



Department of Electrical and Computer Engineering
CSE 465: Pattern Recognition and Neural Network,
Sec – 3

Course Outline – Summer 2025

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Office Hour:

Sunday + Tuesday	9:30 AM – 1:00 PM
Monday	10:00 AM – 11:00 AM

Credit: 3 Credit Hours

Course Outline:

This course provides a comprehensive introduction to deep learning, covering foundational concepts and advanced techniques. It begins with the basics of neural networks, introducing Artificial Neural Networks (ANN) for classification and regression tasks. Convolutional Neural Networks (CNN) are explored for image-related applications, while Recurrent Neural Networks (RNN) are studied for sequence data and natural language processing. Advanced topics include Autoencoders for feature extraction and anomaly detection, and Generative Adversarial Networks (GAN) for creating synthetic data. The course culminates with Object Detection and Image Segmentation, exploring cutting-edge techniques like YOLO, Faster R-CNN, and U-Net. Students gain hands-on experience through coding exercises, real-world projects, and capstone assignments, ensuring a strong theoretical and practical grasp of deep learning for diverse applications in areas like image analysis, text processing, and autonomous systems.

Tentative Marks Distribution:

Assignments (Project)	30%
Quiz	10%
Midterm	30%
Final Exam (comprehensive)	30%

Reference Text Books and Materials:

- <https://www.deeplearningbook.org/>
- <http://neuralnetworksanddeeplearning.com/>

(You will be expected to read a lot of academic papers)

Course Objectives:

- Understand the Fundamentals of Deep Learning.
- Explore Advanced Deep Learning Techniques.
- Master Object Detection and Image Segmentation.
- Apply Deep Learning in Real-World Projects

Class Policies:

- **Course Structure:** This course will be delivered offline, and course materials will be shared through the Learning Management System CANVAS.
- **Exams:** There will be one midterm and one final exam.
- **Project:** Project should be completed in groups of four students.
- **Late Work Policy:** You will lose 0.5% per late hour (rounded up) on any submission, with a maximum of 48 late hours per submission. For example, if you submit 20 hours late, you lose 10% of points on it (which is 0.5% of your overall course grade). If you have medical reason for an extension, send faculty copy of your medical visit report before the deadline, and we may grant an extension (typically 2 days); we will consider other requests on a case-by-case basis.
- **Commit to Integrity:** As a student in this course (and at this university), you are expected to maintain high degrees of professionalism, commitment to active learning and participation in this class, and integrity in your behavior in and out of the classroom.
- **Academic Honesty Policy:** The North South University system believes that academic honesty and integrity are fundamental to the mission of higher education. Students are responsible for the honest completion and representation of their work, appropriate citation of sources, and respect for others' academic endeavors. Students who violate these standards must be confronted and accept their actions' consequences. Academic misconduct includes, but is not limited to:
 - cheating on a quiz or examination;
 - collaborating with others in work to be presented, contrary to the stated rules of the course;
 - submitting a paper or assignment as one's work when a part or all of the paper or assignment is the work of another;
 - submitting, if contrary to the rules of a course, work previously presented in another course;
 - tampering with the laboratory experiment or computer program of another student;
 - knowingly and intentionally assisting another student in any of the above, including assistance in an arrangement whereby any work, classroom performance, examination, or other activity is submitted or performed by a person other than the student under whose name the work is submitted or performed.

Grading Policy:

As per NSU grading policy available in <http://www.northsouth.edu/academic/grading-policy.html>