



## Syllabus, Spring 2022

### CSCI 6521: Advanced Machine Learning I, Room: Internet/TBA.

Lecture: Monday & Wednesday: 6:30 PM to 7:45 PM

**Zoom Link and Passcode to attend the class –**

**Zoom ID:** 815 8170 6517

**Passcode:** 409696

**Instructor:** Md Tamjidul Hoque

**Email:** thoque@uno.edu

**Phone:** 504-280-2406

**Office Hours: Monday** 12:50 – 2:05 PM and 7:45 PM to 9:00 PM.

**Wednesday** 12:50 – 2:05 PM and 7:45 PM to 9:00 PM.

**Friday** 12:50 PM – 1:50 PM.

**Online Office Hours:**

<https://uno.zoom.us/meeting/register/tZUvd-utqD8pHdNVHBVGVVN4fWzNXZ417Eys>

**Prerequisites:** Consent of the department or CSCI 4/5588.

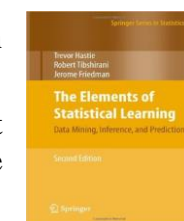
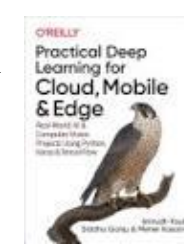
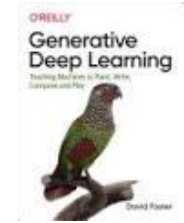
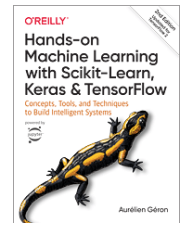
**Textbooks:** The slides, notes, and exercises contain sufficient reading materials.

**The following books are recommended for optional reading:**

1. Hands-on Machine Learning with Scikit-Learn, Keras, and TensorFlow, 2nd Edition., by Aurélien Géron, O'Reilly Sep., 2019.
2. Generative Deep Learning: Teaching Machines to Paint, Write, Compose, and Play, by David Foster.
3. Practical Deep Learning for Cloud, Mobile, and Edge: Real-World AI & Computer-Vision Projects Using Python, Keras & TensorFlow, by Anirudh Koul, Meher Kasam, and Siddha Ganju.
4. The Elements of Statistical Learning, 2<sup>nd</sup> ed<sup>n</sup>, by Trevor Hastie, Robert Tibshirani and Jerome Friedman. Springer, 2009, ISBN: 978-0387848570. The book is available online, <http://www-stat.stanford.edu/~tibs/ElemStatLearn/>
5. Hands On Unsupervised Learning Using Python by Ankur A. Patel.

**Course Content:** This course covers advanced machine learning applications and their development using the latest tools and platforms such as [Tensorflow](#), [Keras/TFLearn](#), [Cloud platform](#), [Jupyter Notebook](#), [Scikit-learn](#), and [Weka](#). The course encompasses the probabilistic aspect of machine learning techniques to uncover patterns to predict future data or other outcomes of interest. Topics covered will include:

- Introduction to various programming aspects, tools, and platforms of machine learning
- Regression, Classification, and Optimization
- Generative Modeling
- Autoencoders
- Representation Learning and Generative Learning Using Autoencoders and GANs



- Paint
- Write – Natural Language Generator
- Compose
- Advanced Generative Modeling
- Feature Detection Using Deep Belief Networks
- Time Series Clustering
- Real-Time Object Classification on iOS with Core ML

**Learning Outcomes:** The course is about learning to build advanced machine learning by apply suitable and effective statistical machine learning techniques using lasted tools and platforms. The target is to learn about the systematic application of probabilistic reasoning to inferential problems. After successful completion of the course, a student is expected to be able to easily apply the latest tools and methods in many important areas including but not limited to text-processing, computer vision, robotics, and bioinformatics. A student will also learn to utilize lasted hardware architecture such as vector-registers, parallel CPUs, and GPU/TPU.

**Online Materials:** Essential course material, assignments, announcements, etc. will be posted to this course page on Moodle, <http://www.uno.edu/moodle>. Make sure to check your @uno.edu email frequently.

**Attendance:** Your attendance at class is needed and essential for you to meet course requirements. 5% mark is allocated for your attendances.

**Grading:**

Programming Assignments (3):	marks 39%
[Tentative] Homework Assignments (1):	marks 11%
Class Tests (3):	marks 20% [best 2 counts]
Attendance:	marks 5% { %5: [90-100%], 4%: [85-90], 3%: [80-85], 2%: [75-80), 1%: [70-75), 0%: <70.}
Final Examination:	marks 25% ( <b>Must attend to pass</b> )
<i>Grading scale:</i> A: 90+%, B: 80-89%, C: 70-79%, D: 60-69%, F: < 60%.	

**Bonus:** A student who will be able to produce any publishable work (approved based on superior results, recognized by the instructor during the course period) related to any given assignment(s) or the topics covered in the class, will be given 10% bonus marks.

**Exams:** Test 1, 2 and 3: tentatively on Feb 23<sup>rd</sup>, March 23<sup>rd</sup>, and April 27<sup>th</sup>, respectively.

**Last Class:** May 13<sup>th</sup> (Friday) [but effictively May 11 (Wednesday) for this class]

**Final Exam:** Date/Time - --- day, May/14-20/2022, 8:00 PM to 10:00 PM, Location: Internet/TBA.

**Due Dates:** You are responsible for handing in your assignment on time. Late submissions will be assessed at the following rates: 80% for 1-48 hours late, 60% for 49-96 hours late, 40% for 97-144 hours late, 20% for 145-168 hours late. Assignments that are over a week late will receive no credit. For online submission, use Moodle. However, if Moodle is not working for some technical reason, email me (thoque@uno.edu) the assignment. If you are unable to act according to the deadlines due to exceptional circumstances, you must inform long before the deadline or, you must provide evidence.

### Conducts:

- (1) All submitted works must be your own. Any academic dishonesty, including cheating, plagiarism, and conspiracy will result in 0 marks and will be reported to the appropriate authority in the University (<https://www.uno.edu/media/15321>).
- (2) Please be on time in the class. Late coming in the class is discouraged.
- (3) Please avoid disruptive and noisy activities in the class and be respectful to others.

You may be interested in:

- Undergraduate Machine Learning (ML) and AI Concentration, [click-here](#) for the details.
- Graduate Certificate in ML & AI, [click-here](#) for the details.
- CSCI 4587/5587 ML I (offered in **Spring** semester), [click-here](#) for sample syllabus.
- CSCI 4588/5588 ML II (offered in **Fall** semester), [click-here](#) for sample syllabus.
- CSCI 6522 Advanced ML II (offered in **Fall** semester), [click-here](#) for sample syllabus.