Business analytics provides benefits throughout all major functional areas of an organization. Business analytics is defined as the study, integration, and application of knowledge, skills, and methods for using data, statistical analysis, quantitative approaches, and predictive modeling to enable data-driven decision making, innovation, and leadership in organizations. Business analytics enables “Big Data” initiatives. This course teaches students how to use market-leading analytics and statistical packages (SAS, Tableau, MySQL, Python, Google, dashboards, etc.), including hands-on skills to implement strategies and approaches for defining, performing, and presenting business analytics. This course does not assume prior knowledge of topics for business analytics, has no prerequisites, and is open to all USC graduate students from all schools and all disciplines.
The course goals are for each student to come away with a detailed knowledge of how to work with, and understand, uncertainty. Many business decisions are made with imperfect information, so understanding the methodology and process for handling the unknown is critical. Probability theory will help with this and Excel computations will be critical in applying these ideas to real situations.

Who should take this course?

- Students who are interested in the application of probability theory to data analysis.
- Students who want an applicable, hands-on course that explains how to model various types of data. This depends very much on knowledge of common distributions and data structures, so you will learn what is appropriate in which situations.

Course objectives

The course goals are for each student to come away with a detailed knowledge of how to work with, and understand, uncertainty. Many business decisions are made with imperfect information, so understanding the methodology and process for handling the unknown is critical. Probability theory will help with this and Excel computations will be critical in applying these ideas to real situations.

Key concepts

- Modeling uncertainty
- Distribution functions
- Laws of large numbers
- Sampling
- Statistics and data analysis
- Spreadsheet skills

Together, we will build probability models for:

- Demand prediction
- Quality of service evaluation
- Capacity planning
- Portfolio allocation

Course description

Uncertainty is everywhere. Our objective is to use probability theory to find structure in this uncertainty. We will do this by building probability models from data, which can then be used as inputs for simulation models. Simulation types we will address are Monte Carlo and Discrete-event models that focus on incorporating variability in a process.
Who should take the course?

Students who plan to have a career in Business Analytics and interested in knowing more about Big Data and Predictive Analytics should take this class. Students who have previous knowledge in Analytical Models do not know how to use it in Business should take this class. Managers who want to combine Analytics with Business Analysis should take this class.

Course Objectives

- To provide students with concepts, frameworks, analytical thinking, critical thinking and creative thinking skills for converting Company Data + Big Data into actionable form and building analytical models for monetizing data.
- To provide practical knowledge (cases), skills, methods, tools, KPIs and resources for conceiving, building and solving new paradigms in Big Data Analytics space.
- To give a Big Picture view of Big Data Analytics

Key Concepts

- Data Mining
- Business Intelligence
- Data Warehousing
- Big Data Platforms
- MAGIC framework
- JMP Software
- SAS Enterprise Miner
- Classification & Clustering & Association
- Decision Tree, Logistic Regression, KNN
- Neural Network, Naïve Bayesian
- Partitional and Hierarchical Clustering
- KPIs – Business and Statistical
- Search Engine Marketing
- Enrichment, Star Schema, Dash Boards
- Introduction to many industry tools

Course Description

The course focus is to give a Big Picture view of Business Analytics, its components and platforms. To build sophisticated business analytical models from raw data using Desk top and Industry level tools for Classification, Clustering and Association Problems. To show how to leverage the readily available “Big Data” from third party sources for enriching and monetizing data. To develop data mining and business analysis skillset to gain inference from your analysis, from Executive, Business and Statistical point of view. **To provide a systematic approach to build Analytical Models. To provide the missing link between Analytics and Business Analysis.**
Data Science and Operations
USC Marshall School of Business

DSO-529
Advanced Regression Analysis (Section 16268 D)

Spring 2021
Tuesdays and Thursdays, 2:00 – 3:20 pm

Why should you take this course?

- Students completing this course will have a detailed understanding of Regression Analysis, Analysis of Variance, and other various Multivariate methods.
- Numerous real examples from finance, marketing, economics, accounting, politics, sports, etc., are used to illustrate applications of the material covered. Emphasis will be placed on the analysis of actual datasets.
- Knowledge of Regression Analysis is a skill in very high demand for working in either the private or public sector. This course develops those skills and also opens possibilities for a business analyst/forecasting management position in business. There is a shortage of well-trained MBAs for these positions.
- This course is intended for students working in the fields of Accounting, Economics, Finance, General Business, Human Resources, Marketing, Operations, International Trade, etc., who want a practical introduction to Applied Statistics, Multivariate Analyses, and Econometrics.

Course objective

The course goals are for each student to understand regression methods and obtain hands-on experience using, analyzing, and developing multivariate models for business applications. This is a data analysis course that shows how to use the statistical package JMP to help solve both simple and complex real-life data problems.

Key applications

Regression analysis is performed in any organization working with quantifiable data.

- Marketing managers use a sales forecast to establish promotional budgets.
- Accountants rely on forecasts of costs and revenue in tax planning.
- Finance experts must forecast cash flows to maintain solvency.
- The personnel department depends on forecasts as it plans recruitment of new employees and other changes in the workforce.
- Production managers rely on forecasts to determine raw material needs and the desired inventory of finished products.

Course description

This is a data-driven applied statistics course focusing on the analysis of data using Regression and Multivariate models. Topics include Multiple Linear Regression, Residual Analysis and Non-linear Model-building, Heteroscedasticity, Time Series Modeling, Categorical Predictors, Logistic Regression, Analysis of Variance, Clustering, and Panel Data Analysis.
Digital Foundations for Business Innovation

Adjunct Professor Vivek Sharma,
CEO & Founder, InStride

Wednesday - 2:00-4:50pm - Section 16280

Who should take this course?

Students looking to gain a greater understanding of how digital tools and technologies can accelerate business innovation firsthand, from executives currently driving digital growth in a Fortune 100 company.

Course Objectives

- Demonstrate fluency in the language framework of digital as a tool for business innovation
- Engage in dialogue with one another and with executive guest speakers how the emerging digital tools and technologies of our time can provide opportunities for business leaders, along with potential drawbacks to be safeguarded against.
- Infuse perspectives from thought leaders and business executives working to address real-world business needs into written work.
- Build a business case based on digital innovation.

Key Concepts & Tools

The course examines 15 emerging digital innovations shaping consumer-oriented businesses, in order to provide a basic framework for these concepts and provide leaders a greater understanding of how to leverage these powerful capabilities to build or grow businesses. For each of these digital innovations and in each class session, the course is focused on five questions: What does it mean? Why is it an important trend? What is the landscape? What are the key metrics? What are the implications for users, organizations and business leaders?

Course Description

Every business has become, or is transitioning into, a digital business. Consumers today live in a world where the most valuable retailer has no inventory, the world's most popular media owner creates no content, the world's largest accommodation provider owns no real estate and the world's largest taxi company owns no vehicles. But the forces shaping this digital revolution are often difficult to understand, for both these consumers and many business leaders.

This course will largely be based on discussion and require students’ active participation in every session. Its content and format stem from a successful initiative undertaken at The Walt Disney Company to provide greater context around digital innovations to thousands of its business leaders addressing current business realities.
DATA SCIENCES AND OPERATIONS (DSO)

USC Marshall School of Business

DSO 536(16307D/16308D)
Monte Carlo Simulation and Decision Models
*Corequisite DSO 516

Spring 2021
Mon 6:30-9:20PM
(Meets in second-half of semester)

Who should take the course?
Students who are interested in business analytics in general, and in techniques to account for risk in decision-making more specifically.

Course Objectives
To empower students with the knowledge to develop decision models in Excel that incorporate uncertainty, by using techniques like random number generation and Crystal Ball Excel plug-in.

Key Concepts
- Risk analysis
- Decision making under uncertainty
- Statistics and data analysis
- Random number generation
- Quantitative spreadsheet skills.
- Oracle “Crystal Ball” Excel plug-in

Course Description
We live in an uncertain world. In business and every-day life one must make decisions all the time with a stochastic outcome. Understanding this uncertainty by relying on rigorous methodology can help us make better decisions. Through simulation and risk analysis tools provided in this course, we can account for randomness in decision-making, by considering a range of possible outcomes, and their probabilities of occurrence for each possible course of action. Examples of uncertain situations where we will perform simulations and risk analysis will include many business fields like finance, marketing, accounting, and operations.

In relation to DSO 547 (Designing Spreadsheet-Based Business Models), this course focuses more on uncertainty modeling (without assuming knowledge from DSO 547).

Professor Cosimo Arnesano
BRI 303E
arnesano@marshall.usc.edu

Corequisite DSO 516
Who should take the course?

Are you interested in cleaning, reshaping, and exploring data?
Are you interested in producing beautiful and informative graphics?
Are you interested in learning R?
Are you interested in statistical computing and modelling?
If your answer is YES to these questions, then it’s YOU who should take this class!

Course objectives

Clean messy big data using R
Distinguish between good and bad graphics
Produce 1-D, 2-D, 3-D, hypervariate, time series, and spatial graphics
Present data analysis and graphics using web dashboards

Key concepts

R statistical package
Data cleaning
Data reshaping
Univariate data graphics
Multivariate data graphics

Time series data graphics
Spatial data graphics
Animated data graphics
Web dashboards
Reproducible data reports

Course description

In this course, you will learn how to make sense of data, and not the specifics of modeling. The course starts with statistical computing, and you will gain experience with a programming language called R. You will learn the practice of data cleaning, reshaping of data, basic tabulations, and aggregations in order to be able to produce high quality visualizations. Then, the course proceeds with graphics that are critical elements of modern data analysis and presentation. And finally, the course concludes with creating web dashboards connected to R.
Aspiring finance professionals, business analysts, quant-savvy entrepreneurs, and management consultants need spreadsheet modeling skills to draw insights and build projections amidst uncertain conditions.

Course Objectives

Using MS Excel as the platform, this course trains professionals to become effective modelers: to translate industry challenges into well-formulated spreadsheet models, and then use those models to drive decision-making.

Key Concepts

- Spreadsheet Modeling
- Sensitivity Analysis
- Monte Carlo simulation
- Optimization
- Financial modeling
- Scenario analysis
- Decision analysis (decision trees)
- Data tables & Pivot Tables
- Risk Analysis
- Multiple regression modeling

Course Description

The course teaches spreadsheet modeling skills as well as industry best practices and expectations. Modeling skills are developed throughout the course using examples from many functions and industries. In addition to general modeling skills, the course will teach a handful of frameworks and tools useful to drawing managerial insights.

Emphasis is placed on the understanding of the fundamental drivers to quantitative decision-making as well as the communication skills necessary to drive organizational change.
Interested in digital transformation that takes place when any enterprise wants to take a core part of its business online and to “go digital”? Would you like to learn how to intelligently harness the strategic business value of disruptive digital technologies such as Internet of Things, machine learning/artificial intelligence, business analytics, and social media? Would you like to understand the critical differences between digital business and traditional business? This course is also a good companion course to DSO 554 “Digital Strategies for Sustainability in Global Markets” taught by professor Omar El Sawy and DSO 574 “Using big data” taught by professor Milan Miric.

Who should take the course?

This is an overview course to prepare the general manager to be more effective in dealing (both strategically and organizationally) with the digital transformation of the global enterprise and its ecosystem of partnerships. Mastering the concepts, practices, and technologies of digital transformation is a critical skill for line managers in any area of business. This is a “future-proof” survey course that helps you understand enough pieces of the mosaic that forms digital transformation.

Course objectives

This is an overview course to prepare the general manager to be more effective in dealing (both strategically and organizationally) with the digital transformation of the global enterprise and its ecosystem of partnerships. Mastering the concepts, practices, and technologies of digital transformation is a critical skill for line managers in any area of business. This is a “future-proof” survey course that helps you understand enough pieces of the mosaic that forms digital transformation.

Key concepts

- How to manage partnerships in a digital business ecosystem
- Organizational changes enabled by disruptive digital technologies
- Digital Leadership
- Uniqueness of platform business (vs. traditional business)
- Business analytics and new management practices
- Machine learning management
- Artificial intelligence and Human intelligence
- Social media strategies
- Digital transformation in selected industry sectors

Course description

- Recent case studies, articles, industry reports, current happenings.
- Senior executive guest speakers who provide current practice insights.
- Fosters interactive discussion & peer learning.
- Industry focus group analysis
Who should take the course?

Structured query language (SQL) is an extremely desirable skill for anyone in today’s workforce. It’s becoming increasingly common for employers to require at least a basic knowledge of SQL in professions related to finance, operations management, supply chain, banking, economics, data science and business analytics. When you apply for a business analyst position, it is very likely you will also have to answer technical questions to demonstrate your knowledge. With SQL, data analysis can be performed more efficiently. SQL allows you to better understand and interpret documents that contain results from databases, and it enables you to conduct a deeper analysis of the data stored in databases. If you want to learn how can database management provide a competitive edge, you should take this class.

Course Objectives

The purpose of this course is to equip students with the foundational knowledge, skills, methods, tools, and resources needed to design a database and learn how to operate and interact with databases. In this course, the students will learn the essential structure of relational databases, how to read and write simple and complex SQL statements, as well as advanced database manipulation techniques.

Key Concepts

- Modeling and Designing Database
- Entity-Relationship Model
- Database structures
- From ER Diagram to SQL Tables
- Querying a Database Using SQL
- Google Big Query

Course Description

Structured query language (SQL) is the language for databases. Databases arguably store the vast majority of the world’s data. Without accurate data, companies simply can’t deliver the basic services they need to provide. Databases provide fast, safe and effective means to store this information, and databases are at the core of most information. This course provides a step-by-step introduction on how to design and implement an SQL database. You will learn how to create SQL statements for data storage, data collection, data computation and reporting.
Data Sciences and Operations

USC Marshall School of Business

DSO 554 - Spring 2021 (Section 16274D)

Digital Strategies for Sustainability in Global Markets

7 Selected Saturdays 9 am to 12 noon + Virtual Trip – Online

Includes semester-long field consulting project & virtual experiential learning trip to companies in Copenhagen, Denmark on March 15-19. Details in course guide attached to USC Schedule of Classes [https://classes.usc.edu/term-20211/classes/dso/](https://classes.usc.edu/term-20211/classes/dso/)

Professor Omar El Sawy  elsay@marshall.usc.edu
https://www.marshall.usc.edu/personnel/omar-el-sawy

Who should take the course?

Professionals who want to gain a managerial understanding of business strategies for sustainability in a global environment which is increasingly enabled by digital platforms, and want to have a field team consulting experience in a global context.

Course objectives: **Trip is Virtual, Field Project Experience is Real!**

Providing the understanding that a successful business strategy for sustainability is different from and much broader than just “green” and must consider multiple facets of the business ecosystem in which an organization operates: socio-cultural, economic, and technological. It is about creating long-term common shared value for all stakeholders in the communities and markets that the enterprise operates in. Digital platforms provide new opportunities and business models for more effectively managing sustainability. Denmark provides a sophisticated humanistic context for both digitalization and sustainability.

**Key concepts**

- How to scope and assess a business strategy for sustainability
- How digital business models can enable novel sustainability strategies
- Future-looking familiarity with energy/environment/transportation sectors
- Forming new perspectives for your managerial future with insights from a progressive Nordic economy
- Executing a team field project in collaboration with a company

**Course description**

- 7 Saturday classes – 5 before and 2 after Spring break (very front loaded)
- Lectures, cases, readings, individual write-ups.
- Semester long field consulting project with a company in Copenhagen, Denmark with a team of 5-6 students. All students see all projects.
- Virtual learning trip to 4-5 Copenhagen companies March 15-19 with company executive briefings and discussion.
- Virtual Denmark week will start very early morning in LA to be able to visit with the Danish companies in European time afternoon.
- Companies sought for 2021: Maersk, LEGO, Vestas, CR Hansen, Carlsberg
GLOBAL IMMERSION OFFERING

COURSE GUIDE – SPRING 2021

Digital Strategies for Sustainability in Global Markets
(with real field consulting projects and a virtual experiential learning trip to Copenhagen, Denmark from March 15-19)

DSO 554 -- OMAR A. EL SAWY

CLASS DAY AND TIME
This class will be online. Online class sessions will be held from 9 am – 12 noon PST for 7 select Saturdays via Zoom as noted in the schedule on Page 4. The Zoom link is posted with your Blackboard course pages. Please note that the course is front-loaded in terms of workload in the first half of the semester.

The class also includes 4-5 semester-long Danish company team field projects and a virtual international field trip to Copenhagen, Denmark during the week of March 15-19. The Virtual Denmark week will start very early morning in LA to be able to visit the Danish companies in European time afternoon and get company briefings followed by MBA/MS project mid-point presentations with feedback from company managers. Please note that first session is on Saturday, January 23rd and it is required to attend the first session to stay enrolled!

COURSE INSTRUCTOR: OMAR A. EL SAWY
Kenneth King Stonier Chair in Business Administration & Professor of Information Systems
Department of Data Sciences & Operations, Marshall School of Business
https://www.marshall.usc.edu/personnel/omar-el-sawy

- e-mail: elsawy@marshall.usc.edu (easiest)  Mobile phone: 310-991-6627 or 310-991-omar
- Office Hours: By appointment/Zoom, by phone, or after class.

The International Field Trip is Virtual..
But, the Global Immersion & the Company Field Project Experience are Real..!
COURSE DESCRIPTION & OBJECTIVES:
This is a multidisciplinary cross-functional course that is suitable for MBA/MS students from all business functions and with interests in any industry. The course provides a managerial understanding of business strategies for sustainability in a global environment which is increasingly enabled by digital technologies and digital platforms.

In its most generic and simplest form, sustainability strategy is about meeting the needs of the present without compromising the ability of future generations to meet their own needs. In the corporate world, strategies for sustainability are still in their infancy and not yet well integrated into corporate strategy or digital business strategy – but we are moving steadily in that integration direction.

But -- sustainability has many other facets in addition to the temporal longitudinal dimension of not compromising future generations nor resources. It comprises many different components. A successful business strategy for sustainability is much broader than just “green” and must consider the multiple facets of the business ecosystem in which an organization operates: socio-cultural, economic, and technological – and not just the natural physical environment. Thus, a successful business strategy for sustainability has to worry about operating profitably while protecting/restoring the natural environment, but also about how actions affect members of society, and resonate with cultural values. Furthermore, a sustainability strategy has a cross-sectional ecosystem dimension and is also about creating common shared value for all stakeholders in the communities and markets that the enterprise operates within. Furthermore, sustainability strategy has a collaborative consumption dimension when idle resources are shared. Think Uber, Airbnb, etc.. and how the sharing economy allows the shared use of idle resources. In short, sustainability strategy is a multi-faceted phenomenon that requires our careful managerial attention across the corporation, and it is not about compliance, but it is about creating new opportunities and new business models.

In the context of sustainability strategy “the elephant in the room” are digital technologies, digital platforms, and digital business models and the new opportunities that this creates. The course will also specifically focus on how to take advantage of digital technologies for sustainability strategies – and hopefully you will appreciate why as we go through the course. We now live in a technology intensive digital world that is filled with ubiquitous high-speed communication wireless networks, real-time sensors, smart grids, social networks, and a multitude of mobile devices. These technologies are enabling novel digital business models that enable open innovation, complex sensing, real-time information, health and environment monitoring, customer co-creation, and much more. This provides a multitude of new options for intelligent business strategies for sustainability. In the next few years the energy and environment industries (include smart clean energy) will undergo a radical transformation due to the use of digital technologies, and many industry boundaries will shift in associated industries such as building and construction, real estate, tourism, transportation, and wellness/healthcare. Furthermore, smart cities and smart government services are also slowly but surely becoming more digital-platform-centric. Smart sustainable city initiatives in a growing number of cities around the world are steadily surely becoming a reality rather than just a battle cry.

FIELD CONSULTING PROJECTS & COMPANIES:
This course has always focused on global markets and has included field consulting projects with companies in an overseas location, and an international experiential learning trip. This is now the 10th
year and round for this course and from 2011-2018 we focused on the UAE (Dubai and Abu Dhabi), a context which has provided a very rapid emerging growth global development venue where sustainability issues abound. The course experience has been consistently highly rated by both companies and participants. Starting from the 8th round in Summer 2019 we have shifted our focus to the more established Nordic region – we specifically focus on Denmark – where there is a refreshingly progressive view of sustainability strategy, digital strategies for sustainability, digitalization, humanistic perspectives, and smart city services. Furthermore, in case you did not know: Denmark has been consistently ranked among the top three happiest countries in the world year after year in the World Happiness Report. So, they must know or do something that we don’t...

Project companies and visits in Summer 2019 were TDC (telecom and media), Coloplast (intimate healthcare), Novo Nordisk (Pharmaceuticals), GreenMobility (electric car service), DTU Wind lab (wind turbines). In Spring 2020 companies and visits were Maersk (shipping), Orsted (wind turbines), Green Mobility (electric car service), CR Hansen (bioscience for food products), and State of Green (sustainability non-profit). In Spring 2020 we had to pivot in mid-semester to a virtual trip due to Covid-19 and we were still able to get a useful and immersive project interaction and experience with the companies as reported by both the class participants and the companies. We look forward to similarly learningful and engaging fulfilling days of projects and visits for Spring 2021! The companies being sought include LEGO, Vestas, CR Hansen, and Carlsberg.

**SKILLS AND MINDSET ACQUIRED THROUGH THIS COURSE:**

It is becoming increasingly critical for managers to understand and appreciate what business strategies for sustainability are, how to design them, and to become sensitized to the challenges of organizational implementation. Most importantly, the course provides a managerial understanding of business strategies for sustainability in a business environment which is becoming increasingly driven and enabled by digital technologies. The object of the course is to give you the skills and mindset to be a full participant in such progressive undertakings at the managerial level. You will learn and understand:

1) How to scope and assess a business strategy for sustainability, & understanding the drivers of sustainability
2) An understanding of digital business models and how they can enable novel sustainability strategies
3) An understanding of digital platform ecosystems and their critical properties
4) An understanding of how to proactively transform value chain activities in a company for sustainability
5) An appreciation of economic global opportunities in the Nordic region in a direct experiential manner
6) A team consulting experience in an international location and context
7) A future-looking familiarity with the energy/environment/transportation/smart city sectors
8) Forming a mature perspective on what business strategy for sustainability with multiple stakeholders means for your managerial future
9) How Covid-19 has changed the sustainability mindset
<table>
<thead>
<tr>
<th>Session #</th>
<th>Date (2021)</th>
<th>Topic</th>
<th>Special Events</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sat Jan 23¹ (MLK is Jan 18)</td>
<td>Course Orientation &amp; Intro. to Smart Sustainability &amp; Digital Business Models – and their inter-connection</td>
<td>Introduction &amp; Explanation of Project Procedures</td>
</tr>
<tr>
<td>2</td>
<td>Sat Jan 30</td>
<td>Digital Disruption in the Smart Energy Sector -- and More on sustainability strategy and digital platform business models..</td>
<td>Sector Case #1 – Smart Clean Energy/Environment Assignment#1 Due</td>
</tr>
<tr>
<td>3</td>
<td>Sat Feb 6</td>
<td>Smart Mobility and Monitoring &amp; Measuring Sustainability Initiatives</td>
<td>Sector Case #2 – Smart Sustainable City/Transportation Assignment#2 Due</td>
</tr>
<tr>
<td>4</td>
<td>Sat Feb 20</td>
<td>The Danish Nordic Economic and Cultural Context, and its outlook on smart sustainability</td>
<td>Country Orientation</td>
</tr>
<tr>
<td>5</td>
<td>Sat Feb 27</td>
<td>Consulting Dry-Run Mid-point Project Presentations with Feedback</td>
<td>Interim Class Presentations for Teams</td>
</tr>
<tr>
<td>6</td>
<td>Sat March 27 (Easter is Sun April 4)</td>
<td>Integrative Re-Cap &amp; Lessons for the Future</td>
<td>Golden Nuggets Assignment &amp; Team “Left to-do” Consultations Assignment#3 Due</td>
</tr>
<tr>
<td>7</td>
<td>Sat April 17</td>
<td>Team Consulting Project Walkthroughs with Feedback</td>
<td>Final Walkthrough Presentations for Teams</td>
</tr>
<tr>
<td></td>
<td>Wed April 21</td>
<td>*** Final Team Consulting Report due</td>
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</tbody>
</table>

¹ You do need to attend the first class to stay enrolled. Course is front-loaded and accelerates quickly! You will need to turn in your first assignment on Sat Jan 30, and there are readings for Sat Jan 23.
**PEDAGOGY & LEARNING METHODS**

The course has 5 interrelated learning components as below. *Please note that the course is front loaded with more work in the first half of the semester until the trip, and the summer semester is already accelerated.*

1. **CASES & READINGS:** The 1st component is a series of sector cases and readings to help you understand the key issues, underlying concepts, enabling technologies, and effective techniques for digital sustainability strategies. This learning will take place through five scheduled sessions before the trip. Individual case-related write-ups are required.

2. **TEAM CONSULTING PROJECT:** The 2nd component (major) is working on a team consulting project that gives you the challenge/opportunity of dealing with the details and the idiosyncrasies/fickleness/fuzziness of a company project and honing your skills through doing and shaping. Teams are assigned to each of the companies. An oral class presentation by each team is required before the virtual field trip; another is expected at the company virtually, as well as a final walkthrough at end of semester. A written report for each team is also required as well.

3. **COUNTRY ORIENTATION:** The 3rd component is an orientation session on the Danish economy and Nordic model and culture.

4. **VIRTUAL FIELD TRIP:** The 4th component is a virtual field trip to the Denmark companies. It involves a 5-day schedule of virtual on-site visits to learn about and discuss digital sustainability strategies with managers of the 5 selected companies. All participants are expected to be actively engaged in this experience at *all* the companies during that week.

5. **DRAWING LESSONS FOR THE FUTURE:** The 5th component is an integrative recap of what was learned through the first 4 components, reflecting back, and drawing lessons for the future. One session and one “golden nuggets” assignment is dedicated for that immediately after returning from the field trip. We have also typically brought in class alums from previous years over video.

2. Other Readings: Articles from professional journals and trade press, and industry reports. These will be made available on-line through the BlackBoard class folder.

3. Optional Book: Elkington, John *Green Swans: The Coming Boom in Regenerative Capitalism*, Fast Company, 2020. This is an intriguing book that is a manifesto for system change deserved to serve people, planet, and prosperity. Elkington shows how today’s “Ugly Ducklings” may turn into tomorrow’s world-saving “Green Swans”.

4. Initial field consulting project information for each of the companies will be provided at start of semester to each of the company teams. Each company team will then be responsible for gathering further information pertaining to the company and the field consulting project, and for maintaining liaison with the company.

5. Blackboard Course Folder: *There will be a session preparation guide posted for every session on Blackboard.* Other than the book that needs to be purchased, other readings will be posted on Blackboard course folder – as will session PowerPoints, assignment instructions, administrative information, etc. Please check it frequently! The sections that are populated typically are Syllabus, Assignments, and Content.

** RELATED BOOKS & READINGS **

If you have deeper special interest in any of the topics we will cover, let me know and I will recommend related books that may be useful and fun. I can also recommend readings related to your project focus as needed.
Course Assignments, Grading, & Policies

Each individual's effort and grade will be based on the following 4 components. Please note that extraordinary effort in any of those components will be recognized. Conversely, plagiarism in written assignments will be dealt with very severely as per USC rules.

1. Two Individual Case Write-Ups (20%)
Each participant is required to submit two individual case write-ups. The first is a sector case which will analyze exemplary company strategies using digital technologies in the clean energy/environment space. The second is a transportation or smart city case with a sustainability focus. Instructions provided for each case to guide your write-up.

2. Team Consulting Project (55% -- 38% for report, 17% for presentations)
We will form project teams based on student preferences, project requirements, and what the instructor thinks are balanced multi-skill teams. We therefore cannot guarantee that you will get your first preference. Each team will be responsible for organizing itself and gathering further information pertaining to the company and the consulting project. This may involve visiting the local Southern California offices of similar companies if appropriate. There will be one team project report. Each team member will also be asked to assess the relative contributions/efforts of all the other member of their team in order to reward excellence and avoid free riders.

The team will be required to give two presentations: an interim presentation before the trip (Feb 27 - see course schedule), and a presentation to the company in Denmark. The two presentations are graded (a composite grade based on the first presentation and how much progress was achieved in the second). At the time of the trip presentation, the project is typically about 1/3 to 1/2 done depending on the project circumstances. There will also be a project walkthrough on April 17 related to the final report presented to the company.

The final report is due after the final walkthrough (April 22 - see schedule). The report is expected to be about 40-50 Vi3P pages (in addition, appendices can be attached). Apart from being reviewed and evaluated by the instructor, it will also be sent to the company. Vi3P format is Vertical PowerPoint that is Intensive, Inviting, and Interactive. It is a consulting report format that we named in this course which yields consulting reports that are more likely to be read by senior executives and are more likely to engage them without being superficial. They also take advantage of internet active links. It is a format for the digital age.

3. Active Participation in Class Sessions & Field Trip (15%)
The course will move through material relatively quickly. Each class will build on material from previous classes. Thus it is very important that participants attend and be prepared for each class. You are expected to actively discuss both readings and cases and add to the learning of the class. Quality is heavily favored over quantity.

Furthermore, to encourage cross-team fertilization and learning, a portion of your participation grade is based on how well you provide thoughtful input to consulting teams other than your own. Optional peer evaluations will be used for this latter component.
4. INTEGRATIVE GOLDEN NUGGETS ASSIGNMENT (10%)
There is also a written “golden nuggets” assignment that is due on Saturday immediately after returning from the virtual trip. A “golden nugget” is an insight, a management practice, a rule of thumb, a lesson, or a revelation that you have found to be particularly valuable or unique. In the context of this course the “golden nugget” would be about digital strategies for sustainability in global emerging markets --- especially in the context of Denmark, and that you “found” through your various experiences in this class. We would like you to reflect back on those experiences and to draw lessons for the future. Your write-up will identify and describe 5 “golden nuggets,” and how they have changed your understanding of digital strategies for sustainability, digital business models, smart cities, sustainability practices, or idiosyncrasies of contexts like Denmark – and how you will approach these in the future as a manager.

👍 CLASS PARTICIPATION PROFESSIONALISM 👍
Your participation grade is based on quality and a sincere effort to provoke, learn and understand, rather than quantity. The more you engage with the class with passion, intellectual curiosity, and interest, the higher will be your participation grade, and the more successful and exciting our learning experience will be – and the more fun you will have. We are all here to learn and share our understanding.

CLASSROOM POLICIES

1. ATTEND! Class attendance and active participation is critical for developing a mastery of the materials covered in the course – as well as contributing to the class. You are expected to attend all sessions. If you cannot attend for an extenuating circumstance then please inform the professor that you are unable to attend, or your absence will affect your participation grade. Treat it like a professional meeting at work: if you cannot attend, you are expected to inform the person running the meeting as a professional courtesy. **There are only 6 in-class sessions so it is especially important to attend all sessions.**

2. ENGAGE! Please keep your camera/video on during Zoom the class sessions. Preferably use headsets or earphones to ensure the best audio quality. **Please advise me if you have circumstances under which you will not be able to meet these expectations.** You are expected to attend and prepare for each class and to actively engage in the discussion of readings and cases. If you don't keep up with the reading, you will not enjoy the class. Thus it is very important that you be prepared for each class. You are also expected to raise questions that provoke the thinking of others. You may be randomly called upon in class to comment and answer questions, so please be prepared.

3. PRACTICE PROFESSIONAL ONLINE ETIQUETTE!
   - Please Log into class early or promptly
   - Please arrange to attend class where there is a reliable internet connection and without distractions.
   - Please dress respectfully and professionally as you would with business colleagues.
   - If you use a virtual background, please keep it respectfully professional.
   - Please display your name during Zoom sessions.
   - Respectfully minimize distractions by muting when you are not talking. Same if video distraction.
   - Please do not engage in a simultaneous activity not related to the class such as interacting with persons who are not part of the class, or having others in view of camera
STATEMENT ON ACADEMIC INTEGRITY

USC seeks to maintain an optimal learning environment. General principles of academic honesty include the concept of respect for the intellectual property of others, the expectation that individual work will be submitted unless otherwise allowed by an instructor, and the obligations both to protect one’s own academic work from misuse by others as well as to avoid using another’s work as one’s own. All students are expected to understand and abide by these principles. Scampus, the Student Guidebook, contains the Student Conduct Code in Section 11.00, while the recommended sanctions are located in Appendix A:
http://www.usc.edu/dept/publications/SCAMPUS/gov/

Required USC Statement on Academic Conduct and Support Systems

Academic Conduct: Students are expected to make themselves aware of and abide by the University community’s standards of behavior as articulated in the Student Conduct Code. Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in Scampus in Part B, Section 11, “Behavior Violating University Standards” https://policy.usc.edu/scampus-part-b/. Other forms of academic dishonesty are equally unacceptable. See additional information in Scampus and university policies on scientific misconduct, http://policy.usc.edu/scientific-misconduct.

SUPPORT SYSTEMS:

Counseling and Mental Health - (213) 740-9355 – 24/7 on call
studenthealth.usc.edu/counseling
Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

National Suicide Prevention Lifeline - 1 (800) 273-8255 – 24/7 on call
suicidepreventionlifeline.org
Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

Relationship and Sexual Violence Prevention and Services (RSVP) - (213) 740-9355(WELL), press “0” after hours – 24/7 on call
studenthealth.usc.edu/sexual-assault
Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

Campus Support & Intervention (CSI) - (213) 740-0411
https://campussupport.usc.edu/
A team of professionals here to assist students, faculty, and staff in navigating complex issues. Whether you are here seeking support for yourself or someone else, we are available to help you problem solve, understand options, and connect with resources. Please note that we are not an emergency resource and are not available 24/7.

Office of Equity and Diversity (OED)- (213) 740-5086 | Title IX – (213) 821-8298
equity.usc.edu, titleix.usc.edu
Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants. The university prohibits discrimination or harassment based on the following protected characteristics: race, color, national origin, ancestry, religion, sex, gender, gender identity, gender expression, sexual orientation, age,
physical disability, medical condition, mental disability, marital status, pregnancy, veteran status, genetic information, and any other characteristic which may be specified in applicable laws and governmental regulations. The university also prohibits sexual assault, non-consensual sexual contact, sexual misconduct, intimate partner violence, stalking, malicious dissuasion, retaliation, and violation of interim measures.

**Reporting Incidents of Bias or Harassment** - (213) 740-5086 or (213) 821-8298

[uscare_advocate.symplicity.com](http://uscare_advocate.symplicity.com/care_report)

Avenue to report incidents of bias, hate crimes, and microaggressions to the Office of Equity and Diversity |Title IX for appropriate investigation, supportive measures, and response.

**The Office of Disability Services and Programs** - (213) 740-0776

dsp.usc.edu

Support and accommodations for students with disabilities. Services include assistance in providing readers/notetakers/interpreters, special accommodations for test taking needs, assistance with architectural barriers, assistive technology, and support for individual needs.

**USC Support and Advocacy** - (213) 821-4710

uscsa.usc.edu

Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

**Diversity at USC** - (213) 740-2101

diversity.usc.edu

Information on events, programs and training, the Provost’s Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

**USC Emergency** - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call

dps.usc.edu, emergency.usc.edu

Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

**USC Department of Public Safety** - UPC: (213) 740-6000, HSC: (323) 442-120 – 24/7 on call
dps.usc.edu

Non-emergency assistance or information.

**Students with Disabilities**

USC is committed to making reasonable accommodations to assist individuals with disabilities in reaching their academic potential. If you have a disability which may impact your performance, attendance, or grades in this course and require accommodations, you must first register with the Office of Disability Services and Programs (www.usc.edu/disability). DSP provides certification for students with disabilities and helps arrange the relevant accommodations. Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to me (or to your TA) as early in the semester as possible. DSP is located in GFS (Grace Ford Salvatori Hall) 120 and is open 8:30 a.m.–5:00 p.m., Monday through Friday. The phone number for DSP is (213) 740-0776. Email: ability@usc.edu.

**Emergency Preparedness/Course Continuity**

In case of a declared emergency if travel to campus is not feasible, the USC Emergency Information web site (http://emergency.usc.edu) will provide safety and other information, including electronic means by which instructors will conduct class using a combination of USC’s Blackboard learning management system (blackboard.usc.edu), teleconferencing, and other technologies.
Who should take the course?

Students who wish to go beyond the standard business analytics course. You will learn about “getting an edge” -- how to make effective decisions using data and models through optimization. The skills and tools learned in this course will give you a unique analytics and competitive edge, and they can be applied to a broad range of careers, including finance, consulting, marketing, operations, and technology.

Course objectives

The course will teach students how to convert data into models, and most importantly, how to use the models to make effective decisions through optimization. Students will learn about optimization concepts and tools, and see how it can be applied to a broad range of applications. The class will provide students with extensive hand-on optimization practices.

Key Concepts

- Decision trees
- Bayes’ Rule
- Probability distributions
- Linear programming (LP)
- Shadow prices
- Linear optimization under uncertainty
- LP in finance and operations
- Nonlinear programming and applications to portfolio optimization
- Integer programming
- Dynamic optimization over time
- Applications in aviation, supply chain, manufacturing, and retail

Course description

You will learn how to build models from data, and how to translate these models into effective decisions through optimization, providing you with a unique analytics and competitive edge. We will study four modules:

- Framework for effective decision-making
- Dealing with uncertainty: Fundamentals of probability
- From data to models: Building blocks of optimization
- Putting everything together: Effective decisions through optimization

Comparison to other DSO courses: This course (DSO 570) provides a much more in-depth study of optimization models and methods in decision-making. We will also cover more business cases involving optimization. There is minimal overlap with DSO 547.
Getting the Organization Ready for Big Data

[Previously offered as DSO 599 - Duplicates 599 Credit] Asst. Prof. Milan Miric
Mon, Wed 2:00-3:20pm
Mon. 6:30-9:30pm

Whom Should Attend?

Students who expect to be working in data driven organizations, that would like to understand how companies can use big data and business analytics, preparing them for a career as a consultant, analyst, or analytics manager.

Marketable Concepts

- **Identify Tradeoffs**: When implementing big data initiatives
- **Differentiate**: Unique challenges across different industries (tech, sports, entertainment, etc.)
- **Analyze**: Perform Analysis on Large Datasets using Python
- **Critique**: Evaluate real world scenarios, live cases
- **Pitch**: Develop and present data driven insights

Course description

How do companies go from making decisions based on experience or intuition, to making decisions based on data and analytics? What are the challenges? When does analytics provide new answers, and when does it create new problems? Students will confront these issues with applications for their future careers. This class will feature case studies and guest speakers along with several labs where students will learn to implement big data analysis in Python. The major project will feature a real analytics problem working together with a company.
Data Sciences and Operations

USC Marshall School of Business

DSO 580 - Project Management

Spring 2021
Section 16286R
Tuesday 6:30 pm – 9:20 pm

Professor Cosimo Arnesano
BRI-303(E) – (213) 740-0172
arnesano@marshall.usc.edu

Why take the course?

In any position, our graduates will work in projects either as a project manager or a team member. It is important that they know effective project management methodologies. This course provides them with necessary formal project management skills that can be applied all industries.

Course objective

To provide students with tools and skills needed in planning, managing, monitoring and controlling complex projects with numerous uncertainties. Also, mastering simulation models using specialized software to make quantitative trade-offs while managing projects.

Key concepts

- Project organization structures
- Work Break Down structures
- Project evaluation and selection
- Planning and budgeting
- Project scheduling
- Critical Chain method
- Resources management
- Time and cost trade-offs
- Risk management
- Agile and Scrum project management
- Project monitoring with Earned Value analysis
- Microsoft Project
- Excel and Monte-Carlo Simulation models

Course description

This course begins with project definition and organization concepts. Then it moves on to planning, estimation, scheduling methodologies projects. It will also cover risk and resource management and Earned Value Analysis. Course materials are enriched with guest speakers, games, software tutorials in MS Project, Excel and Crystal Ball, and case discussions.
Graduate students who are interested in healthcare management. Students who want to learn operations management, and developing multi-disciplinary solutions to improve healthcare.

This course focuses on management and improvement of healthcare delivery systems. You will learn operations management tools and techniques to design, manage, and improve these systems. A significant component of this course is a Consulting Project. Projects are based in: Los Angeles, Brazil, Costa Rica, India, and Africa. The goal of these projects is to improve access and quality of care. LA projects were based in LA County, Keck, Riverside County, & Cedars

Key concepts

- Modeling and analysis of healthcare systems
- Forecasting short term and long term demands on health systems
- Business process reengineering
- Opportunities in healthcare delivery technologies
- Patient health behaviors and decision making processes
- Patient experience management
- Data analytics in healthcare
- Simulation

Course description

This course focuses on tools and techniques needed to close the gap between supply and demand for healthcare services. You will learn how to determine the capabilities of existing health systems, estimate the needs for health services, and identify solutions for reducing the gap. The field project provides you an opportunity to apply these techniques, develop creative solutions, and hopefully have a lasting impact on issues that are of concern to society.

Healthcare systems are amongst the most complex systems and insights gleaned from studying healthcare often find application in other services.
DSO 599 (____) – “NEW COURSE OFFERING”

Course Title: HR AND PEOPLE ANALYTICS

Instructor: Professor Jeffry A Higgins, MBA
Contact Information:
Email: jeff.higgins@hcminst.com

Who should take the course?
Students seeking to apply analytic tools and methods to the complex world of people analytics to solve common business problems faced by real organizations

Course Objectives
• Develop problem solving skills using quantitative methods to analyze and perform root cause analysis.
• Solve complex business human capital questions using data.
• Understand new metric standards in HR and human capital and impact upon financial performance.
• Learn how to transform data into intelligence for insight and build a business case with data that tells a story

Key Concepts
• Analytic levels, HR standards, KPIs and scorecards
• People data sources, pain points and value creation
• Transforming data into business intelligence
• Interpreting analytic results, statistics vs. financial models
• Visualization, presentation and storytelling with data

Course Description
This course covers analytic methods and tools to create a winning data driven business case and story with financial impact and ROI.
Motivated MBA students with little or no prior programming experience who would like to develop basic competencies in the Python programming language for data analytics. These skills are foundational for data analysts and are beneficial for every manager in today’s data-rich economy. “Everyone is talking about Python, and for good reason. With an exponentially growing community around data science, machine learning, AI, web dev and more, Python is a language that opens programming access to the world.” (CodingNomads)

Course objectives

Upon successful completion, students will be able to 1) write code to clean, manipulate, plot, and analyze given datasets; 2) Uncover insights in data from a variety of industries; 3) build predictive models; 4) communicate the analysis to a non-technical audience.

Key concepts

- Algorithmic thinking
- Data structures
- Python and Jupyter notebook
- Functions and packages
- Iterations and conditional statements
- Predictive modeling
- Pandas DataFrame and Series
- Plotting
- Data assembly
- Data cleaning
- Data munging
- Efficiently analyzing large and messy datasets

Course description

Python is one of the world’s most popular programming languages due to its simplicity, versatility, efficiency, and community support. Recent surveys have found it to be the most highly demanded programming language among job postings in business analytics, data science, data engineering and AI. This course equips motivated students with little or no prior programming experience with foundational knowledge of the Python programming language for data analytics. The course covers data structures in Python, numerical and visual exploratory data analysis, data preparation for modeling, and the introduction to predictive analytics. Datasets and applications are taken from a variety of fields, including healthcare, economics, education, marketing, digital platforms, and finance. By the completion of the course, students will be able to write Python codes for data analytics.