

## ESE 545 Computer Architecture Spring 2022

**Course Description:** This course focuses on the techniques of quantitative analysis and evaluation of modern computer systems. The emphasis is on instruction set design, pipelining, different types of parallelism (instruction, data, and thread level), and memory hierarchies. Students will undertake a design project on the multimedia processor design related to the course contents. The project is to be done with a use of hardware description languages, such as VHDL or Verilog/SystemVerilog, as well as modern CAD systems, such as Cadence, Mentor Graphics, etc.

Neither VHDL/Verilog languages nor the use of CAD systems will be taught in the class. Students are strongly encouraged to begin learning these tools individually starting from the first week of the class.

**Instructor:** Mikhail Dorojevets  
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**Course website:** <http://www.ece.stonybrook.edu/~midor/ESE545/index.html>

**Lectures:** Thursday 6:30 - 9:20 PM 154 Light Engineering

**Office:** 243 Light Engineering, 632-8611

**Office hours:** Wednesday 10:00 am - 12:00 pm

**Text:** J. Hennessy and D. Patterson, Computer Architecture: A Quantitative Approach, **Sixth edition**, Morgan Kaufmann Publishers (Elsevier), 2019  
ISBN: 978-0-12-811905-1

### Other Highly Recommended Books:

1. David A. Patterson and John L. Hennessy. Computer Organization and Design: The Hardware/Software Interface, Fifth/Sixth Edition.
2. Peter J. Ashenden. The Designer's Guide to VHDL, 3rd edition, Morgan Kaufmann Publishers, 2008, ISBN: 978-0-12-088785-9.

**Exam:** There will be one ("late mid-term") exam in April.

**Project Part1** (dual-lane processing core): March 21, 2022

**Full project submission deadline:** Monday, May 1, 2022 by email to Instructor.

**Project Presentations:** May 2-4, 2022 (TBA).

### Grading:

Exam: 50%

Project (one or two person teams): 50%

If you have a physical, psychological, medical or learning disability that may impact on your ability to carry out assigned course work, I would urge that you contact the staff in the Disabled Student Services office (DSS), room 133 Humanities, 632-6748/TDD. DSS will review your concerns and determine, with you, what accommodations are necessary and appropriate. All information and documentation of disability is confidential.