ESE 547. Digital Signal Processing

Fall 2019.

Instructor: Dmitri Gavrilov.　　　**Email:** dmitri.gavrilov@stonybrook.edu

Location: TBA (M, W, 7:00-8:20 PM)

Office hours: TBA

Course Overview: This is a basic course in Digital Signal Processing. The following topics will be discussed:

1. Representation of discrete-time signals and systems.
2. Discrete-Time Fourier Transform.
3. Z-transform.
4. Sampling of continuous-time signals.
5. Transform analysis of linear time-invariant systems.
6. Structures for discrete-time systems.
7. Digital filter design techniques.
8. Discrete Fourier Transform.
9. Computation of the Discrete Fourier Transform. Fast Fourier Transform.
10. Fourier analysis of signals.

Learning Objectives: At the end of this course, students should know basic theoretical techniques and tools of digital signal processing:

1. The Z-transform, the Discrete-Time Fourier Transform, the Discrete and Fast Fourier Transform, and the inverses of these transforms;
2. Design techniques of Finite-Impulse-Response and Infinite-Impulse-Response filters;
3. Sampling and reconstruction of continuous-time signals, and the problems arising from these operations;
4. Implementation issues, including signal-flow graphs, state variables, and techniques for analyzing internal overflow and round-off noise problems.

Text: Oppenheim, A.V. and Schafer, R.W. "Discrete-Time Signal Processing", 3rd ed., 2010.

Additional Reading: Mitra, S.J., "Digital Signal Processing: A Computer-Based Approach", 4th ed., 2011.

Software: MATLAB.

Examinations: Midterm test and final examination.

Grading: Midterm test is 40% and final exam is 60% of the final grade.

If you have any conditions, such as physical or mental disability, which will make it difficult for you to carry out the work as outlined above, please notify me in the first two weeks so that appropriate arrangements could be made.