

## ESE 545 Computer Architecture Spring 2025

**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/Verilog/SystemVerilog, as well as modern CAD systems, such as Cadence, Mentor Graphics, etc.

Neither VHDL/Verilog/SystemVerilog languages nor the use of CAD systems will be taught in the class.

**Course's website:** <http://www.ece.sunysb.edu/~midor/ESE545/index.html>

**Instructor:** Mikhail Dorojevets  
**Office:** 243 Light Engineering, 632-8611  
**Office hours:** W 10:00 am - 12:00 pm  
**E-mail:** [mikhail.dorojevets@stonybrook.edu](mailto:mikhail.dorojevets@stonybrook.edu)

**Lectures:** Thursday 154 Light Engineering, 5:00 - 7:50 PM

**The last lecture notes (pdf) are here.** (If necessary, use "Open link in new window" to see and save the lecture slides.)

**Textbook:** 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 mid-term exam in late April (no final exam in May)

**Project Deadlines:**

**Your instruction set table report by email to Instructor: 11:00 PM Feb. 16, 2025**

**Project Part 1** (a dual-lane processing core with a RF & forwarding stage) (by email): **11:00 PM March 24, 2025**

**Full Project submission** (by email): **11:00 PM, May 3, 2025**

**Project presentation by each team to Instructor in the Graduate Linux lab using lab computers only (room 183): May 5-6, 2025 (TBD)**

Every student must get an account at the Graduate Linux lab from John.Joseph@stonybrook.edu

**Grading:**

Mid-term exam: 50%

Project (one or two student teams): 50%

Thanks to the ESE 545 course and its design project, many students got job offers from the leading computer & chip design companies.

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.