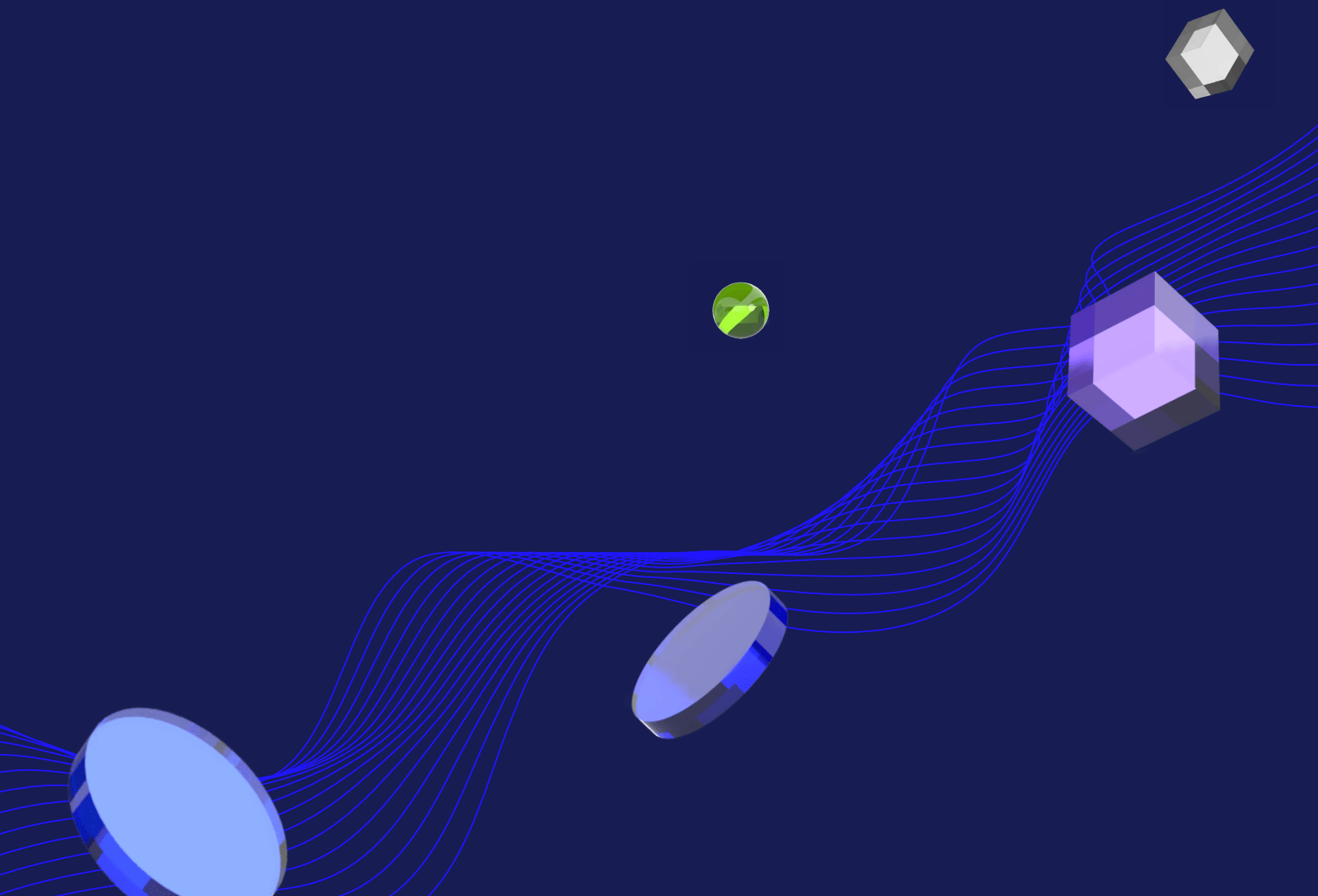# UDACITY

SCHOOL OF BUSINESS

# AI for Business Leaders

Executive Program Syllabus

# Overview

The rise of artificial intelligence in the past decade has transformed computer science and the workplace, causing businesses to rethink ways of integrating this emerging technology into their corporate strategy. Become familiar with the fundamental technical terms and concepts of machine learning, and develop a strategic framework to evaluate business applications of artificial intelligence across industries. Through practical case studies, learn what strategic questions to ask and how to formulate proposals grounded in first principles when assessing opportunities to embed machine learning and artificial intelligence into a corporate strategy. From going through the ideation of feasible machine learning and artificial intelligence solutions to the assessment of implementation architectures, operational risks, and strategic impact, learners will be enabled to build a machine learning/artificial intelligence strategy rooted in technical competence.

### 💡 Learning Objectives

This Executive Program is ideal for business leaders and managers who are responsible for making strategic decisions regarding these technologies and want to equip themselves to evaluate proposals in terms of both impact on a business and technical feasibility. It will also enable them with the skills and knowledge necessary to formulate and evolve these strategies themselves.

**Built in collaboration with:**

# Program information

### ⏳ Estimated Time

4-6 weeks at 5/week*

### Skill Level

Intermediate

### Prerequisites

A well prepared learner will have some prior exposure to statistics and probability in an academic or professional setting, basic knowledge of Algebra, and will have spent time in a business setting being involved in business decision-making and technical/IT projects.

### Required Hardware/Software

Learners must have access to Google Sheets and Google Slides, or similar spreadsheet and slides software, and Google Forms to facilitate more practical exercises in the lessons and Capstone project.

*The length of this program is an estimation of total hours the average student may take to complete all required coursework, including lecture and project time. If you spend about 5-10 hours per week working through the program, you should finish within the time provided. Actual hours may vary.

# AI for Business Leaders

This program teaches the fundamental technical terms and concepts of AI and machine learning for business. Each lesson's material will demonstrate how to apply a new series of concepts through a hands-on case study walkthrough of McThornton's, a national electronics retailer. In the first lesson, learners will be presented 11 business use cases McThornton's Electronics is considering as candidates for its newly allocated artificial intelligence innovation budget. As learners progress through each lesson, incremental case information will be revealed and they will be tasked with applying the strategic decision-making concepts they've just covered. Over time, they'll eliminate use cases from contention, ultimately arriving at a final proposal for McThorton's go-forward ML/AI strategy.

**Course Project**

## Deliver a Machine Learning/AI Strategy

Draw on all of the skills learned throughout the lessons to create an ML/AI strategy that is technically achievable and highly impactful on the business based on evaluation of various AI-enabled use cases

**Lesson 1**

**The Paradigm Shift**

- Understand how probabilistic reasoning is applied to machine learning.

- Understand key terms and components involved in machine learning approaches, such as algorithm, model, training, feature, test set, training set, and ground truth dataset.

- Develop ideas for machine learning and AI use cases for a business.

- Create before/after storyboards and use them to evaluate the feasibility and impact of an ML/AI use case.

**Lesson 2**

**The Math Behind the Magic**

- Differentiate between how the five "V's" of data (velocity, volume, variety, veracity, value) affect a ML model.

- Understand how information about the five "V's" of data impacts the potential and feasibility of an ML/AI use case.

- Distinguish between classification, regression, optimization, and simulation in ML/AI applications.

- Understand the basics of predictive modeling and the differences between classification and regression.

- Understand the basics of optimization and the relationship between optimization and simulation.

- Become familiar with key terms and concepts of deep learning, and how it can be applied to predictive modeling.

- Learn how reinforcement learning models can be applied to the most complex optimization scenarios.

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**Lesson 3**

**Architectures of AI Systems**

- Understand the importance of machine learning system architectures and their various components.

- Distinguish between the applications of various machine learning capabilities, including classifiers, regressors, optimizers, simulators, policy learners, and segmenters.

- Differentiate between the capabilities of natural language processing, voice/speech processing, and computer vision.

- Build machine learning system architectures for a digital channel chatbot, negotiation engine, and visual classifier.

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**Lesson 4**

**Working with Data**

- Learn the importance and potential costs of labeling data for supervised learning.

- Understand AI infrastructure requirements, and how to overcome common hurdles in implementing it.

- Evaluate data readiness for implementation of particular ML/AI capabilities in a business context, and use this to assess feasibility of use cases.

**Lesson 5**

**Accuracy, Bias & Ethics**

- Define reasonable machine learning model accuracy and how it can change over time.

- Understand why accuracy is only one measure of machine learning model performance and when, how, and why other metrics are commonly used.

- Learn how to to avoid underfitting and overfitting when developing an ML model.

- Apply ethical considerations and frameworks to make machine learning model design decisions that are ethically sound.

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**Lesson 6**

**Gathering Feedback**

- Learn how to build surveys and conduct interviews to solicit feedback on prototypes.

- Identify various stakeholders inside and outside an organization to provide feedback in an iterative design process.

- Analyze results of feedback from stakeholders to inform evaluation and prioritization of use cases.

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**Lesson 7**

**Thinking Bigger**

- Learn how to begin implementing AI use cases with small learning experiments.

- Build a roadmap deploying machine learning applications that strategically complement one another.

- Create a proposal integrating use cases into a transformational business story.

**Capstone Project**

# Deliver a Machine Learning/AI Strategy

Business leaders need to develop and execute strategies that are equally organizationally transformative and technically feasible. In this project, learners will formulate a cohesive AI strategy for either their own company or a predefined business scenario surrounding an automotive manufacturer.

**Part 1**

**Capstone Work**

- Confirm the need to incorporate machine learning/artificial technologies in the business by envisioning a future state and storyboarding use cases of how various business processes might be evolved.

**Part 2**

**Capstone Work**

- Analyze the proposed use cases' potential for success by assessing characteristics of the data sources needed.

**Part 3**

**Capstone Work**

- Create mock architectures for a subset of these use cases and assess readiness for implementation of each AI/ML capability you are considering.

**Part 4**

**Capstone Work**

- Take into consideration a variety of operational concerns including ethics, stakeholder implications, and long term costs to finalize your view of business impact versus technical feasibility

**Part 5**

**Capstone Work**

- Ceate a strategic AI and machine learning proposal that is technically achievable and highly impactful based on the synthesis of conclusions drawn throughout the project's process.

# Meet your instructors.

## William Ross

**Founder, Product Manager & Corporate Development Leader**

William Ross is an experienced investor in AI and ML, and previously worked with IBM's Watson group managing a variety of PM and corporate dev teams. Today, he is the co-founder of a Silicon Valley-based AI startup. He attended Stanford's Graduate School of Business.

## Luis Serrano

**AI Engineer at Apple**

Luis was formerly a machine learning engineer at Google. He holds a PhD in mathematics from the University of Michigan, and a postdoctoral fellowship at the University of Quebec at Montreal.
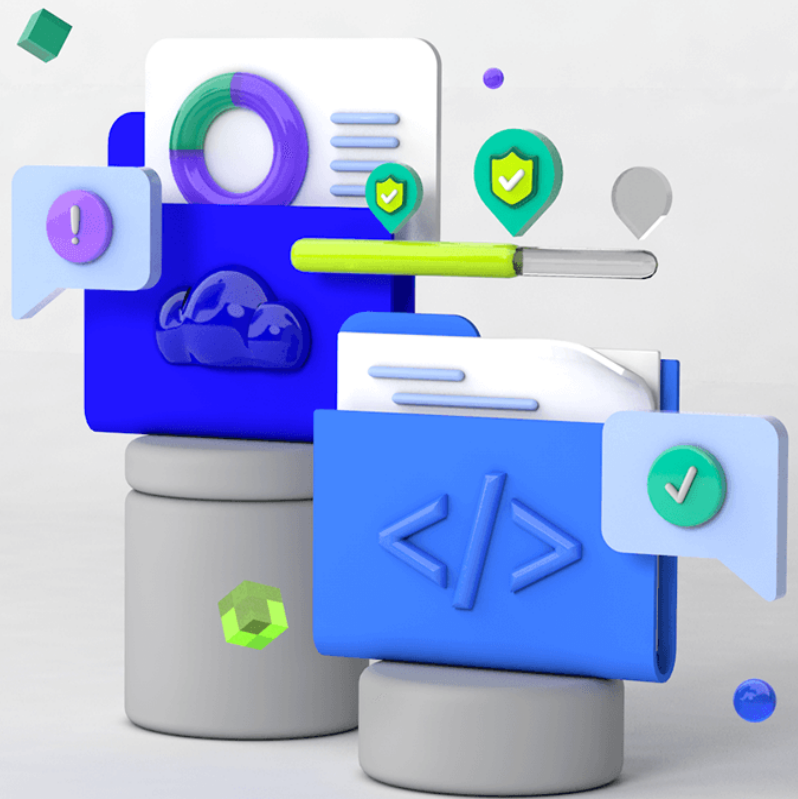
## Josh Bernard

**Data Scientist**

Josh has been sharing his passion for data for nearly a decade at all levels of university, and as lead data science Instructor at Galvanize. He's used data science for work ranging from cancer research to process automation.

# Udacity's learning experience

### Hands-on Projects

Open-ended, experiential projects are designed to reflect actual workplace challenges. They aren't just multiple choice questions or step-by-step guides, but instead require critical thinking.

### Quizzes

Auto-graded quizzes strengthen comprehension. Learners can return to lessons at any time during the course to refresh concepts.

### Knowledge

Find answers to your questions with Knowledge, our proprietary wiki. Search questions asked by other students, connect with technical mentors, and discover how to solve the challenges that you encounter.

### Custom Study Plans

Create a personalized study plan that fits your individual needs. Utilize this plan to keep track of movement toward your overall goal.
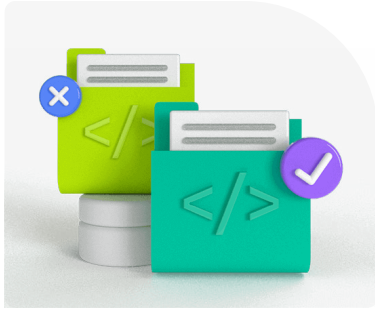
### Workspaces

See your code in action. Check the output and quality of your code by running it on interactive workspaces that are integrated into the platform.

### Progress Tracker

Take advantage of milestone reminders to stay on schedule and complete your program.

# Our proven approach for building job-ready digital skills.

### Experienced Project Reviewers

## Verify skills mastery.

- Personalized project feedback and critique includes line-by-line code review from skilled practitioners with an average turnaround time of 1.1 hours.

- Project review cycle creates a feedback loop with multiple opportunities for improvement—until the concept is mastered.

- Project reviewers leverage industry best practices and provide pro tips.

### Technical Mentor Support

## 24/7 support unblocks learning.

- Learning accelerates as skilled mentors identify areas of achievement and potential for growth.

- Unlimited access to mentors means help arrives when it's needed most.

- 2 hr or less average question response time assures that skills development stays on track.
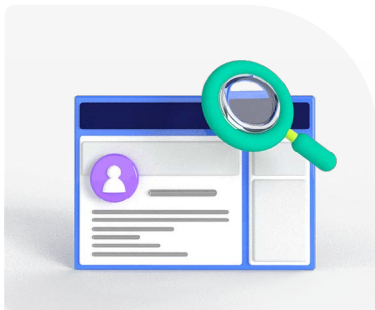
### Personal Career Services

## Empower job-readiness.

- Access to a Github portfolio review that can give you an edge by highlighting your strengths, and demonstrating your value to employers.*

- Get help optimizing your LinkedIn and establishing your personal brand so your profile ranks higher in searches by recruiters and hiring managers.
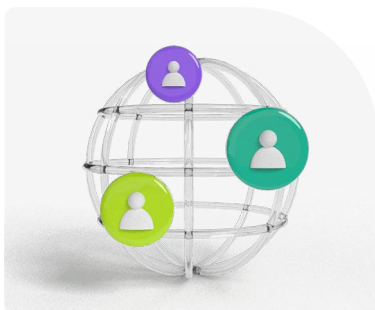
### Mentor Network

## Highly vetted for effectiveness.

- Mentors must complete a 5-step hiring process to join Udacity's selective network.

- After passing an objective and situational assessment, mentors must demonstrate communication and behavioral fit for a mentorship role.

- Mentors work across more than 30 different industries and often complete a Nanodegree program themselves.

*Applies to select Nanodegree programs only.

# UDACITY