Class hours:

Mon. & Wed. 3:05pm-4:20pm, SCOB 201

Instructors and office hours:

Prof. Jae-sun Seo (jaesun.seo@asu.edu), ISTB4 551B, Mon. 1:30pm–2:30pm, Wed. 12:30pm–1:30pm

Pre-requisite:

- Comfortable with Matlab, Python or similar languages for algorithm development
- EEE 525 or equivalent
- Experienced with RTL coding, synthesis, and automatic place and route (APR)

Course description: In recent years, both industry and academia have shown large interest in low-power hardware designs for neuromorphic computing (e.g. TrueNorth) and deep learning algorithms (e.g. convolutional neural networks) for a wide range of image, speech, and biomedical applications. In this course, we will learn the underlying theory, basic algorithms, and efficient device/circuit/architecture design of neuromorphic computing.

Class website: [https://myasucourses.asu.edu/](https://myasucourses.asu.edu/)


Course topics:

- Computation in the brain and related learning algorithms
- Biological neuron/synapse models and implementations
- Artificial neural network models and implementations
- Analog vs. digital design of neuromorphic hardware
- Device-level design techniques for neuromorphic computing
- Circuit-level design techniques for neuromorphic computing
- Architecture-level design techniques for neuromorphic computing
- Case studies of neuromorphic hardware implementations
- Deep neural network hardware designs

Homework: The homework assignments will be posted on the class website. Late submissions will not be allowed. Students may work together on the homework, but copying is unacceptable.
**Laboratory:** The laboratory is located in GWC 273. There will be several laboratory assignments (learning algorithm design, custom digital CMOS hardware design) which will cover algorithm, circuit and architecture design using EDA tools (Cadence, Synopsys, etc.) using a given CMOS technology. Details of the laboratory assignments, due dates, etc. will be posted on the class website.

**Teaching assistant:** TBD

**Grader:** TBD

**Assessment:** Overall grading is on a curve with the following distribution (subject to change).

- Homework assignments: 30%
- Midterm exam: 15%
- Laboratory assignments: 55%
  - Intermediate report: 10%
  - Final presentation: 20%
  - Final report: 25%