Northeastern University
College of Engineering

INFO 7374Application Machine Learning and Python in Fintech

Course Information
Course Title: Application Machine Learning and Python in Fintech
Course Number: INFO 7374
Term and Year: Spring 2022
Credit Hour: 4
Course Format: On-Ground

Instructor Information
Full Name: Yizhen Zhao
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Course Prerequisites
N/A

Course Description
Machine learning has had fruitful applications in finance well before the advent of mobile banking apps, proficient chat bots, or search engines. This class is designed to teach introductory machine learning techniques as applied in finance. The course combines methodology with theoretical foundations and computational aspects. The focus of the course is on implementation rather than theory. It treats both the art of financial intuition and the science of realizing algorithms in Python. Students will learn implementing algorithms and solving real-world problems faced by quants, market makers and portfolio managers.

Standard Learning Outcomes

Learning outcomes common to all College of Engineering Graduate programs:
1. *An ability to identify, formulate, and solve complex engineering problems.*
2. *An ability to explain and apply engineering design principles, as appropriate to the program's educational objectives.*
3. *An ability to produce solutions that meet specified end-user needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.*

The Information Systems Program accepts students of different engineering backgrounds with minimum programming skills and produces first class Information Systems engineers that operate at the intersection of real-world complexity, software development, and IT management. Graduating students will be able to construct end-to-end advanced software applications that meet business needs.

Specific Learning Outcomes for the Information Systems program:
1. *Create a strong technical foundation through diverse, high-level courses*
2. *Built crucial interpersonal skills needed to succeed in any industry*

3. *Foster a deep level of applied learning through project based case studies*

Course Outcomes and Assesment Standards

Based on satisfactory completion of this course, a student should be able to master the machine learning algorithms widely adopted by the fintech industry. Students will otain the capiability to develop, design, modify and customize machine-learning and deep learning algorithms according to the business needs. Four assignments (10% each) and one final exam (paper based exam 40% + final project presentation 20%) work as the performance assessments.

Technical/Course Materials Requirements

- No textbook is required.

- Students are expected to bring their own laptops with Python installed to attend the class.

Course

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There is no prerequisite for the course, but students are expected to be comfortable with statistics, matrix analysis and at least one type of programming languages. Much of the course addresses machine learning algorithms, and students who are deficient in statistics may find it difficult to keep up. I will do my best to teach the course at a level appropriate for someone who has not had any instruction in finance. Some background material may be taught using differential equations and stochastic calculus; this material will only be used for the demonstration of concepts and you will not be tested on it. I will make myself available before and after classes if you would like to meet to further discuss class material or related topics.

Student Learning/Course Outcomes (SLOs)

Specialized Knowledge	Broad and Integrative Knowledge	Applied and Collaborative Learning	Civic and Global Learning	Experiential Learning

Machine Learning in Finance will study major machine learning algorithms in the context of finance using Python. The course will also introduce leading quantitative models used by finance professionals.	*Master the mainstream machine learning algorithms.*	*Obtain a hands-on experience in working with quantitative finance modeling using Python via teamwork.*	*The focus of the course will be on implementation rather than on theories. The methods can be extensively applied in public health, education and other civic learning areas.*	*Understand the implications of algorithm building blocks spanning across matrix analysis, statistics, optimization, econometrics and stochastic calculus.*

Attendance Policy

Students are expected to complete course readings, participate in class discussions or other learning activities during the unit, and complete written assignments for each unit during the time of that unit. It is understood that there might be one week when active participation in ongoing class conversations and learning activities might be delayed.

Beyond one week time, if there is an absence or lateness in participation (1) faculty must be notified in advance; (2) grades will be adjusted accordingly.

Late Work Policy

Students must submit assignments by the deadline <u>in the time zone</u> noted in the syllabus. Students must communicate with the faculty prior to the deadline if they anticipate work will be submitted late.

Work submitted late without prior communication with faculty will not be graded.

Grading/Evaluation Standards Grade Scale

95-100%	A	87-89.9%	B+	77-79.9%	C+	69.9% or below	F
		84-86.9%	B	74-76.9%	C		
90-94.9%	A-	80-83.9%	B-	70-73.9%	C-		

End-of-Course Evaluation Surveys

Your feedback regarding your educational experience in this class is very important to the College of Professional Studies. Your comments will make a difference in the future planning and presentation of our curriculum.

At the end of this course, please take the time to complete the evaluation survey at **https://neu.evaluationkit.com**. Your survey responses are **completely anonymous and confidential**. For courses 6 weeks in length or shorter, surveys will be open one week prior to the end of the courses; for courses greater than 6 weeks in length, surveys will be open for two weeks. An email will be sent to your HuskyMail account notifying you when surveys are available.

Academic Integrity

A commitment to the principles of academic integrity is essential to the mission of Northeastern University. The promotion of independent and original scholarship ensures that students derive the most from their educationalexperience and their pursuit of knowledge. Academic dishonesty violates the most fundamental values of an intellectual community and undermines the achievements of the entire University.

As members of the academic community, students must become familiar with their rights and responsibilities. In each course, they are responsible for knowing the requirements and restrictions regarding research and writing, examinations of whatever kind, collaborative work, the use of study aids, the appropriateness of assistance, and other issues. Students are responsible for learning the conventions of documentation and acknowledgment of sources in their fields. Northeastern University expects students to complete all examinations, tests, papers, creative projects, and assignments of any kind according to the highest ethical standards, as set forth either explicitly or implicitly in this Code or by the direction of instructors.

Go to http://www.northeastern.edu/osccr/academic-integrity-policy/ to access the full academic integrity policy.

Student Accommodations

Northeastern University and the Disability Resource Center (DRC) are committed to providing disability services that enable students who qualify under Section 504 of the Rehabilitation Act and the Americans with Disabilities Act Amendments Act (ADAAA) to participate fully in the activities of the university. To receive accommodations through the DRC, students must provide appropriate documentation that demonstrates a current substantially limiting disability.

For more information, visit http://www.northeastern.edu/drc/getting-started-with-the-drc/.

Library Services

The Northeastern University Library is at the hub of campus intellectual life. Resources include over 900,000 print volumes, 206,500 e-books, and 70,225 electronic journals.

For more information and for Education specific resources, visithttp://subjectguides.lib.neu.edu/edresearch.

24/7 Blackboard Technical Help

For immediate technical support for Blackboard, call 617-373-4357 or emailhelp@northeastern.edu

Within Blackboard, open a support case via the red support button on the right side of the screen, click Create Case

myNortheastern, e-mail, and basic technical support
Visit the Information Technology Services (ITS) Support Portal
Email: help@northeastern.edu
ITS Customer Service Desk: 617-373-4357

Diversity and Inclusion

Northeastern University is committed to equal opportunity, affirmative action, diversity and social justice while building a climate of inclusion on and beyond campus. In the classroom, member of the University community

work to cultivate an inclusive environment that denounces discrimination through innovation, collaboration and an awareness of global perspectives on social justice.

Please visit http://www.northeastern.edu/oidi/ for complete information on Diversity and Inclusion

TITLE IX
Title IX of the Education Amendments of 1972 protects individuals from sex or gender-based discrimination, including discrimination based on gender-identity, in educational programs and activities that receive federal financial assistance.

Northeastern's Title IX Policy prohibits Prohibited Offenses, which are defined as sexual harassment, sexual assault, relationship or domestic violence, and stalking. The Title IX Policy applies to the entire community, including male, female, transgender students, faculty and staff.

In case of an emergency, please call 911.

Please visit www.northeastern.edu/titleix for a complete list of reporting options and resources both on- and off-campus.