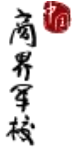




**PHBS**  
北京大学汇丰商学院



# Course Code AI & Application Module 1, 2024-25

## Course Information

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**Instructor: Ding Ma**

Office: PHBS Building, Room

Phone: 86-755-2603-

Email:

Office Hour:

**Teaching Assistant:**

Phone:

Email:

**Classes:**

Lectures: Monday and Thursday, 1:30 - 3:20 pm

Venue: PHBS Building, Room

**Course Website:**

TBA

## 1. Course Description

### 1.1 Context

Course overview:

This course provides a comprehensive introduction to the foundational theories and practical applications of artificial intelligence (AI) and data analysis, with a particular focus on how these technologies are transforming modern industries. Students will explore a broad range of data analysis techniques, from basic data sampling and visualization to advanced machine learning and deep learning methods.

The course will begin by establishing a strong theoretical foundation in data analysis, enabling students to understand the principles that drive effective AI applications. Topics will include data sampling techniques that ensure the reliability of insights, and visualization methods that make complex data accessible and actionable. As the course progresses, students will delve into pattern recognition, learning how AI can detect trends and anomalies in large datasets, and prediction techniques, where they will gain skills in forecasting future outcomes based on historical data.

A significant portion of the course will be dedicated to exploring various machine learning algorithms, including supervised and unsupervised learning methods. Students will gain hands-on experience with regression, classification, clustering, and dimensionality reduction

techniques, understanding their practical applications in fields such as finance, healthcare, marketing, and more.

In the latter part of the course, we will transition to deep learning, a subset of machine learning that has revolutionized areas such as image and speech recognition, natural language processing, and autonomous systems. Students will learn about neural networks, including convolutional and recurrent neural networks, and their applications in developing intelligent systems that can learn and adapt from vast amounts of data.

By the end of the course, students will be equipped with the skills to apply AI techniques to solve real-world problems, make data-driven decisions, and contribute to the advancement of AI in various professional fields. Whether pursuing a career in AI, data science, or a related field, this course will provide the necessary tools and knowledge to succeed in an AI-driven world.

Prerequisites:

Fair Knowledge of programming and statistics

## **1.2 Textbooks and Reading Materials**

- No official textbooks, we use the following two books as References.
- James Gareth, Daniela Witten, Trevor Hastie, Robert Tibshirani, and Jonathan Taylor "An introduction to statistical learning with Applications in Python."
- Hastie, Trevor, Robert Tibshirani, and Jerome H. Friedman "The elements of statistical learning: data mining, inference, and prediction."

## **2. Learning Outcomes**

### **2.1 Intended Learning Outcomes**

<b>Learning Goals</b>	<b>Objectives</b>	<b>Assessment (YES with details or NO)</b>
1. Our graduates will be effective communicators.	1.1. Our students will produce quality business and research-oriented documents.	YES
	1.2. Students are able to professionally present their ideas and also logically explain and defend their argument.	YES
2. Our graduates will be skilled in team work and leadership.	2.1. Students will be able to lead and participate in group for projects, discussion, and presentation.	YES
	2.2. Students will be able to apply leadership theories and related skills.	
3. Our graduates will be trained in ethics.	3.1. In a case setting, students will use appropriate techniques to analyze business problems and identify the ethical aspects, provide a solution and defend it.	
	3.2. Our students will practice ethics in the duration of the program.	YES

4. Our graduates will have a global perspective.	4.1. Students will have an international exposure.	YES
5. Our graduates will be skilled in problem-solving and critical thinking.	5.1. Our students will have a good understanding of fundamental theories in their fields.	YES
	5.2. Our students will be prepared to face problems in various business settings and find solutions.	YES
	5.3. Our students will demonstrate competency in critical thinking.	YES

## **2.2 Course specific objectives**

See section 1.1 Context.

## **2.3 Assessment/Grading Details**

Attendance 15%, Assignments 20%, Exams 30%, Final Project 35%

The level of background knowledge may vary among students, but it will be ignored in grading.

## **2.4 Academic Honesty and Plagiarism**

It is important for a student's effort and credit to be recognized through class assessment. Credits earned for a student work due to efforts done by others are clearly unfair. Deliberate dishonesty is considered academic misconducts, which include plagiarism; cheating on assignments or examinations; engaging in unauthorized collaboration on academic work; taking, acquiring, or using test materials without faculty permission; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to obtain dishonestly grades, honors, awards, or professional endorsement; or altering, forging, or misusing a University academic record; or fabricating or falsifying of data, research procedures, or data analysis.

All assessments are subject to academic misconduct check. Misconduct check may include reproducing the assessment, providing a copy to another member of faculty, and/or communicate a copy of this assignment to the PHBS Discipline Committee. A suspected plagiarized document/assignment submitted to a plagiarism checking service may be kept in its database for future reference purpose.

Where violation is suspected, penalties will be implemented. The penalties for academic misconduct may include: deduction of honour points, a mark of zero on the assessment, a fail grade for the whole course, and reference of the matter to the Peking University Registrar.

For more information of plagiarism, please refer to *PHBS Student Handbook*.

### 3. Topics, Teaching and Assessment Schedule (Tentative)

Week	Dates	Topics
1	Sep 2, 5	Introduction to AI in Business: Leveraging Python for Strategic Data Analysis and Business Insights
2	Sep 9, 12	Advanced Data-Driven Decision Making: Implementing Multiple Testing, FWER, and FDR in Business Analytics
3	Sep 14, 19	Predictive Analytics in Business: Harnessing Logistic Regression, LDA, and Naïve Bayes for Market Forecasting
4	Sep 23, 26	Optimizing Business Performance: Cross-Validation and Bootstrap Techniques for Robust Model Development
5	Oct 9, 10	Strategic Model Selection in Business: Applying Ridge & Lasso for Enhanced Forecasting and Decision Support
6	Oct 14, 17	Midterm Exam and Business Project Proposals: Designing AI-Driven Strategies for Real-World Business Challenges
7	Oct 21, 24	Advanced Business Analytics with Tree-Based Methods: Enhancing Decision-Making through Bagging, Random Forests, and Boosting
8	Oct 28, 31	Deep Learning Applications in Business: Using Convolutional and Recurrent Neural Networks for Competitive Advantage
9	Nov 4, 7	Unsupervised Learning for Market Segmentation: Employing PCA, K-Means, and Hierarchical Clustering for Business Growth

### 4. Miscellaneous