MGB/P/T 490V
Applied Data Science for Business Leaders

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Contact Information:

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Course Information:

Quarter: Winter, 2023

Mode: Lecture, text/readings, exercises

Sessions: The course consists of ten session, as outlined below.

Week	1	2	3	4	5	6	7	8	9	10
Date	1/12	1/19	1/26	2/2	2/9	2/16	2/23	3/2	3/9	3/19

Course Description:

Data science is transforming companies across industries and fueling unprecedented innovation. In this changing landscape, “data science literacy” is becoming critical for business leadership to drive their organizations forward. This course focuses on the applied side of data science in organizations across key business domains and is organized to give students a practical understanding of the WHY (business analytics value proposition), the WHAT (analytics problems in high-value business domains), and the HOW (solution framework for analytics, including artificial intelligence & machine learning). The students will also learn storytelling strategies for pitching business cases. Applying data science in organizations is a “team sport”, so the course will also cover the WHO (cross-functional stakeholders) in an organizational context. During the course, students will develop a firm understanding of the applied side of data science to identify business opportunities and to guide end-to-end data science projects in their organizations. Several industry leaders will also join us during the course to share how they are applying data science in their organizations for driving data-driven insights to deliver business outcomes.

Course Materials:

1. Selected readings (available through Harvard Business Review Digital subscription)
2. Occasional handouts for extra readings in class or via Canvas

Course Schedule:

The course will use a combination of lectures, reading material, classroom discussions, class presentations, and a final project. There are ten sessions in the course and will include assigned pre-reading, theory lecture, practical lecture, class activities, and an overview of assignments.

Note: Please note that this schedule may be adjusted before or during the course, based on the pace of learning.

#	Date	Topics & Assignments
1	Week 1	**Applied Data Science Overview:** 1. Course Introduction 2. Human Decision-Making (Judgement & Biases) 3. Key Internal & External Drivers 4. Business Value Proposition 5. Business Context and Practical Considerations **Discussions & Review:** 1. Class Discussions 2. Assignment Review **Pre-Reading Material:** *1. Are You Still Prioritizing Intuition Over Data? by Tomas Chamorro-Premuzic - HBR* *2. Legacy Companies Need to Become More Data Driven — Fast by Randy Bean and Ash Gupta - HBR* *3. Why Becoming a Data-Driven Organization Is So Hard by Randy Bean - HBR* *4. Big Data: the management revolution - HBR*
2	Week 2 **1. *Individual Short-Paper #1 Due***	**Applied Data Science Framework (People):** 1. Data Science as a Team Sport 2. Data Science Team Roles & Responsibilities 3. Organizational Stakeholders **Applied Data Science Framework (Process):** 1. Artificial Intelligence & Machine Learning Overview 2. Machine Learning Techniques: Classification and Regression 3. Applied Data Science Process Model 4. Business Context and Practical Considerations **Discussions & Review:**

		1. Class Discussions 2. Assignment Review *(including Team Assignments)* **Pre-Reading Material:** *1. Your Data Literacy Depends on Understanding the Types of Data and How They're Captured by Hugo Bowne-Anderson - HBR* *2. What Every Manager Should Know About Machine Learning - HBR* *3. 5 Essential Principles for Understanding Analytics - HBR* *4. What Great Data Analysts Do and Why Every Organization Needs Them - HBR*
3	Week 3 ***1. Individual Short-Paper #2 Due***	**Applied Data Science Framework (Technology):** 1. Data Science Reference Architecture 2. Data Science Technology Platforms Landscape 3. Commercial Data Science Technology Platforms 4. Business Context and Practical Considerations **Discussions & Review:** 1. Class Discussions 2. Assignment Review **Pre-Reading Material:** *1. A Better Way to Put Your Data to Work by Veeral Desai, Tim Fountaine, and Kayvaun Rowshankish - HBR* *2. How to Win with Machine Learning by Ajay Agrawal, Joshua Gans, and Avi Goldfarb - HBR* *3. What Every Manager Should Know About Machine Learning - HBR* *4. What is your data strategy - HBR*
4	Week 4	**Applied Data Science (Social Media):** 1. Social Media Analytics Overview 2. Common Business Use Cases (Sentiment Analysis, Social Listening, Others) 3. Common Data Science Techniques 4. Business Context and Practical Considerations **Discussions & Review:** 1. Class Discussions 2. Assignment Review **Pre-Reading Material:** *1. Sentiment Analysis Can Do More than Prevent Fraud and Turnover - HBR* *2. The Basic Social Media Mistakes Companies Still Make - HBR* *3. Fix Your Social Media Strategy by Taking It Back to Basics - HBR* *4. How to Start Thinking Like a Data Scientist by Thomas C. Redman*

5	Week 5 ***1. Individual Short-Paper #3 Due*** ***2. Individual Assignment #1 Due***	**Applied Data Science (Marketing):** 1. Marketing Analytics Overview 2. Common Business Use Cases (Segmentation, Customer Churn, Others) 3. Common Data Science Techniques 4. Business Context and Practical Considerations 5. ***Guest Lecture*** **Discussions & Review:** 1. Class Discussions 2. Assignment Review **Pre-Reading Material:** *1. Why customer analytics matter - McKinsey Article* *2. Quantifying the Impact of Marketing Analytics - HBR* *3. Using Analytics to Align Sales and Marketing Teams - HBR* *4. How to Design an AI Marketing Strategy by Thomas H. Davenport, Abhijit Guha, and Dhruv Grewal*
6	Week 6 **1. *Individual Short-Paper #4 Due***	**Applied Data Science (Digital Customer Experience):** 1. Digital Customer Experience Overview 2. Common Business Use Cases (ChatBots, Recommender Systems, Others) 3. Common Data Science Techniques 4. Business Context and Practical Considerations ***5. Guest Lecture*** **Discussions & Review:** 1. Class Discussions 2. Assignment Review **Pre-Reading Material:** *1. A technology blueprint for personalization at scale - McKinsey* *2. Using Analytics to Prevent Customer Problems Before They Arise by Paul D. Berger and Bruce D. Weinberg - HBR* *3. Customer Experience in the Age of AI by David C. Edelman and Mark Abraham* *4. 3 Ways AI Is Getting More Emotional - HBR*
7	Week 7 ***1. Individual Short-Paper #5 Due***	**Applied Data Science (Healthcare):** 1. Healthcare Analytics Overview 2. Common Business Use Cases (Population Health, Risk Modeling, Others) 3. Common Data Science Techniques 4. Business Context and Practical Considerations 5. ***Guest Lecture*** **Discussions & Review:** 1. Class Discussions 2. Assignment Review **Pre-Reading Material:** *1. Boosting Health Care Payer Performance with Advanced Analytics - Boston Consulting Group*

		2. *How a Pharma Company Applied Machine Learning to Patient Data - HBR* 3. *Insurers Hold the Key to Healthcare's Digital Future - Bain & Company* 4. *Using machine learning to unlock value across the healthcare value chain - McKinsey*
8	Week 8 ***1. Individual Assignment #2 Due***	**Data Science Project Delivery (End-to-End):** 1. Business Case 2. Project Scoping 3. Solution Approach 4. Cross-functional Team & Stakeholders 5. Delivery Planning 6. Business Context and Practical Considerations **Discussions & Review:** 1. Class Discussions 2. Assignment Review **Pre-Reading Material:** 1. *How to Decide Which Data Science Projects to Pursue by Hilary Mason - HBR* 2. *Data Science and the Art of Persuasion - HBR* 3. *Present Your Data Like a Pro by Joel Schwartzberg - HBR* 4. *How advanced analytics can help contact centers put the customer first - McKinsey*
9	Week 9	**Leading Transformation:** 1. Organizational Change 2. Experimentation & A/B Testing 3. Agile Approach 4. Business Context and Practical Considerations 5. Team Presentation Guidelines **Discussions & Review:** 3. Class Discussions 4. Assignment Review 5. Final Project Presentation Review **Pre-Reading Material:** 1. *A Refresher on Randomized Controlled Experiments by Amy Gallo - HBR* 2. *An Agile Approach to Change Management by Sarah Jensen Clayton - HBR* 3. *Break Down Change Management into Small Steps by Jeff Kavanaugh and Rafee Tarafdar - HBR* 4. *When Machine Learning Goes Off the Rails by Boris Babic, I. Glenn Cohen, Theodoros Evgeniou, and Sara Gerke*
10	Week 10 ***1. Team Assignment Due***	**Project Reports & Team Presentations**

Team Assignment:

Students will also be given one team assignment that will require them to apply the concepts, methods, and techniques covered in the class. Further project details will be shared during the class.

Grading (*subject to change before the beginning of the course*):

There are 100 total points possible for this course. Distribution of these points is given below:

1. ***Class Participation - 15 points (15% of grade)***
    a. *Class attendance and discussion (15 points)*
2. ***Individual Short-Papers - 15 points (15% of grade)***
    a. *5 Individual short-papers (3 points each)*
3. ***Individual Assignments - 35 points (35% of grade)***
    a. *Individual Assignments #1 (20 points)*
    b. *Individual Assignments #2 (15 points)*
4. ***Team Assignments - 35 points (35% of grade)***
    a. *Team Assignment (35 points)*

Code of Academic Conduct:

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