationships* among variables and to create *predictions*
- Use available *computing technology* to arrive at optimal solutions.

Starting from basic principles, you will learn about data exploration and visualization, methods for data & decision modeling, and risk analysis. The course is very hands-on, and emphasis is placed on understanding when to use which method. This course will also allow you to better interact with personnel specializing in analytics. In addition, you will learn how to implement data-driven decision making using one of the most powerful software packages.

INSTRUCTOR:

Wolfgang Jank is the Anderson Professor of Global Management in the Department of Information Systems and Decision Sciences, College of Business Administration, at the University of South Florida. Before joining USF, Professor Jank was an Associate Professor in the Department of Decisions, Operations & Information Technologies and the Director of the Center for Complexity in Business at the Robert H. Smith School of Business, University of Maryland. He is interested in applying ideas from statistics and data mining to problems in electronic commerce, marketing, and operations management. Dr. Jank has authored over seventy refereed articles and three books, and presented his work at national and international meetings. Dr. Jank received his Master's degree from the Technical University of Aachen (Germany) and his PhD in Statistics from the University of Florida. He has been involved in a variety of consulting projects and he is on the advisory board of several private companies. Prof. Jank is teaching classes in data analytics in different programs. While at the University of Maryland, he has received numerous awards including the top 15% teaching award for teaching MBA core classes.

Required Texts/Reading Materials: We will use two different books for this course. The books will be used simultaneously in that one book covers strategic aspects of business analytics from a high-level point of view; the other book has more of an operational flavor in that it conveys hands-on ideas for data-modeling. The two books are

- *Business Analytics for Managers* by Jank, Springer, 2011 (ISBN 978-1-4614-0405-7).
- *Competing on Analytics* by Davenport and Harris, Harvard Business School Press, 2007 (ISBN 142-2-1033-23)

PLEASE NOTE THAT THE EMBA OFFICE WILL PROVIDE YOU WITH YOUR TEXTBOOKS – YOU WILL NOT HAVE TO PURCHASE THEM YOURSELVES.

INTERACTIVE POLLING DEVICE

In addition to the above two books, we will also make extensive use of interactive response devices ("clickers"). Clickers allow me to receive feedback from the entire class instantly; they also allow you to gauge your own progress relative to your peers. Background stories on clickers can be found e.g. here **http://news.cnet.com/New-for-back-to-school-Clickers/2100-1041_3-5819171.html (http://news.cnet.com/New-for-back-to-school-Clickers/2100-1041_3-5819171.html)**

DATA MINING SOFTWARE

We will use the software *R* for analyzing and mining our data. R is free! In fact, R is an open-source based software and as such grows much faster than any commercial software solution. R is one of the most powerful and popular software solutions for mining business data. In fact, large analytical companies such as Google or AT&T use R. R is also becoming more and more popular among government agencies (such as the DOD). R is powerful, yet it is free – this combination makes it a winning proposition for many companies, especially during times of tightening budgets and financial stress.

Installing R Commander:

Please see the "Getting Started" module for detailed instructions.

COURSE WEBSITE

I will use the course website (hosted by 'Canvas') to distribute various files as necessary (e.g., course documents, data, assignments and solutions). Please be sure to visit Canvas on a regular basis.

COURSE FORMAT

Class meetings include lectures, discussions, team presentations and in-class projects. Each class meeting requires extensive **reading** to be completed before class. Please refer to the schedule at the end of this syllabus for the reading assigned for each class.

The lesson plan for each class is designed to *complement* and *leverage* the assigned readings, not merely replicate the ideas contained in the readings. *You will find the pace of the class to be uncomfortably rushed if you have not completed the reading assigned for that class.*

Completion of assigned readings will be checked in two ways. One is via class **discussion**; the other is via specifically designed test questions, administered via the "Clickers" (see also earlier topic), and to be answered by the entire class. Performance on both will affect your **participation grade**.

We will discuss both **hands-on implementation** of data-driven ideas as well as more **high-level, strategic concepts** of data analytics. Strategic discussions of data analytics will be led by **student teams** using chapters from the text “Competing on Analytics.” In every meeting, a different chapter will be discussed. To that end, I will post questions pertaining to each chapter. For every meeting, one or two student teams will prepare a short presentation based on these questions and discuss their answers and solutions in class.

At the end of some class meetings, we will conduct **in-class projects**. In-class projects serve the purpose for you to immediately practice the theoretical concepts learned in class. It will also give you an opportunity to get clarification and instant feed-back from the instructor and the class. Since class time is valuable, time for these projects will be limited. It is thus essential that you show up prepared. Projects will be posted before class and you are expected to have downloaded instructions & data and you are also expected to have attempted to solve the problem(s). In other words, you are expected to already have a good sense of the problem *before the start of the project* so you can hit the ground running.

Grade Categories and Weights: Your final numerical score for the semester will be determined by various deliverables according to the following system of weights:

Attendance & Class Participation	5%
Weekly Team Presentation	20%
Individual Assignments (3x)	45%
Team Project.	30 %
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	100 %

For each component, you will receive a numerical score, but not a letter grade. The overall letter grade for the semester will be determined by the table below.

Grading Scale:

Letter Grade Percent Score

A	95% - 100%
A-	90% - 95%
B+	87% - 90%
B	83% - 87%
B-	80% - 83%
C+	77% - 80%
C	73% - 77%
C-	70% - 73%
D+	67% - 70%
D	63% - 67%
D-	60% - 63%
F	Below 60%

ATTENDANCE & CLASS PARTICIPATION

Effective participation consists of not only responding to questions raised by the instructor but also asking thoughtful questions and responding to contributions from your fellow-students.

Quality of participation is more important than quantity. However, you will not earn credit in this component, if you rarely speak in class. Quality of participation includes:

Evidence of reading and prior analysis; Relevance of comments; Ability to listen and relate to input from other students; Ability to lead discussion into previously unexplored areas; Ability to admit error; Ability to intellectually interact with other students (and not just the instructor).

Attendance and participation will be captured in part by the *interactive polling system*. Special emphasis will be placed on participation during the *in-class projects*.

WEEKLY TEAM PRESENTATIONS

Every week, a different team (or set of teams) will take the lead discussing select chapters from the text "Competing on Analytics." Please refer to the detailed weekly schedule at the end of this syllabus. The team(s) will prepare a short presentation (based on a set of questions that I will distribute) and present their answers and solutions in class. While the presentation is primarily lead by one team of students, the remaining class is also encouraged to share additional/alternate views.

INDIVIDUAL ASSIGNMENTS

Several times throughout the course, an individual assignment will be due. The primary purpose of these assignments is for students to have the opportunity to practice the concepts learned in class, and to implement them using real data and real software. Individual assignments are expected to be solved rather quickly and not to consume much of your time. Careful participation during the *in-class projects* will allow you to solve the individual assignments more efficiently.

TEAM ASSIGNMENT: TEAM PAPER & TEAM PRESENTATION

The team assignment consists of two components: a **team paper** and a **team presentation** (to be held during our last in-class meeting).

The team paper consists of a comprehensive exercise in which you will use all of the methods & concepts learned in class and apply them to a decision making situation. In particular, your task will be to identify a data-driven decision scenario, collect appropriate data, analyze the data and derive actionable insights from your analyses. The data-driven decision scenario should relate to a real-world problem at your workplace and you should collect real data to address (and propose solutions) to the problem. Your final deliverable should contain answers to the following questions

- What is the nature of the business problem that you are addressing? Why is the problem important? Why is it difficult (i.e. why has it not been addressed before)?
- How did you identify a suitable data-source for your problem? Why is the data relevant for your problem? Would other data-sources have been possible? Which ones?
- How did you collect and capture the data? How did you assure that the collected data achieves the necessary data-quality? Were there any challenges with collecting the data?

- How did you explore the data? What tools did you use to discover patterns and trends in your data? What insights did you find? How did these insights affect your data collection efforts? How did they affect your modeling efforts?
- How did you go about modeling your data? What are the main research hypotheses that you wanted to address with your model? Did your model confirm these hypotheses? Or did it suggest alternate findings?
- How did you use your model and data explorations to derive actionable insights? What business insight can you derive from your analysis? Did you share these insights with managers/clients at your workplace? How did they react to it?

The deliverable for this assignment is a team paper (10 page limit) and a team presentation. Presentations will be held during the last class meeting. The paper is due at the same time.

It is anticipated that this is the most time-consuming assignment so you are urged to start early. You should, as a team, start as soon as possible to lay out a project plan and assign project components to individual team members.

The order for the team presentations will be determined *randomly*.

All team members are expected to be present during the presentations.

OTHER USF POLICIES:

Covid-19 Procedures

All students must comply with university policies and posted signs regarding COVID-19 mitigation measures, including wearing face coverings and maintaining social distancing during in-person classes. Failure to do so may result in dismissal from class, referral to the Office of Student Conduct and Ethical Development, and possible removal from campus.

Additional details are available on the University's Core Syllabus Policy Statements page: **https://www.usf.edu/provost/faculty/core-syllabus-policy-statements.aspx (https://www.usf.edu/provost/faculty/core-syllabus-policy-statements.aspx)**

Class Recording

Classes may be recorded and streamed online. Student's voice and video may be included in the class recording. It is the student's responsibility to make sure the privacy of their surroundings and background is maintained.

OTHER MATTERS

The health and safety of students, faculty, staff and visitors on our campuses is our top priority. In response to the current COVID-19 pandemic, the USF community will be working together to support compliance with recommended health and safety standards to optimize the learning experience while

minimizing health risks. The Conduct Expectations for all members of the community may be accessed at (**Conduct Expected to Support USF Health and Safety Standards (https://www.usf.edu/general-counsel/documents/resources/conduct-expected-to-support-usf-health-and-safety-standards.pdf)**) with details provided below.

Students and faculty will be guided by established USF processes to ensure the safest possible non-disruptive environment including the:

(1) **Academic Disruption Regulation (https://usf.app.box.com/v/usfregulation3025)** which provides for an immediate removal or restriction from a classroom setting with academic sanctions and/or

(2) **Student Conduct Regulation (https://usf.app.box.com/v/usfregulation60021)** to address conduct that is inconsistent with the expectations as outlined below.

OTHER USF COURSE POLICIES

"I" GRADE:
Students who are unable to complete all requirements of the course for circumstances beyond their control may request to receive an "I" grade to allow for completion of the remaining coursework the next semester(s).

USF Tampa Undergraduate: **http://ugs.usf.edu/policy/IGradePolicy.pdf (http://ugs.usf.edu/policy/IGradePolicy.pdf)**
USF Tampa Graduate: **http://www.grad.usf.edu/policies_sect7_full.php (http://www.grad.usf.edu/policies_sect7_full.php)**
USFSM: **http://usfsm.edu/catalog/academics/academic-policies-regulations/graduate-grading-system/incomplete-i/ (http://usfsm.edu/catalog/academics/academic-policies-regulations/graduate-grading-system/incomplete-i/)**
USFSP Undergraduate: **http://regulationspolicies.usf.edu/policies-and-procedures/pdfs/policy-11-004.pdf (http://regulationspolicies.usf.edu/policies-and-procedures/pdfs/policy-11-004.pdf)**
USFSP Graduate: **http://regulationspolicies.usf.edu/policies-and-procedures/pdfs/policy-11-004.pdf (http://regulationspolicies.usf.edu/policies-and-procedures/pdfs/policy-11-004.pdf)**

FINAL EXAMINATIONS
USF System Policy 10-005 (http://regulationspolicies.usf.edu/policies-and-procedures/pdfs/policy-10-005.pdf)
All final examinations are to be scheduled in accordance with the University's final examination policy.

ACADEMIC INTEGRITY OF STUDENTS
USF System Regulation 3.027 (http://regulationspolicies.usf.edu/regulations/pdfs/regulation-usf3.027.pdf)
Knowledge and maintenance of the academic standards of honesty and integrity as set forth by the

university are the responsibility of the entire academic community, including the instructional faculty, staff, and students.

DISRUPTION OF ACADEMIC PROCESS

USF System Regulation 3.025 (http://regulationspolicies.usf.edu/regulations/pdfs/regulation-usf3.025.pdf)

Although disruptive student conduct is already prohibited by the Student Code of Conduct, the purpose of this policy is to clarify what constitutes disruptive behavior in the academic setting, what actions faculty and relevant academic officers may take in response to disruptive conduct, and the authority of the Office of Student Rights and Responsibilities or designated office handling conduct issues in Student Affairs to initiate separate disciplinary proceedings again students for disruptive conduct.

STUDENT ACADEMIC GRIEVANCE PROCEDURES

USF System Policy 10-002 (http://regulationspolicies.usf.edu/policies-and-procedures/pdfs/policy-10-002.pdf)

The purpose of these procedures is to provide all students taking courses within the USF System an opportunity for objective review of facts and events pertinent to the cause of the academic grievance An "academic grievance" is a claim that a specific academic decision or action that affects that student's academic record or status has violated published policies and procedures, or has been applied to the grievant in a manner different than that used for other students.

EARLY NOTIFICATION REQUIREMENT FOR OBSERVED RELIGIOUS HOLIDAYS

USF System Policy 10-045 (http://regulationspolicies.usf.edu/policies-and-procedures/pdfs/policy-10-045.pdf)

Students who anticipate the necessity of being absent from class due to the observation of a major religious observance must provide notice of the date(s) to the instructor, in writing, at the beginning of the term.

GENDER-BASED CRIMES/SEXUAL MISCONDUCT/SEXUAL HARASSMENT (INCLUDING SEXUAL VIOLENCE)

USF System Policy 0-004 (http://regulationspolicies.usf.edu/policies-and-procedures/pdfs/policy-0-004.pdf)

USF has a commitment to the safety and well-being of our students. Please be aware that educators must report incidents of sexual harassment and gender-based crimes including sexual assault, stalking, and domestic/relationship violence that come to their attention. I am required to report such incidents in order for the Office of Student Rights and Responsibilities or the Office of Diversity, Inclusion, and Equal Opportunity can investigate the incident or situation as a possible violation of the USF Sexual Misconduct/Sexual Harassment Policy and provide assistance to the student making the disclosure. If you disclose in class or to me personally, I must report the disclosure and will assist you in accessing available resources.

The Center for Victim Advocacy and Violence Prevention, the Counseling Center and Student Health Services are confidential resources where you can talk about such situations and receive assistance

without the incident being reported.

- Center for Victim Advocacy and Violence Prevention:
  - (813) 974-5757
  - **http://sa.usf.edu/advocacy (http://sa.usf.edu/advocacy)**
- Counseling Center
    - (813) 974-2831
  - **http://usf.edu/student-affairs/counseling-center (http://usf.edu/student-affairs/counseling-center)**
- Student Health Services
  - (813) 974-2331
  - **http://usf.edu/student-affairs/student-health-services (http://usf.edu/student-affairs/student-health-services)**

GENERAL ATTENDANCE POLICY

USF General Attendance Policy (http://ugs.usf.edu/policy/GeneralAttendance.pdf)

Students are expected to attend classes. Faculty must inform students of attendance requirements on syllabi. Instructors should accommodate excused absences by making arrangements with students ahead of time (when possible) or by providing a reasonable amount of time to make up missed work.

DISABILITY ACCESS

USF System Policy 0-108 (http://regulationspolicies.usf.edu/policies-and-procedures/pdfs/policy-0-108.pdf)

Students with disabilities are responsible for registering with Students with Disabilities Services (SDS) in order to receive academic accommodations.

SDS encounters similar difficulties with course syllabi each semester. Highlighted here are some issues to consider as faculty members develop syllabi:

Accommodated Quizzes, Tests and **Exams**

SDS administers more than 7,000 exams to the USF community each academic year. The student is responsible for scheduling accommodated tests and exams with SDS. Students must schedule with SDS at least one full week before the requested test date. Students who miss this deadline complete a Late Exam Request Form requiring an instructor signature. SDS schedules late exam requests as space allows and as close to the original test date as possible.

Due to the volume of tests and exams SDS manages, SDS cannot provide accommodated testing space for "pop" or unscheduled quizzes. Consult with SDS for information on accommodating unscheduled quizzes.

Make-up Exams

Students who are taking a make-up exam due to disability reasons (medical issues, scheduling conflicts with other courses and extended exam time, disability related appointments etc.) should be allowed to

take a make-up exam within 10 business days of the student's return to classes. SDS schedules make-up exams as space allows.

Online Proctoring such as Proctorio
Consult with SDS prior to a student who utilizes accommodations using Proctorio. Some SDS students have atypical testing behaviors. Other SDS students utilize adaptive software that does not collaborate well with Proctorio software.

Laptop or Electronic Device Usage
If prohibiting laptop, phone or electronic device usage in class, keep in mind that some SDS students utilize such devices for note taking and recording. Still others have medical applications on cell phones that the student cannot turn off (blood sugar monitors, medication alerts etc.) Policies that indicate, "Only those with accommodations may use such devices" inadvertently draw attention to the student with the accommodation. SDS suggests using language that indicates, "Students utilizing laptops, cell phones or other electronic devices for non-academic reasons during class time may be penalized . . . ."

Clicker Accessibility
Consult with SDS about alternatives to clicker points. Many SDS students have disabilities that affect the ability to answer clicker questions.

Attendance/Participation Accommodations Apply to all courses – Even on-line
If a student has attendance or participation accommodations, SDS provides an "Attendance/Participation Accommodation Form" as part of the student's accommodation letter. This form is tool intended to guide a conversation between a student and instructor about missed courses, missed deadlines and the procedures to follow when requesting extensions. The accommodation does not allow a student to miss an indefinite number of classes or deadlines. Instructors may always consult with SDS to determine what is reasonable.

Accessible Materials
USF policy requires that all course materials be accessible to students. Per the USF Caption and Media Access Policy, all media sources must be captioned prior to use. SDS encourages faculty to consider document accessibility. Use the "Style" functions in Microsoft Word and the OCR functions in Adobe to ensure that all course documents are accessible to those who utilize screen reading technology. See the SDS Accessibility Guide for more information: www.sds.usf.edu (under resources).

Course Schedule:

(all below readings from "Business Analytics for Managers" by Jank; for reading assignments from the book "Competing on Analytics/Davenport & Harris, please see weekly team presentations)

Meet #	Topic	Weekly Reading *
1	Introduction; Exploring & Discovering Data	Ch.1,2&7
2	Basics of Data Modeling (I); Fitting and Interpreting Regression Models	Ch.3.1&3.2
3	Basics of Data Modeling (II); Identifying and Selecting Important Predictors	Ch.3.3&3.4
4	Making Models More Flexible (I); Dummy Variables	Ch.4.1
	Making Models More Flexible (II); Interaction Terms	Ch.4.2
5	Wrap-up; Team Project Presentations	NA
	* all readings from "Business Analytics for Managers" by Jank	

Course Summary:

Date	Details	Due
Sat Aug 26, 2023	First Day Attendance Quiz (https://usflearn.instructure.com/courses/1827668/assignments/14282649)	due by 11:59pm
	Getting Started Quiz (https://usflearn.instructure.com/courses/1827668/assignments/14282641)	due by 11:59pm
	In-class Project 1 Quiz (https://usflearn.instructure.com/courses/1827668/assignments/14282645)	due by 11:59pm
Fri Sep 8, 2023	Individual Assignment 1 (https://usflearn.instructure.com/courses/1827668/assignments/14282643)	due by 11:59pm
	Individual Assignment 2 (https://usflearn.instructure.com/courses/1827668/assignments/14282637)	due by 11:59pm

Date	Details	Due
Sat Sep 23, 2023	Individual Assignment 3 (https://usflearn.instructure.com/courses/1827668/assignments/14282639)	due by 11:59pm
	Team Project Feedback (https://usflearn.instructure.com/courses/1827668/assignments/14282647)	due by 11:59pm
	Attendance & Participation (https://usflearn.instructure.com/courses/1827668/assignments/14282651)	due by 11:59pm
	Please submit your course evaluations (https://usflearn.instructure.com/courses/1827668/assignments/14282653)	due by 11:59pm
	Team Data Project (Paper & Prez) (https://usflearn.instructure.com/courses/1827668/assignments/14282655)	due by 11:59pm
	Weekly Team Presentation (https://usflearn.instructure.com/courses/1827668/assignments/14282657)	due by 11:59pm