

B8148

The Analytics Advantage

Need help? Have any questions?

For material-related questions, email that class's Professor directly.

For all other questions (logistics, attendance, due dates, extensions, podcast suggestions, etc...) email ana_adv@guetta.com

This is the final class in the CBS Business Analytics sequence, and focuses on how analytics have transformed industries from healthcare to finance. This class will build upon concepts you encountered in the core and in follow-on analytics classes. The only pre-requisites for this class are core Statistics and Business Analytics.

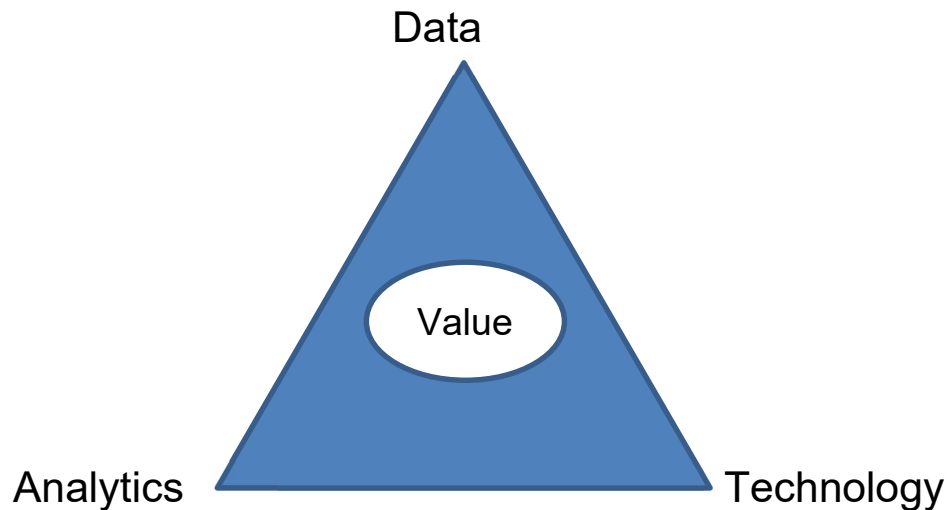
Course description

Business analytics refers to the ways in which enterprises such as businesses, non-profits, and governments use data to gain insights and make better decisions. Business analytics is applied in operations, marketing, finance, and strategic planning among other functions. The ability to use data effectively to drive rapid, precise and profitable decisions has been a critical strategic advantage for companies as diverse as WalMart, Google, Capital One, and Disney. In addition, many current and recent startups are based on the application of analytics to large databases. With the increasing availability of broad and deep sources of information – so-called “Big Data” – business analytics are becoming an even more critical capability for enterprises of all types and all sizes.

This class will focus on how analytics have generated value in a broad range of industries. Each class will be taught by a different faculty member with specific subject matter expertise and will focus on one specific industry and on how it has been transformed through the use of analytics. Each session will include one or more of the following:

- Background on the history and importance of the problem in that industry, and the impact analytics have had in that respect
- A primer on relevant technologies and methods
- A discussion of the inherent complexities involved in implementing an analytical solution in a messy, fast-moving environment
- Current, state-of-the-art approaches to the problem

In each session, the focus will be on how analytics can be used to drive value; each of the points above, whether about data, technology, or analytics, will converge on that topic.



As in the core, this class will involve 'hands on' work using the Business Analytics add-in and other tools as appropriate.

Connection to the Core & Analytics Curriculum

This class works as a standalone follow-up to your core "Business Analytics" class. It has many links to other classes in our curriculum (including Business Analytics 2, Applied Regression Analysis, Python for MBAs, Data Analytics in Python, and Modern Econometrics for Business, among others), but they are not pre-requisites for this class.

Course materials

There is no required textbook for the class. There will be slides for each class that will be posted on canvas.

Requirements and grading

This class will be assessed by means of data-based exercises that will be set either before or after each class. These exercises will give you an opportunity to either prepare for the upcoming class or extend the examples you have studied in the previous class.

There will be six assignments, one for each class. Your grade for the four best assignments you attempt will be used.

See Canvas for assignment details and due dates.

Grades will be determined as follows:

- 70/% : assignments

- 30/% : attendance and participation

You are expected to come to class prepared, on time, and ready to discuss any pre-class readings and articles assigned for that class.

Detailed class plan

Each class will be taught by a faculty member in the Decision, Risk, and Operations division, based on their research and expertise in a specific industry. All logistics will be dealt with centrally by the teaching team, which can be reached at ana_adv@guetta.com.

Classes will be as follows; order and exact content is subject to change.

- **The Magic of Optimization**

Prof Daniel Guetta

Optimization is one of the most powerful techniques in the modern analytics arsenal. From creating complex schedules, to optimizing CBS clusters, to pricing plane tickets, to managing complex supply chains, optimization runs many of the world's most complex logistical operations. In this lecture, we will build on the introduction to optimization in Business Analytics, and look at many of the technique's exciting applications.

- **Analytics in Healthcare: When Regression Isn't Enough**

Prof Carri Chan

There is great promise surrounding the use of Machine Learning in healthcare. We will introduce tools to evaluate the potential benefits of utilizing predictive analytics with a particular emphasis on healthcare delivery at hospitals. We will also discuss how to address challenges introduced by the need to provide guidance on how to go from predictive analytics to prescriptive analytics when randomized control trials are not always possible.

- **Machine Learning in Finance**

Prof Paul Glasserman

Financial markets present distinctive opportunities and challenges for the application of machine learning and AI. These tools are used to extract predictive information from conventional and alternative data, including text data from news, social media, corporate and legal documents. But the financial context carries special obstacles. We will discuss some of the main tools and challenges in this area, with particular emphasis on text analysis.

- **The rise of recommendation engines: the promise and challenges**

Prof Assaf Zeevi

Recommendation engines (or recommender systems as they are often referred to) are one of the most successful and widely used applications of machine learning technologies

in business. They are central to many areas, in particular in the burgeoning tech sector, including social networks, search engines, online retail, music and video streaming platforms, and content dissemination, to name but a few. In this session we will introduce the basic premise for recommendation engines, key working principles and relevant concepts, as well as some of the methods that pertain to their operation. We will illustrate these on several use cases, and discuss key challenges that present in these contexts.

- **Ridesharing: an analytics-based industry**

Prof Hongyao Ma

Ride hailing is an industry based on information technology and data. Mobile computing devices in the hands of every rider and driver – with broadband connectivity, graphical interfaces, GPS tracking and high-resolution mapping – have created an unprecedented capability to instrument and automate transportation. This has led to the creation of novel marketplaces for transportation that have fundamentally changed urban transportation throughout the world. In this session, we look at the role of analytics in enabling this innovation.

- **Digital Marketplaces**

Prof Yash Kanoria

This session will cover some of the fundamental product decisions together with the basic analytic and data science tools to support them that are currently being used to run the most exciting online marketplaces in the world. More specifically, we will explore how to build an algorithmic, scalable reputation and trust system in an e-commerce platform such as Amazon, including new opportunities emerging from Generative AI.

Inclusion, Accommodations, and Support for Students

At Columbia Business School, we believe that diversity strengthens any community or business model and brings it greater success. Columbia Business School is committed to providing all students with the equal opportunity to thrive in the classroom by providing a learning, living, and working environment free from discrimination, harassment, and bias on the basis of gender, sexual orientation, race, ethnicity, socioeconomic status, or ability.

Columbia Business School will make reasonable accommodations for persons with documented disabilities. Students are encouraged to contact the Columbia University's Office of Disability Services for information about registration. Students seeking accommodation in the classroom may obtain information on the services offered by Columbia University's Office of Disability Services online at www.health.columbia.edu/docs/services/ods/index.html or by contacting (212) 854-2388.

Columbia Business School is committed to maintaining a safe environment for students, staff and faculty. Because of this commitment and because of federal and state regulations, we must advise you that if you tell any of your instructors about sexual harassment or gender-based misconduct involving a member of the campus community, your instructor is required to report this information to a Title IX Coordinator. They will treat this information as private, but will need

to follow up with you and possibly look into the matter. Counseling and Psychological Services, the Office of the University Chaplain, and the Ombuds Office for Gender-Based Misconduct are confidential resources available for students, staff and faculty. “Gender-based misconduct” includes sexual assault, stalking, sexual harassment, dating violence, domestic violence, sexual exploitation, and gender-based harassment. For more information, see <http://sexualrespect.columbia.edu/gender-based-misconduct-policy-students>.