



Syllabus

College of Computing and Software Engineering
Department of Information Technology

IT 4613 Machine Learning Technology in Banking and Investment

Meeting Times

Method: Hybrid

Time: TBD

Contact Information

Name: Dr. Ying Xie

Preferred Method of Contact: D2L Email

Email: yxie2@kennesaw.edu * Please use this for emergency only

Phone: 470-578-2143

Office Location: J-360

Email: Please feel free to reach out to me at any time. You can expect a response within 24 hours during business hours.

Office Hours: TBD

Email and Classroom Response Time:

Please contact me using **D2L Email** for all course related questions. I will check my D2L Email at least once a day, not including weekends or holidays. During the week, I generally respond to emails within 24 hours. Over the weekend (starting Friday at 4 p.m.) I will respond to emails the next following business day.

Description

This course covers applications of different machine learning techniques to a variety of banking and investment problems. Topics include supervised learning for predictive analysis, unsupervised learning for financial data clustering and visualization, and deep learning/reinforcement learning for financial decision making.

Credit Hours: 3

Prerequisites: IT 4603

Learning Outcomes

Students who complete this course successfully will be able to:

1. Describe major types of machine learning methods
2. Describe major applications of machine learning on banking and investment
3. Develop proper machine learning models for different types of banking and investment problems.

Materials/Textbooks

Course Website

D2L Brightspace: <https://kennesaw.view.usg.edu>

- It's important to know how to use this learning management system for: following learning modules, submitting assignments, checking grades and feedback, downloading files, participating discussion boards, etc.
- Please check the course site regularly for important announcements and other issues.

Learning Materials

- **Required Textbook: None.**
- Required readings (from different sources) will be assigned in each learning module.

Required Software/Hardware

- Python:
<https://www.anaconda.com/>
- Sklearn:
<https://scikit-learn.org/stable/>
- Tensorflow
<https://www.tensorflow.org/>
- Other software:
 - Software that can open and/or edit Word, PowerPoint, Excel, PDF, and ZIP files.

Evaluation

Weighted by Percentage:

Category	Weight
Assignments	40%
Course Discussions	20%
Course Project	40%
Total	100%

Grade Conversion

A: (90-100), B: (80-89), C: (70-79), D: (60-69), F: (0-59)

*** Detailed grading criteria are available in D2L for how Discussions and Projects will be graded. ***

Course Outline

Weekly learning topics (subject to change).

Week	Description
1	Overview of supervised learning
2	Overview of unsupervised learning
3	Overview of Neural Networks
4	Overview of reinforcement learning
5	Overview of applications of machine learning on Banking and Investment
6	Logistic regression for predictive analysis
7	Logistic regression for building credit risk models
8	Tree-based learning
9	Tree-based learning for Fraud Detection
10	Deep Learning
11	Deep Learning solutions to anti-money laundering
12	(Deep) Reinforcement learning
13	Reinforcement learning for trading decisions
14	SOM
15	Clustering and visualizing bankruptcy trajectory using SOM
16	Course project presentation

Course Policies

Announcement

Important announcements will be made to the class electronically through the D2L Announcements tool. It is important that you check your D2L account regularly for announcements, assignments, and course updates.

Assignments, Quizzes, & Exams Policy

- All assignments **MUST** be submitted through D2L (<https://kennesaw.view.usg.edu/>) by the deadline. Email submissions are **NOT** accepted. Any assignment that is less than 24 hours late is subject to 10% penalty. Any assignment that is more than 24 hours late will **NOT** be accepted.
- All quizzes and/or exams **MUST** be completed on D2L website by the deadline. The quizzes and/or exams can't be opened/submitted after the deadline.
- If you must miss an exam due to illness, you must e-mail or call the instructor before the scheduled time. Failure to notify the instructor prior the scheduled time will produce an automatic zero for the exam. NO makeup test except for emergencies with proof (e.g. doctor's slip).

Discussions

People learn through interactions, to facilitate interactive learning this course will use the Discussions feature in D2L. Discussions will take place in an **asynchronous** manner.

Grading

Grades will be posted in D2L, generally within one week from the due date or submission date whichever is later. Significant assignments such as projects may take longer to grade. If you think there is an error, please make a re-grading request by e-mail within one week of grade posting. A request for reassessment will not be granted if more than two weeks have passed since the grade in question was posted. Please check your grades in D2L regularly.

No “extra credit” work will be given to improve one’s grade. Copies of your class work and test will be kept for record.

Assignment Submission Guidelines

All work turned in for this class must meet the submission guidelines presented in the Start Here module. Work that does not meet the submission criteria will not be graded. Scoring rubric will be provided for each assignment.

Attendance

Attendance in classes, laboratories and lectures is important. All students are expected to attend these activities in accordance with their schedule of courses. The instructor determines the attendance policy for each course. All instructors will provide the students, at the beginning of each semester, a clear statement regarding their policies in handling absences. Instructors will also be responsible for advising their students regarding the academic consequences of absences. To view the complete student attendance policy, please visit <http://catalog.kennesaw.edu/content.php?catoid=38&navoid=3019#attendancepolicy>.

Enrollment Status Statement - Students are solely responsible for managing their enrollment status in a course; nonattendance does not constitute a withdrawal.

Federal, BOR, and KSU Student Policies

The information below constitutes the Federal, BOR, and KSU course syllabus policies and procedures and must be included by faculty members in their course syllabi. These policies are updated on this site annually.

Note to Faculty: The KSU faculty handbook requires the Academic Integrity Policy in the course syllabus.

KSU Academic Integrity Statement

Every KSU student is responsible for upholding the provisions of the [Student Code of Conduct](#), as published in the Undergraduate and Graduate Catalogs. Section 5c of the Student Code of Conduct addresses the university’s policy on academic honesty, including provisions regarding plagiarism and cheating, unauthorized access to university materials, misrepresentation/falsification of university records or academic work, malicious removal, retention, or destruction of library materials, malicious/intentional misuse of computer facilities and/or services, and misuse of student identification cards. Incidents of alleged academic misconduct will be handled through the established procedures of the Department of Student Conduct and Academic Integrity (SCAI), which includes either an

“informal” resolution by a faculty member, resulting in a grade adjustment, or a formal hearing procedure, which may subject a student to the Code of Conduct’s minimum one semester suspension requirement.

KSU Disruption of Campus Life Policy

All students are responsible for knowing the information, policies and procedures outlined in the Kennesaw State University Codes of Conduct. [Student Conduct and Academic Integrity](#) (SCAI) includes: the general Student Code of Conduct, the Residential Code of Conduct, and the Code of Academic Integrity.

KSU Web Accessibility Policy Statement

Federal law Section 508 Subsection 1194.22 of the Rehabilitation Act and the Board of Regents (BOR) of the University System of Georgia (USG) Web Accessibility Guidelines require that all web content meet the federal government’s accessibility guidelines. As such, KSU complies with USG guidelines.

University accessibility assistance is provided by several offices as noted below. Staff in these offices work to accommodate requests for access or assistance with access as soon as possible in order to either accommodate the request or identify an effective alternative for the requestor.

- Request for

Office

Contact Number

Contact Email

- [Student Support Services](#)

[Student Disability Services](#)

470-578-2666

studentdisability@kennesaw.edu

- [Student Technology Assistance](#)

[University Information Technology Services](#)

470-578-3555

studenthelpdesk@kennesaw.edu

- [Third Party Technology Assistance](#)

University Information Technology Services
 470-578-6999
service@kennesaw.edu

KSU Reasonable Accommodations Policy

Students with qualifying disabilities under the Americans with Disabilities Act (ADA) and/or Section 504 of the Rehabilitation Act who require “reasonable accommodation(s)” to complete the course may request those from Office of Student Disability Services. Students requiring such accommodations are required to work with the University’s Office of Student Disability Services rather than engaging in this discussion with individual faculty members or academic departments. If, after reviewing the course syllabus, a student anticipates or should have anticipated a need for accommodation, he or she must submit documentation requesting an accommodation and permitting time for a determination prior to submitting assignments or taking course quizzes or exams. Students may not request retroactive accommodation for needs that were or should have been foreseeable. Students should contact the office as soon as possible in the term for which they are seeking accommodations. Student Disability Services is located in the Carmichael Student Center in Suite 267 on the Kennesaw campus or Building A in Suite 160G on the Marietta campus. Please visit the [Student Disabilities Services website](#) for more information, or call the office at 470-578-2666 (Kennesaw campus) or 470-578-9111 (Marietta campus).

KSU Enrollment Management/Course Attendance Policy

Students are solely responsible for managing their enrollment status in a class; nonattendance does not constitute a withdrawal.

KSU Military Withdrawals Policy

Kennesaw State students who are called to active duty or who are deployed during the term may be eligible for a military withdrawal. Students who withdraw for military reasons will receive a WM grade in all courses and receive a refund of tuition and mandatory fees and a pro rata refund of other fees. Students who would like to withdraw for military reasons must submit a copy of their official orders to the Registrar's office. Military withdrawals do not count as part of the eight (maximum) allowed withdrawals.

Copyright Law

It is the responsibility KSU faculty and students to respect the rights of copyright holders and complying with copyright law. The University System of Georgia recognizes that the exclusive rights of copyright holders are balanced by limitations on those rights under federal copyright law, including the right to make a fair use of copyrighted materials and the right to perform or display works in the course of face-to-face teaching activities.

The University System of Georgia facilitates compliance with copyright law and, where appropriate, the exercise in good faith of full fair use rights by faculty and staff in teaching, research, and service activities. The University System of Georgia ensure compliance with copyright law in the following ways.

- A. The USG informs and educates students, faculty, and staff about copyright law, including the limited exclusive rights of copyright holders as set forth in 17 U.S.C. § 106, the application of the four fair use factors in 17 U.S.C. § 107, and other copyright exceptions.
- B. The USG develops and makes available tools and resources for faculty and staff to assist in determining copyright status and ownership and determining whether use of a work in a specific situation would be a fair use and, therefore, not an infringement under copyright law;
- C. The USG facilitates use of materials currently licensed by the University System of Georgia and provides information on licensing of third-party materials by the University System; and
- D. The USG identifies individuals at the University System and member institutions who can counsel faculty and staff regarding application of copyright law.

Protecting Students' Privacy (FERPA)

Students have certain rights to privacy. These rights are mandated by federal policy. Leaving their work in an unsecured area such as outside your office door (unless agreed upon with each student) means that the students' names and grades and possibly social security numbers are accessible to everyone. Additionally, research papers can be taken and used by other individuals. It is recommended that you permit students to retrieve their work from your office if you don't return it to them in class. Information should not be made public in any way in which a student's grades, social security number, or other personal information may be identified. Grade information may be shared with members of the KSU community who also have a legitimate educational interest in student success (e.g. academic advisors or members of the Behavioral Response Team). Faculty may be asked to provide early alert information if there is a concern that a student is at risk, academically or otherwise.

As a member of the Kennesaw State University community of scholars, I understand that my actions are not only a reflection on myself, but also a reflection on the University and the larger body of scholars of which it is a part. Acting unethically, no matter how minor the offense, will be detrimental to my academic progress and self-image. It will also adversely affect all students, faculty, staff, the reputation of this University, and the value of the degrees it awards. Whether on campus or online, I understand that it is not only my personal responsibility, but also a duty to the entire KSU community that I act in a manner consistent with the highest level of academic integrity. Therefore, I promise that as a member of the Kennesaw State University community, I will not participate in any form of academic misconduct.

The [Student Handbook](#) contains information regarding Rights Pertaining to Student Records, and FERPA specific details are available online at:
<http://registrar.kennesaw.edu/ferpastudents.php>

Privacy in the Education Process. A key requirement of the formal evaluation process is the protection of individual privacy rights concerning educational grading. The University's online learning system and email system is designed to prevent unauthorized individuals from gaining access to sensitive information or information protected by federal or state law. Consequently, faculty and students are strongly encouraged to only communicate regarding course matters through the University's designated technology learning system.

KSU Sexual Misconduct Policy

KSU does not condone and will not tolerate sexual misconduct or sexually exploitative or harassing behavior of any kind. The University has a comprehensive sexual misconduct policy and affirms its responsibility to:

- Respond promptly and effectively to sex discrimination, especially sexual harassment and sexual violence;
- Take immediate steps to eliminate the sexual harassment or sexual violence, prevent its recurrence, and address its effects; and
- Support all students with appropriate resources regardless of their status as complainant or accused.

Questions about this policy should be directed to the KSU [Office of Institutional Equity](#) (OIE) and Title IX officer by telephone at (470) 578-5189.

This policy applies broadly to all KSU employees, students, and third parties. All individuals are encouraged to report and seek assistance regarding incidents of sexual misconduct. A student who is under the influence of alcohol or drugs in violation of the KSU Student Code of Conduct at the time of a sexual misconduct incident should not be reluctant to seek assistance for that reason. In order to encourage students to come forward, disciplinary violations against a student (or against a witness) for his or her use of alcohol or drugs will not be enforced if the student is making a good faith report of sexual misconduct.

KSU Course Withdrawal Policy

Students may withdraw from one or more courses any time before the last week of the semester. Summer withdrawal dates vary according to the part of term in which the student is enrolled. However, as of fall 2004, students will be allowed a maximum of eight total withdrawals if they enter KSU as a freshman. Transfer students will be allowed one withdrawal per fifteen credit hours attempted, for a maximum of eight. Students who choose to pursue a second degree at KSU will be allowed two additional withdrawals. Students who entered KSU before fall 2004 will be allowed one withdrawal per fifteen credit hours attempted for a maximum of eight after the institution of this policy. As part of the Kennesaw State University and Southern Polytechnic State University Consolidation process, SPSU students will have eight withdrawals available beginning Fall Semester 2015.

Students who exceed the maximum number of withdrawals will receive a grade of "WF" for any subsequent withdrawals. To completely or partially withdraw from classes at KSU, a student must withdraw online through Owl Express.

Students who officially withdraw from courses before the last day to withdraw without academic penalty will receive a grade of "W" and receive no credit. Students who officially withdraw after the last day to withdraw without academic penalty and before the last week of classes during the semester or who have exceeded the maximum number of withdrawals will receive a grade of "WF," which will be counted as an "F" in the calculation of their grade point average.

The only exceptions to these withdrawal regulations will be for instances involving unusual circumstances, which must be fully documented. Students may appeal to the Academic Standing Committee for consideration of unusual circumstances. Exact withdrawal dates are published in the official academic calendar. Students who simply stop attending classes without officially withdrawing usually are assigned failing grades. Students will receive refunds only when they withdraw from ALL their classes and only by the schedule outlined in the University System refund policy.

In specific circumstances when a student experiences an extreme emergency during the term, the student may qualify for an Administrative Emergency Withdrawal. That process is coordinated through the Office of the Dean of Students and information is available at <http://deanofstudents.kennesaw.edu/resources/withdrawal.php>.

KSU Graduate Course Auditing Policy (Graduate Courses Only)

Auditing of courses will be permitted for regularly enrolled graduate students, as well as on a space-available basis for those who hold a graduate degree from Kennesaw State. Auditing courses is not allowed in the Coles Doctor of Business Administration, the Coles Executive MBA, the Master of Science in Conflict Management (MSCM), the Master of Science in Information Systems (MSIS), or any of KSU's Master of Education (M.Ed.) programs. Students must have completed all prerequisites necessary for the course to be audited and are expected to complete all course requirements as noted on the course syllabus. A student may audit no more than 6 credit hours of graduate course work in a given term.

The grade of "V" will be given for successfully completed audited courses. This grade will have no effect upon the student's grade-point average, and students will not be permitted to have the audit grade changed at any future date. Audited courses will not count toward degree completion for any of KSU's graduate programs.

The permission to audit form, available in the Office of the Registrar, must be submitted before the end of final registration. The form must be signed by the Graduate Program Director of the program offering the course to be audited. Audited courses count at full value in computing the student's course load and fees. The student's name will appear on the official class rolls of the courses audited, as well as the student's approved schedule of courses. No credit is granted for audited courses, and students are not permitted to change to or from an auditing status except through the regular procedures for schedule changes.

Academic Feedback

Institutional Chief Academic Officers will encourage faculty to clarify for students, at the beginning of each course, the basis on which grades will be determined and to provide timely academic feedback as the course progresses ([BOR Academic and Student handbook policy 2.18](#)).

Netiquette: Communication Courtesy

All members of the class are expected to follow [rules of common courtesy in all email messages](#), threaded discussions and chats.

Inclement Weather Policy

During the course of the year, Kennesaw State University may decide to close campus or operate on a delayed schedule in cases of inclement weather.

The University will announce campus closures and delayed schedules in several ways. The cell phone number on file with the university will automatically receive KSU Alerts, so make sure your information in OwlExpress is accurate at all times. An email will also be sent to your university account.

In addition, announcements will be made by a notice on the [Kennesaw State University home page](#).