CS 295: Artificial Intelligence Applications
Fall 2026
Department of Computer Science
SUNY Polytechnic Institute

Course Information

Class Times and Location:
Mondays, Wednesdays, and Fridays
9:20 AM to 10:30 AM
Kunsela Hall A135

Required Textbook
"Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow"
by Aurélien Géron
3rd Edition, O'Reilly
ISBN: 9781098125974

Instructor Information

Name, Email, Office, and Phone:
Derek Taylor
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Kunsela C120
315-525-7229

Office Hours:
After class, by appointment, or:
Monday and Wednesday 1pm - 3pm
Tuesday 8am - 10am

Course Description
Applying Artificial Intelligence techniques across academic disciplines enables innovative solutions to complex, real-world problems. This course provides an application-based introduction to Artificial Intelligence. A portion of the course reviews the Python programming language and introduces essential data structures, including queues, trees, and graphs. Through hands-on projects, students will explore core AI applications using popular libraries such as NumPy, Pandas, Scikit-learn, and Keras/TensorFlow. Topics include predictive analytics (classification and regression), neural networks, pre-trained networks for image recognition, neuroevolutionary learning with genetic algorithms to optimize network parameters, and reinforcement learning. The course emphasizes the practical implementation and evaluation of AI techniques, preparing students for further studies in machine learning.

Student Outcomes

By the conclusion of this course, students are expected to:

- Implement and analyze fundamental data structures including queues, trees, and graphs, along with associated algorithms like BFS and DFS.
- Utilize software libraries to manipulate and prepare data for AI contexts.
- Apply and evaluate supervised learning techniques (classification and regression) to build predictive models.
- Build, train, utilize and optimize various neural networks.
- Understand the core concepts of reinforcement learning.
- Develop and evaluate practical AI applications.

Course Schedule

Week 1: Python Programming (variables, control flow, functions, built-in data structures)
Week 2: Python Programming (built-in data structures continued, classes, NumPy basics)
Week 3: Linear Data Structures (stacks, queues, priority queues, intro to Pandas)
Week 4: Non-Linear Data Structures & Search (trees, graphs, BFS, DFS)
Week 5: Predictive Analytics & Classification Basics (ML workflow, Scikit-learn, KNN, train/test split)
Week 6: Advanced Classification (logistic regression, SVM, evaluation metrics, data preprocessing)
Week 7: Regression Techniques (linear regression, decision trees, evaluation metrics)
Week 8: Neural Networks Basics (MLP, Keras/TensorFlow, simple NN classifier)
Week 9: Neural Networks for Vision
Week 10: Neural Networks for Vision
Week 11: Neuroevolutionary Learning
Week 12: Neuroevolutionary Learning
Week 13: Reinforcement Learning with Neural Networks
Week 14: Reinforcement Learning with Neural Networks

Assignments and Grading

Coursework will fall into three weighted categories as follows:

Projects (60%) - Hands-on applications of course material.
Exams (30%) - Midterm and Final exam with equal weighting
Problem Sets (10%) - Summative assessment for each topic

Cancellation of Classes Due to Inclement Weather or Other Emergency

SUNY Poly has a 24-hour hotline, called Snowline, to inform students, faculty, and staff when severe weather prompts the cancellation of all classes. Snowline can be reached by calling 315-792-7385. In the event of severe weather, Snowline will announce only the cancellation of ALL classes. The cancellation of all classes will also be posted online and broadcast on radio and television stations in the Utica-Rome and Syracuse areas. The SUNY Poly website also maintains a list of individual class cancellations.

In addition, all SUNY Poly students and employees are enrolled in the Rave Alert emergency alert service. You can visit the SUNY Poly Rave Alert website to learn more and to adjust your notification preferences.

Academic Integrity and Code of Conduct

SUNY Poly is committed to academic excellence in a climate of honesty, respect, and trust. The mutually respectful exchange of honest ideas is foundational to the intellectual vigor of the SUNY Poly community. The University seeks to maintain and enhance its educational environment through the development, promotion, and enforcement of standards for academic integrity. Please take a few minutes to become familiar with SUNY Poly's Community Standards, including the Student Handbook and Student Code of Conduct. SUNY Poly's Academic Integrity Policy, which describes SUNY Poly's policies regarding plagiarism and other inappropriate academic activities, can be found in the Student Handbook.

Unless otherwise stated, **your work in this course** (including your homework, programs, code, assignments, projects, presentations, documentation, quizzes, and exams) **should be yours and yours alone**. You shall not plagiarize, copy, buy, or steal any of the above in any form from anyone else and submit it as your own work. You shall not cheat in any way, shape, or form on any exams, quizzes, assignments, projects, or homework in this (or indeed any other) course.

You may talk with other students to grasp a CONCEPT or IDEA related to the material in this course. You may NOT, however, discuss specifics of a given assignment, project, or program. **In particular, you should not be sharing code in ANY form, directly OR indirectly (e.g., retyping it or having someone else type it).** Cheating shall be suspected if your work is effectively identical to the work of another, if your answers are stylistically inconsistent, and/or if you are unable to explain the work you submitted.

Posting assignment descriptions and/or code answers on sites like Chegg.com (or using such answers) is prohibited in this course. Also, usage of ChatGPT or similar artificial intelligence technology to complete assignments (with little to no effort on the student's part) shall be considered plagiarism and therefore a violation of academic integrity. I reserve the right to judge what constitutes "effort".

Various penalties for academic dishonesty and violations of the SUNY Polytechnic Institute Academic Integrity Policy apply. **Evidence of cheating will be reported to the Dean of the College of Engineering, and the result can be (at minimum) failing the assignment or the entire course.**

At the end of the day, you need to be able to do the work in this course yourself in order to learn the material. You don't need to cheat to succeed. I have office hours, an email address, and a phone: ask me questions!

Students are also responsible for taking reasonable precautions to prevent copying or dissemination of their assignments.

Accommodations for Students with Accessibility Needs at SUNY Polytechnic Institute

Your access in this course is important to me. In compliance with the Americans with Disabilities Act of 1990 and Section 504 of the Rehabilitation Act of 1973, SUNY Polytechnic Institute is committed to ensuring comprehensive educational access and accommodations for all registered students seeking access to meet course requirements and fully participate in programs and activities. Students with documented disabilities, temporary, or medical conditions are encouraged to request services by contacting Student Accessibility Services (SAS) or filling out the Request for Accommodations form. Please note, requesting accommodations is only the first step. You must provide documentation to SAS and meet with staff *before* receiving accommodations. Please do this as early as possible 1) because accommodations are never retroactive and 2) so that we have adequate time to arrange your approved academic accommodation/s. Once SAS creates your accommodation plan, it is your responsibility to provide me a copy of the accommodation plan.

If you experience any access barriers in this course, such as with printed content, graphics, online materials, etc., reach out to me or Accessibility Services right away. For information related to these services or to schedule an appointment, please contact the SAS using the information provided below.

Office of Student Accessibility Services
SAS@sunypoly.edu
(315) 792-7170
Peter J. Cayan Library, L112

Pregnancy Statement

SUNY Poly is committed to fostering an inclusive and supportive environment for all students, including those who are pregnant or experience pregnancy-related conditions. In accordance with relevant federal and state laws, including Title IX of the Education Amendments of 1972, students who are pregnant, have recently given birth, or are dealing with pregnancy-related conditions are entitled to equal access to educational opportunities.

If you are pregnant or experience a pregnancy-related condition, please reach out to me as soon as possible to discuss any accommodations you may need to support your participation in the course. Accommodations may include, but are not limited to, adjustments to class attendance policies, extended deadlines, or arrangements for makeup exams.

The university ensures that pregnant students will not face discrimination or be excluded from any educational programs or activities. Any concerns related to pregnancy and academic participation will be addressed with respect and confidentiality.

If you have questions or would like to request accommodations outside of what is being offered in class please contact the Title IX Coordinator, Kathie Artigiani, at artigik@sunypoly.edu.

Technical Assistance for Students

The SUNY Poly Help Desk is in the Cayan Library on the first floor. You can contact them by phone at 315-792-7440, by email at helpdesk@sunypoly.edu, or by submitting an online help ticket on their website.

If the SUNY Poly Help Desk is closed, you can obtain assistance from the Open SUNY Help Desk by calling 1-844-OPENSUNY (673-6786). The Open SUNY email is OpenSUNYHelp@suny.edu or you can submit an online help ticket.

The SUNY Poly ITS website has information about software and hardware that you can access as a student, as well as links to software you may need in your classes. Students are encouraged to save all work in multiple locations. MS Office OneDrive is available for use. For assistance, please contact the ITS Help Desk, helpdesk@sunypoly.edu or 315-792-7440.