

Syllabus

MGMT 173 (Online)

Business Intelligence for Analytical Decisions

This syllabus serves as your guide to this course and outlines what is expected of you. Therefore, you are responsible for knowing its contents and asking questions if you need clarification using the designated channel for course communication. To start, scroll through the document or click the sections below using the table of contents.

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**Your professor always reserves the right to make changes to the syllabus, including due dates and test dates when unforeseen circumstances occur. These changes will be announced as early as possible so that students can adjust their schedules.*

Contact Information

Professor | Vibhanshu Abhishek

Bio | [Faculty Directory Bio](#)

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Office Hours | TBD

General Contact Procedures

My typical response time is within 24 hours Monday - Friday in Canvas. For most course related queries, please use the Q&A discussion board on Canvas to get the fastest response. If you would like to set up a ZOOM meeting, please contact me 48 hours in advance to schedule a day and time.

Zoom Room Links

Please see the 'Zoom' navigation link in the Canvas course for links to the synchronous Saturday Zoom class and the weekly office hours.

Faculty Bio

Vibhanshu Abhishek "Vibs" is an Associate Professor of Information Systems the Paul Merage School of Business, University of California - Irvine. His research focuses on digital transformation and emerging technologies such as AI and IoT. He is a well-known expert in retail, digital advertising, platforms, and AI and has published in top management journals like Operations Research, Marketing Science, Management Science, Information Systems Research, MIS Quarterly and Journal of Interactive Marketing. He is an MSI Young Scholar and has received the ISS Sandra Slaughter Early Career Award. He is also a recipient of the Google Faculty Research Award, Adobe Faculty grant, Flipkart research grand and his papers have won several awards like the ISA-INFORMS best paper award, CIST best student paper award, and the ISS Nunamaker-Chen Dissertation award. He also serves on the editorial boards of Management Science and Information Systems Research, two of the top business journals. His research has been cited in popular press outlets such as the Sloan

Management Review, NY Times, Forbes, Fortune, Pittsburgh Post-Gazette, Seattle Times, and Wall Street Journal.

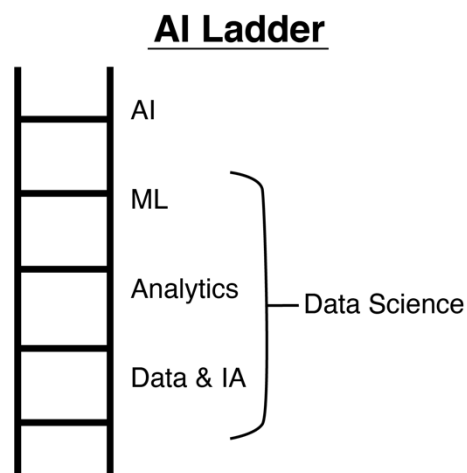
Vibs served as the Consulting Chief Data and AI Officer for Rivigo, a logistic-tech unicorn based in India, where he managed all of data science, product and engineering functions. He has worked closely with several Fortune 500 firms and startups including McKinsey & Co., Sequoia Capital, Pirates, LEGO, Adobe, FICO, IBM, Omnicom, Flipkart, One Championship, and Zilingo.

He received a PhD in Operations and Information Management and a M.A. in Statistics from the Wharton School, University of Pennsylvania. He also holds a B.Tech in Computer Science from IIT Kanpur. Before joining UC Irvine, Vibs was an Assistant Professor of Information Systems at the Heinz College, Carnegie Mellon University.

Course Description

Organizations are collecting increasing amounts of data from multiple sources. They capture, sales order data, shipping data, customer complaint data, product quality data, resume from applicants, employee performance data, supplier performance data, financial markets data, consumer activity such as clicks on their website and other data obtained from external sources, such as retailers, industry trade bodies and the government. There are many insights about consumers, suppliers, employees, competitors, and markets embedded in this data.

Yet few organizations and their employees have the skills, technology and foresight to take full advantage of it. According to a recent PwC report 75% of AI projects fail, but companies that have successfully harnessed AI have grown 2X. There is a big opportunity for individuals who understand the potential of AI and can use it effectively compared to those who don't. In this course, we will learn what is AI, how to use it effectively to mine vast amount of data using machine learning, and make powerful business decisions.



This course provides an overview of fundamentals of machine learning with a strong emphasis on business applications. It begins with an introduction to Artificial Intelligence and the AI ladder. It covers the basic techniques, operational considerations, and AI strategy. You will learn the fundamental building blocks of machine learning such as information theory, data visualization, structured data analysis: classification and clustering, unstructured data analysis and experiments.

Learning Outcomes

Course Learning Outcomes

Our aim for this course is to achieve the following learning outcomes. Learning mastery will be achieved if, at the end of this course, you are able to:

1. Discuss what AI is, how it is different from other technologies and how it can be used as a disruptive technology in any industry.
2. Determine good use cases for AI, how to evaluate AI projects, and institutional setups that can unlock the potential of AI.
3. Apply fundamental AI methods such as classification, clustering and prediction, to solve business problems utilizing data analysis.
4. Explore cutting-edge application of AI from industry experts.
5. Solve a relevant business or industry problem utilizing AI

Program Learning Outcomes

The Paul Merage School of Business has indicated specific program learning outcomes to promote your holistic ability for diverse learning that harnesses meaningful knowledge, skills, and attitudes that will prepare you for practical field application.

1. **Data-Driven Decision Making**

In a digitally-driven world, computer systems amass large amounts of data. At the end of the program, students will know what to do with this data and understand how it can be used to make effective decisions.

2. **Role of Information Technology**

In a digitally-driven world, IT is not just a tool, but a strategic enabler. At the end of the program, students will know about the technologies that are key to driving economic productivity and competitiveness, as well as the technologies on the horizon that are critical for businesses to invest in, so that students may connect IT to business strategy.

3. **Digitally-Driven Leadership**

In a digitally-driven world, leaders must manage cross-functional teams to perform complex analyses to deliver competitive advantage. At the end of the program, students will have excellent communication skills (both oral and written), know how to collaborate effectively, and understand how to persuade others using clear and informed arguments. Moreover, as leadership implies a responsibility to all stakeholders, students will understand how today's digitally-driven world presents new ethical challenges for businesses to meet.

Course Access and Structure

Are You Ready to Learn Online?

Digital learning (online, hybrid) is not for everyone; some people may not be able to manage a course that does not meet 100% of the time in a face-to-face format. Digital learning requires detailed planning and self-pacing to be successful. This course will be covering the same amount of content as a traditional offering, so it is highly recommended that you treat this course the same and manage your time accordingly. Please do not skip or delay weeks of learning and expect to excel or catch up easily. Canvas will have the most up to date version of the course, and for any confusion, please refer to Canvas for deadlines, and any other logistical issues.

Online Course Access

1. Navigate to Canvas at <https://canvas.eee.uci.edu/> (bookmark this page)
2. Log in using your UCINetID credentials
3. Find this course on your Canvas Dashboard
4. Find your course tile, and click to access
5. Start with the get started resources inside the Canvas course space.

Online Course Structure

Delivery Modality

This course is delivered in a hybrid format, with some content delivered in our synchronous class sessions and other content through the Canvas course shell.

Online Course Design

The Canvas course is organized into weekly modules. Weeks start on a Monday and run through the following Sunday. Review the weekly roadmap for an overview of activities and assignments. Some elements of the module will require you to move in sequence before you can view the next item. This is to ensure you learn all the necessary information before proceeding to the next section. Most assignments are submitted in Canvas.

Course Materials, Resources, and Tools

If course materials are available for order from the Bookstore or another service, include the link or point students to Canvas to get the link.

Required Materials

Text/Readings

1. Compulsory reading will be made available as required. If a module has assigned readings, please read them at the beginning of the module.

Software

We will use WEKA an open source (and quite powerful) software for the class.

https://waikato.github.io/weka-wiki/downloading_weka/

Since my focus is on teaching you the important concepts behind machine learning without any programming experience, I have found WEKA to be an excellent choice.

Resources

Business Library and VPN

In this program, you are expected to know how to use the library's resources. If you are not familiar with using the library, please ask for assistance from the business librarian or, take workshops provided by the library by visiting the [library's business website](#). We also recommend you review the [UCI Libraries Orientation videos](#) that introduces students to the UCI Libraries.

Please note, VPN is required to access the library resources from off-campus. Review the FAQ document on how to connect: [Connecting to the Library from Off-Campus](#).

Required Tools for Learning

Detailed information and support for the functionality of Canvas and any other tools we will use for this course for communication, assignments, assessments, etc. will be introduced in detail in the Canvas course space.

Tech Requirement Policies and Support

Overarching Tech Requirements

Digital courses require specific technical skills and device configurations. Carefully review the technology requirement policies and contact your program office or Merage Tech at <https://fixit.merage.uci.edu/> if you have questions.

- [Technology requirement policies](#)

Course Tech Requirements

If there are any specific technical requirements at the course-level, information and necessary directive will be provided in your Canvas course space.

Tech Support

If you have technical problems:

1. Clear your browser's cache
2. Try a different browser (Chrome, Firefox, Safari)
3. Shutdown and restart your computer
4. If your problems persist, click the HELP button in Canvas for technical support.
5. You may also visit <https://fixit.merage.uci.edu/> (Sign in with UCINetID required).

Overarching Policies and Course Policies

Overarching Policies

A specific set of policies apply to each student taking an online or hybrid course or series of courses. The overarching policies outline the terms of engagement each student should abide by. Carefully review and reference regularly the policies as you are responsible for knowing them in relation to each of your courses you take in a digital format.

- [Overarching policies](#)
- [Academic integrity expectations](#)

Course Grading and Assessment

Grading Breakdown

There are 5 components to your grade. They are supposed to test your understanding of the content, how you synthesize information and broadly how aware you are about this contemporary topic. Given the dynamic nature of AI and its implications for business and society, you are expected to go beyond the course content to answer these assignments, and think outside the box. Typically, all your work should be uploaded to Canvas unless otherwise noted.

ASSIGNMENT GROUP	% OF FINAL GRADE
Quizzes	20%
Class Participation	10%
Homework (HW)	40%
Take Home Final Exam	30%
TOTAL	100%

Quizzes (20%): All online modules have quizzes associated with them that you should attempt after you have carefully gone through the required readings and video lectures.

Class Participation (10%): This is meant to be an interactive class, and you are expected to speak up in class. There are three components:

1. **Yellowdig:** You are expected to earn at least 1000 points for 100% of the grade. You get credit for creating pins, commenting and when your pins create social engagement. The pins (posts) can be offering your “short” opinion on an article in popular press, talking about a tool for ML, your thoughts on a specific issue related to AI/ML, or anything else you find relevant to the class.
2. Submit video logs (vlogs) time to time.
3. Participate in synchronous class discussions.

HW (40%): This course has 4 homework, which are supposed to be attempted as a team of 4 students. You should finalize your teammates in the first week and update Canvas appropriately (graded). The same team will also be working together on the class project. For any assignment related question please use YellowDig.

Please note that the assignments are made available several weeks before they are due. Hence, we might not have covered all the concepts in class, when the assignments are made available. Usually, you will have about a week after all the relevant concepts are covered to submit the assignment. However, the assignment requires you to sometimes think outside the box and synthesize information. As a result, you might not find the exact answer to your question in the lecture videos/slides.

Take Home Final Exam (30%): There will be a take home final exam where you will be given 4 days to work on the exam.

Bonus points (2%)

- Read the syllabus and answer a quiz
- Fill out the faculty evaluation

Online Submissions

Assignments are submitted in Canvas. For due dates, always reference the Canvas course space and your Canvas calendar for specific deliverable days and times.

Grading Cycle and Feedback

Grades and corresponding feedback, if applicable will be disseminated in the Canvas course space. Learn how to [check your grades in Canvas](#).

Late Assignments

Given the interdependencies among various parts of the course, late assignments require prior approval from the instructor. Prior approval will only be granted for extreme circumstances with at least one week's prior notice.

Incomplete Grades

Incompletes are not considered, no exceptions. You will get a grade for the course.

Course Schedule Overview

Your detailed schedule, deliverables, and corresponding due dates can be found in the Canvas course space. The schedule below only provides a high-level overview of what you can expect throughout the quarter.

Week 0

- Complete the 'Start Here' module in the Canvas course
- Reminder: 2-min vlog: Introduce yourself and talk about what is AI/ML?
- Reminder: Read Syllabus and Take Quiz

Week 1| Introduction

Learning Objectives

- Discuss what AI is, how it is different from other technologies
- Identify a business problem in the workplace that uses AI to solve a problem, discuss if it is the appropriate use of AI.
- Analyze a case study to examine the state of the art of AI.
- Explain the data processing steps.

Topics

- What is Artificial Intelligence?
- Examples of AI
- Types of Machine Learning
- Using Machine Learning + The ML Pipeline
- AI/ML Canvas
- AI Use cases

Module 2 | Data Processing and Visualization

Learning Objectives

- Load a data set, do initial clean-up, visualize the data, create summary statistics
- Compare and contrast good and bad uses of AI

Topics

- Introduction to WEKA
- Data Sources and Types
- Preparing Data
- Sampling Data
- Visualizing Data
- Dimensionality Reduction

Module 3 | Probability and Information Theory

Learning Objectives

- Formulate a business problem as a machine learning problem
- Apply the mathematical equations to solve specific machine learning problems.
- Identify what business problems can be solved using classifications
- Distinguish between different classification methods.

Topics

- Predicting Customer Churn
- Probability Basics
- Bayes Rule
- Information Theory
- Entropy and Gain Ratio

Module 4 | Classification - Naïve Bayes, Logistic Regression

Learning Objectives

- Apply different classification methods to solve specific business problems.
- Demonstrate the ability to solve business problems using the machine learning approach.

Topics

- Predicting customer churn
- Exact Bayes
- Naïve Bayes
- Linear and Logistic regression
- Building classification models in WEKA

Module 5 | Evaluating ML Models

Learning Objectives

- Evaluate and compare different machine learning models.
- Discuss how different choices will affect the model outcomes and usability.
- Tune the parameters of the machine learning process and models to identify the best performing model.

Topics

- Model Accuracy and Confusion Matrix
- Cost of Errors
- ROC curve
- Training v/s Testing
- Holdout Estimation
- Cross Validation

Module 6 | Classification Decision Trees

Learning Objectives

- Apply the mathematical equations to solve specific machine learning problems.
- Identify what business problems can be solved using classifications
- Distinguish between different classification methods.

Topics

- Examples of classification tasks
- Binary classification
- Multivariate classification
- Decision Trees
- Neural Networks
- Overfitting v/s Underfitting

Module 7 | Clustering

Learning Objectives

- Use clustering methods to solve business problems
- Compare different clustering methodologies
- Apply clusters to solve business problems
- Determine how to build recommender systems

Topics

- Creating customer segments
- Similarity and Dissimilarity
- K-means
- Evaluating clusters – elbow method
- Hierarchical Clustering
- Recommender system

Module 8 | Natural Language Processing

Learning Objectives

- Apply clustering tools to data to solve specific business problems
- Use Weka to do customer segmentation
- Build a recommender system

Topics

- Word Clouds
- Natural Language Processing
- Image Processing
- Deep Learning

Module 9 | Guest Lecture

Learning Objectives

- Discuss current state of AI and ML in the real-world

Topics

- Guest lecture

Module 10 | Final Exam

Learning Objectives

- Complete the take-home Final Exam

Topics

- Final exam