The Business of Data Science

Total Hours Per Day: 7.5
Lecture: 3.5
Lab: 1.0
Group Discussion: 1.0
Breaks: 1.5
Course Exams: 0.5

Course Prerequisite:
None

COURSE DESCRIPTION

This course teaches the importance of data science for business. It emphasizes the fundamentals of data science, how to use it to make better business decisions and how to implement it in your business. Students gain a working knowledge of data science, artificial intelligence and machine learning and their potential impact on business. Other topics include: understanding big data; utilizing supervised and unsupervised machine learning and AI; translating business problems into data science tasks; prioritizing and selecting profitable projects; avoiding being misled by data; building a data science culture; identifying and defining key roles and responsibilities; avoiding common pitfalls in executing data science projects.

RATIONALE

The purpose of this 2-day course is to provide students with an in-depth understanding of how data science can be used in business. Through lectures, group discussions and exercises, students will learn the key components of data science and how to leverage it to make better business decisions. Core concepts include: Using machine learning to assist in decision making; A/B testing; where non-technical managers fit in; facilitating data literacy; applying data science principles to management; privacy, compliance and reputational issues; ethical issues.

COURSE OBJECTIVES

At the successful completion of this course, each student will be able to:

1. Identify key opportunities for data science use
2. Catalog useful data resources within the organization
3. Translate business problems into data science tasks
4. Assess the feasibility and business impact of prospective projects using data science
5. Apply A/B testing to improve business decisions or processes
6. Define roles, responsibilities and skills sets of various data focused roles

TEXTBOOK and/or MATERIALS

Student Book: *The Business of Data Science* **Author:** *Pragmatic Institute*

TOPICAL UNIT OUTLINE

I. Understanding the Fundamentals

A. Data science
1. Data science in use
2. Challenges and opportunities of data science
3. Data science vocabulary

B. Machine learning and artificial intelligence
1. Supervised learning
2. Unsupervised learning
3. Expert systems

C. Big data and reinforcement learning
1. Volume, velocity and variety
2. Internal and external opportunities
3. Exploitation vs. exploration

II. Identifying Profitable Data Projects

A. Identifying a data science opportunity and picking winners
1. Data-driven vs. problem-driven approaches
2. Defining types of data science projects
3. The three pillars of good data science projects
4. Prioritization of projects and metrics

B. Determining what to build and making it better
1. Specs vs. Reqs
2. Common AI products
3. Using in-house or outsourcing resources

C. Measuring business impact of data science implications
1. A/B testing
2. Common pitfalls and challenges
3. Bias in data science

TOPICAL UNIT OUTLINE continued

III. Developing a Data-Driven Work Culture

A. Building data science teams
1. Defining data science roles
2. The data-driven mindset

B. Ethical and legal considerations
1. Ethical considerations
2. Legal considerations

UNIT OBJECTIVES

I. EXPLORE

A. Data science
1. Learn key concepts and terminology needed to effectively communicate with technical staff about data
2. Understand how data science is used in a variety of industries
3. Identify and catalog useful data resources within your organization

B. Artificial intelligence
1. Define AI
2. Communicate the differences, advantages and disadvantages between expert systems and machine learning

C. Big Data
1. Learn the key definition for big data, and understand the technical drivers of increasing data
2. Understand why big data is hard by utilizing the 3 Vs

D. Supervised learning
1. Utilize supervise learning to increase revenue, cut costs, identify new opportunities and improve the customer experience

E. Deep learning
1. Understand the complex nature of deep learning and how it can be used in business

F. Unsupervised learning
1. Apply various types of unsupervised learning tasks to specific business problems and opportunities

G. Reinforcement Learning
1. Assess projects that require both supervised and unsupervised learning

II. PRIORITIZE

A. Origination
1. Identify data science opportunities
2. Communicate the differences between data-driven approaches and problem-driven approaches, and how they work together
3. Understand the key components that make data science projects successful
4. Be able to assess feasibility and business impact of prospective projects
5. Understand the differences between descriptive, predictive and prescriptive machine learning models.

B. Prioritization
1. Utilize the three pillars of good data science projects

C. Definition
1. Define the difference between specs and reqs and who is responsible for each
2. Provide effective requirements to data teams to execute projects successfully
3. Identify when to use in-house resources and when to outsource

D. Evaluation
1. Measure the business impact of data science applications
2. Understand the challenges of quantifying project value
3. Recognize and avoid common data and process pitfalls and challenges
4. Iterate often to improve processes and projects

E. Data science in action
1. Learn the taxonomy of roles within the data science ecosystem and the importance of managers with data awareness
2. Understand the benefits of a data-driven mindset and company culture and develop strategies for adopting one in your organization
3. Understand and proactively address ethical and privacy considerations

COURSE REQUIREMENTS/EVALUATION

COURSE OBJECTIVES	ASSESSMENT MEASURES
Recognize the challenges and opportunities afforded by data science and identify data resources within your organization.	Course exam, exercises, group discussion, class participation.
Break down business problems and effectively communicate business needs to technical staff.	Class participation, group participation, course exam, exercises, group participation.
Conceive feasible and valuable applications of machine learning using available data resources, and identify the data, levers and metrics needed to implement successful projects.	Class participation, exercises, group participation, course exam
Interpret machine learning results and predictions to optimize business decisions, and apply A/B testing to improve business processes and outcomes.	Class participation, course exam, exercises, group participation
Understand the different roles that compose most data science teams and how these roles relate to one another.	Class participation, course exam, group participation