COURSE SYLLABUS

IST 691: Deep Learning in Practice

Instructor: Jeff Saltz
Office: Hinds 233
Office Hours: by appt
Course Time: TBD

Phone: email preferred
Email: jsaltz@syr.edu

Classroom: TBD

Description: Introduction to Deep Learning concepts and techniques required to develop Deep Learning based applications. Hands-on experience applying models using open-source frameworks and packages.

Additional Course Description:

This course will introduce Deep Learning methods for classifying data and predicting outcomes. The background and application of Deep Learning techniques will be discussed and applied on real world challenges. Students will acquire an intuitive understanding of how Deep Learning works, and be able to create Deep Learning based solutions, using state-of-the-art Deep Learning based software.

Prerequisite: IST 687. Exceptions maybe given to students who have acquired skills equivalent to what is taught in IST 387/687

Audience: Graduate Students

The format of the class meetings will be a combined lecture and lab format, with lectures and class discussions to cover material and lab time to investigate small examples for the topic of the week. There will be weekly readings based on the textbook and on other materials, which will be posted on-line.

Credits: 3

Learning Objectives:

After taking this course, the students will be able to:

1. Explain to non-technical people how, at a high level, deep learning works, and what are the key advantages of using Deep Learning
2. Translate data modeling needs into technical Deep Learning solutions.
3. Build Deep Learning models that solve specific predictive data analytics challenges
4. Apply Deep Learning concepts to address real-world problems.

Bibliography/ Texts / Supplies:

Deep Learning – A Visual Approach. Andrew Glassner, 2021 (DLAVA)

Bibliography/ Texts / Supplies – Optional:

A. Zhang, Z. Lipton, M. Li, A.J. Smola, Dive into Deep Learning. https://d2l.ai/ (DIDL)

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Software

- Python & The Keras Deep Learning Framework

Course Requirements:

Your final grade is determined by your performance on the items in the table below. An overview of each item is provided in the remainder of this section.

Assignment	Weight (%)	Learning Objectives
Quizzes (4)	24	2
HW (4)	44	2, 3
Group Project	32	1, 2, 3, 4

NOTES:

- **Homework assignments:** Assignments must be professionally prepared and submitted electronically to the LMS. All assignments should be submitted as Jupyter notebook files.

- **Group Project:** The objective of the project is to work as a team to apply concepts taught in this class to solve a data analytics problem.

Grading:

For this class, an "A" would mean the student has the capability to independently solve a simple data analytics task. Below is the formula for number-to-letter grade conversion.

Grade	Points	Grade	Points	Grade	Points	Grade	Points
		B+	87-89	C+	77-79	F	0-69
A	93-100	B	83-86	C	73-76		
A-	90-92	B-	80-82	C-	70-72		

Grades of D and D- may not be assigned to graduate students.

Course Specific Policies on attendance, late work, make up work, examinations if outside normal class time, etc.:

- **Registration**: Students must register prior to the first class or may be restricted from registering. If you are registered but not present at the first class, you run the risk of being administratively deregistered from this course so that your seat can be given to a student on the wait list.
- **Late Policy for Assignments**: To ensure fast return, all assignments should be submitted on time. One-hour grace period is given to accommodate any incidents around deadline. Late policy will be enforced starting from the second hour. You are free to discuss the assignments with your classmates, but you must write up the report all by yourself. Plagiarism cases will be reported to the university.
- **Communications:** This course will use Blackboard as the main communication platforms for class exercises and notifications. Students are required to check their Blackboard accounts on a regular basis.

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Course Schedule:

***subject to change**

Week	Topic Areas	Readings (in DLAVA)	Submission items
	Artificial Neural Networks		
Jan 26	Machine Learning Concepts	CH 7 – CH 12	
Feb 2	Artificial Neural Networks Concepts	CH 13	
Feb 9	Deep Learning Frameworks, Back Propagation & Optimization	CH 14 – CH 15	Quiz 1 / HW1
	Convolutional Neural Networks		
Feb 16	Convolutional Neural Network Concepts	CH 16	
Feb 23	Convolutional Neural Networks in Practice	CH 17	
Mar 2	Convolutional Neural Networks Techniques – Auto Encoders & Transfer Learning	CH 18	Quiz 2
	Recurrent Neural Networks		
Mar 9	Recurrent Neural Network Concepts	CH 19	
SPRING BREAK			
Mar 23	Word embeddings	CH 20	HW 2
Mar 30	Recurrent Neural Network in Practice		
Apr 6	Recurrent Neural Network Applications: Transformers		Quiz 3
	Emerging Topics		
Apr 13	Reinforcement Learning Concepts	CH 21	HW 3
Apr 20	Deployment Options for Deep Learning Models		
	Project Work		
Apr 27	Group Project: Working Session		Quiz 4
May 4	Group Project: Final Presentation		(May 11) HW 4

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SYRACUSE UNIVERSITY STUDENT POLICIES & SERVICES

iSchool Values

Excellence; Discovery & Innovation; Integrity; Diversity & Inclusion; Global Citizenship and Engagement

Syracuse University Policies

Syracuse University has a variety of policies designed to guarantee that students live and study in a community respectful of their needs and those of fellow students. The policies and services are listed on the new Syracuse University Senate approved syllabus appendix titled, 'Syracuse University Student Policies and Services'. These statements are an official part of this course syllabus.

University Attendance Policy

Attendance in classes is expected in all courses at Syracuse University. Students are expected to arrive on campus in time to attend the first meeting of all classes for which they are registered. Students who do not attend classes starting with the first scheduled meeting may be academically withdrawn as not making progress toward degree by failure to attend. Instructors set course-specific policies for absences from scheduled class meetings in their syllabi.

It is a federal requirement that students who do not attend or cease to attend a class to be reported at the time of determination by the faculty. Faculty should use "ESPR" and "MSPR" in Orange Success to alert the Office of the Registrar and the Office of Financial Aid. A grade of NA is posted to any student for whom the Never Attended flag is raised in Orange SUccess. More information regarding Orange SUccess can be found here, at http://orangesuccess.syr.edu/getting-started-2/.

Students should also review the University's religious observance policy and make the required arrangements at the beginning of each semester.

Diversity and Disability

(ensuring that students are aware of their rights and responsibilities in a diverse, inclusive, accessible, bias-free campus community) can be found here, at: https://www.syracuse.edu/life/accessibilitydiversity/.

Religious Observances Notification and Policy

(steps to follow to request accommodations for the observance of religious holidays) can be found here, at: http://supolicies.syr.edu/studs/religious_observance.htm

Orange SUccess

(tools to access a variety of SU resources, including ways to communicate with advisors and faculty members) can be found here, at: http://orangesuccess.syr.edu/getting-started-2/

Disability-Related Accommodations

Syracuse University values diversity and inclusion; we are committed to a climate of mutual respect and full participation. There may be aspects of the instruction or design of this course that result in barriers to your inclusion and full participation in this course. I invite any student to meet with me to discuss strategies and/or accommodations (academic adjustments) that may be essential to your success and to collaborate with the Center for Disability Resources (CDR) in this process.

If you would like to discuss disability-accommodations or register with CDR, please visit Center for Disability Resources. Please call (315) 443-4498 or email disabilityresources@syr.edu for more detailed information.

CDR is responsible for coordinating disability-related academic accommodations and will work with the student to develop an access plan. Since academic accommodations may require early planning and generally are not provided retroactively, please contact CDR as soon as possible to begin this process. https://disabilityresources.syr.edu/

Academic Integrity Policy

Syracuse University's Academic Integrity Policy reflects the high value that we, as a university community, place on honesty in academic work. The policy defines our expectations for academic honesty and holds students accountable for the integrity of all work they submit. Students should understand that it is their responsibility to learn about course-specific expectations, as well as about university-wide academic integrity expectations. The policy governs appropriate citation and use of sources, the integrity of work submitted in exams and assignments, and the veracity of signatures on attendance sheets and other verification of participation in class activities. The policy also prohibits students from submitting the same work in more than one class without receiving written authorization in advance from both instructors. Under the policy, students found in violation are subject to grade sanctions determined by the course instructor and non-grade sanctions determined by the School or College where the course is offered as described in the Violation and Sanction Classification Rubric. SU students are required to read an online summary of the University's academic integrity expectations and provide an electronic signature agreeing to abide by them twice a year during pre-term check-in on MySlice.

Course Evaluations

At the end of the term, the iSchool will ask you to share course feedback through EvaluationKIT [https://coursefeedback.syr.edu]. Log in to EvaluationKIT using your NetID and password. Please take the time to share your feedback about this course and your experience in it; all ratings and comments are completely anonymous. The iSchool carefully reviews your feedback. Our instructors use this feedback to fine tune course delivery and instruction; our professors of record use this feedback to fine tune course content and assignments. All feedback is factored into iSchool decisions about course, program and instructor development.

Use of Blackboard

This course involves the use of Syracuse University's Blackboard system as an online tool. The environment is composed of a number of elements that will help you be successful in both your current coursework and your lifelong learning opportunities. To access Blackboard, [http://blackboard.syr.edu] use your Syracuse University NetID & Password. This specific course will appear in your course list.

To search for answers to your Blackboard questions, visit the Answers self-help knowledge [https://answers.syr.edu/display/blackboard01/Blackboard]. If you have problems logging in or need assistance with Blackboard, contact the ITS Service Center at: help@syr.edu or 315.443.2677. The Syracuse University Blackboard support team will assist you.

Academic work

Academic work completed during a semester may be used by professors for educational purposes in courses during the semester. Students' registration and continued enrollment constitute consent for this purpose. Before using students' work for educational purposes in subsequent semesters, professors will either request students' permission in writing and render the work anonymous by removing all personal identification.