CSC 202-01, Introduction to Machine Intelligence
Spring 2022
Eastern Connecticut State University

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Office Hours: MW: 1-3:00
F: 1-2:00, or by appointment

Course information:

Title:	Introduction to Machine Intelligence
Day/Time:	MWF 11:00 – 11:50 AM (SCI 135)
Section:	01
Credit:	3 hours

Course Materials:

1. Required interactive textbook: *Programming in Python 3 with zyLabs*, http://zyBooks.com, zyBook code: EASTERNCTCSC202DancikSpring2022
2. Course notes and class material: https://gdancik.github.io/
3. *Python* (http://www.python.org) and *Jupyter Notebooks*, (https://jupyter.org/) will be used for programming assignments. Installation instructions can be found on the Course Info section of the course website.
4. Piazza (https://piazza.com) will be used for online discussion and several assignments. Note: a mobile app is available from the App store (iPhone/iPad) or Google Play (Android devices)
5. Recommended Textbook: Deitel, Harvey and Deitel, Paul. *Introduction to Python for the Computer and Data Sciences: Learning to Program in a World of Big Data and AI*. Pearson Education, United States, 2019.

Course Description

Machine Intelligence is the sub-discipline of computer science concerned with the automation of tasks which have, traditionally, required human intelligence. The course provides an overview of the current state of the art, and provides instruction in the technologies and techniques required to utilize or develop new intelligence-based systems. Students will gain hands-on experience writing computer code using modern scripting languages such as Python and using cloud-based services to create sample intelligent applications that access and analyze information to solve problems. Since these technologies can greatly amplify the influence of any one person the societal impacts and ethical issues regarding the design and application of the technology will be discussed.

This course satisfies the Tier 2 IT Requirement

Students will explore the application of information technology in one or more areas such as information systems, networks, data analysis, model development, simulations, graphic design, artistic creation, the impact of computers on society or the ethical use of digital information. These courses will enable students to apply information technology in problem-solving, the pursuit of knowledge, and the communication of ideas. Students will recognize when information technology will assist or impede the achievement of a goal.

The student learning outcomes, corresponding course activities, and assessment methods are provided below.

Tier II: Applied Information Technology		
Student Learning Outcomes	**Specific Course Activities**	**Assessment Methods**
1. Explain digital representation of information	Develop computer programs to process data, including numeric data, text, images, and real-time voice data.	Projects and Exams
2. Compare information technologies in both abstract and concrete terms	Compare and contrast machine learning methods, for example for sentiment analysis and image classification.	Projects
3. Employ specific information technology to manage existing information, solve problems, and communicate or create new ideas	Development of programs (such as an Interactive digital assistant) to automate problem-solving tasks	Projects and Exams
4. Explain the technical and ethical limits of information technology	Ethical considerations of machine intelligence will be discussed, including bots and automation, machine intelligence and moral decisions, and biases in intelligent systems.	Written Assignment
TIER II: Synthesis and Application (required for all Tier II courses)		
1. Identify and apply diverse methods of inquiry and ways of knowing in making and evaluating decisions in human affairs	Obtained by cumulative activities of multiple requirements of courses in Tier II	
2. Develop the ability to think creatively, and come to value ingenuity and originality by engaging in multiple modes of problem solving	Obtained by cumulative activities of multiple requirements of courses in Tier II	
3. Apply ethical principles to practical problems of life and work	Case study exploring training data biases in facial recognition tool.	Written Assignment
4a. Effectively communicate ideas orally:	Students will give a formal oral presentation of their final project.	Select Projects

4b. Effectively communicate ideas visually:	Student presentations will have a visual component, such as graphs and screen shots of their program.	Select Projects
4c. Effectively communicate ideas in writing:	The students will document their code using standard techniques. Students will also complete written assignments exploring ethical issues in machine intelligence.	Code Documentation and Written Assignments
5. Ability to think critically	The construction of the projects will require the application of complex tools and programming methods.	All Projects
6. Effectively seek and employ information to achieve academic goals	The projects will involve guided discovery of solutions to problems. Through projects, students apply Machine Intelligence to their academic area of interest.	Class Projects

Grading

Programming/Written Assignments	25%
Python Assessment	20%
Project #1	20%
Project #2	20%
Final Presentation	15%

Online discussion: We will use Piazza (https://piazza.com) as an online discussion and question and answer forum in this course. Shortly after the beginning of the semester, you will receive an e-mail with registration instructions sent to your Eastern e-mail address. Piazza allows for students to post and answer questions, anonymously if desired. The class benefits by seeing questions asked by other students (who often have the same questions as you) and by contributing answers. As the instructor, I will answer questions and can endorse correct student answers as well. For these reasons, all non-personal (e.g., not grade-related) questions should be posted to Piazza rather than e-mailed to me. Questions regarding homework assignments should be posted to Piazza. Questions regarding homework must be specific and may contain no more than *several* lines of code. Note that posts not meeting these criteria will be deleted and the poster penalized if warranted. Note that piazza will be required for several assignments.

Assignment Policy: We will devote some class time to completion of assignments. All assignments are due at the beginning of the class on the due date unless specified otherwise. However, a 48 hour grace period is allowed for one eligible assignment of your choice. Is this case, you may turn in an assignment up to 48 hours late with no penalty. *In order to use this grace period, you must e-mail me prior to 48 hours after the assignment deadline.* No assignment will be accepted after the grace period without prior approval. Late assignments will also not be accepted if you have already used your grace period. However, the lowest assignment grade will be dropped. If you know ahead of time that you will be missing class or that you will not be able to complete an assignment on time, please talk to me and if appropriate, additional arrangements will be made. The grace period can be applied to any assignment, unless the assignment specifically states otherwise. Only one grace period can be used for each student.

Grading Scale

93-100: **A**	90-92: **A-**	
87-89: **B+**	83-86: **B**	80-82: **B-**
77-79: **C+**	73-76: **C**	70-72: **C-**
65-69: **D+**	60-64: **D**	59 and below: **F**

Academic Honesty

You are encouraged to discuss projects and exercises with one another unless specified otherwise. However, copying answers from another student (unless otherwise specified) is *cheating* and this will not be tolerated. A student found cheating will automatically receive a grade of "F" on the assignment and will be reported to the department head with further potential consequences. In addition, students are responsible for familiarizing themselves with the University's numerous policies and procedures contained in the University Catalog and Student Handbook. The Code of Conduct policies and the Policy on Academic Misconduct are of special significance, since cheating, plagiarism, and personal misconduct are strictly prohibited and carry severe penalties. Students should read and understand Eastern's Academic Misconduct Policy, which can be found in the student handbook, *www.easternct.edu/academic-misconduct*.
All violations will be handled under the procedures established in this policy.

Classroom civility

Cell phones are not appropriate in class and must be turned off or set to vibrate and stored off of the class desk. In general, follow the Golden Rule and treat others with respect and the way you want to be treated. In addition, students are expected to adhere to current health and safety protocols as regularly updated on Easternct.edu. Any student who fails to follow safety protocols during class will be referred to the Office of Student Conduct for disciplinary review. In response to state or university restrictions, the professor may deem it necessary to revise assignments and due dates articulated here.

Accommodations for Students with Disabilities

Eastern Connecticut State University is committed to following the requirements of the Americans with Disabilities Act (ADA) of 1990, the ADA Amendment Act of 2008, and Section 504 of the Rehabilitation Act of 1973, as amended in 1998. If you are a student with a disability (or think you might have a disability) and require accommodations or assistance evacuating a building in the case of an emergency, please contact the Office of AccessAbility Services (OAS) at 860-465-0189 to discuss your request further. Please note that accommodations are not retroactive and must be communicated through a Letter of Accommodation, which is drafted by the OAS.

***Tentative course schedule**

Week	Week of	Topic	
1	1/17/22	Overview of Machine Intelligence	
2	1/24/22	Introduction to Python (input/output, variables, and expressions)	
3	1/31/22	Python Programming Fundamentals (basic object types)	
4	2/7/22	Python Programming Fundamentals (branching and loops)	
5	2/14/22	Python Programming Fundamentals (loops)	***Lincoln's Birthday (Observed) - No Class Friday***
6	2/21/22	***President's Day – No Class Monday***	**Review / Python Assessment**
7	2/28/22	More Python (Dictionaries and List Comprehension) Natural Language Processing (TextBlob and Spacy)	
8	3/7/22	Mining Twitter Data **Project #1 (NLP)**	
9	3/14/22	***Spring Break - No Class***	
10	3/21/22	Introduction to Machine Learning (k-nearest neighbor)	
11	3/28/22	Introduction to Neural Networks	
12	4/4/22	Convolutional Neural Networks (TensorFlow)	
13	4/11/22	Machine Learning as a Service	
		Day of Reflection - No Class on Friday	
14	4/18/22	Machine Learning as a Service (Digital Assistants)	
15	4/25/22	**Project #2 (Machine Learning)**	
16	5/2/22	Ethical Issues in Machine Learning	
	5/9/22	**Final Presentations** **(Wednesday, May 11, 11:00 AM - 1:00 PM)**	