

## ESE 345: Computer Architecture

Spring 2019

**Description:** This course focuses on the fundamental techniques of designing and evaluating modern computer architectures and tradeoffs present at the hardware/software boundary. The emphasis is on instruction set design, processor design, memory and parallel processing. Students will undertake a design project using a hardware description language and modern CAD tools.

**Prerequisites:** ESE380 ESE382 3 credits

**Instructor:** Prof. Mikhail Dorojevets  
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**Office Hours:** Wednesday 9:50 –11:50 AM  
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**Course's website:** <http://www.ece.stonybrook.edu/~midor/ESE345/index.html>      [The last lecture notes \(pdf\) are here.](#)

**Teaching Assistants:** Ryan Thielke  
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**TA office:** 208 Light Eng.  
**TA hours:** Tuesday, Friday 10:00-11:00 am

**Lecture:** Tuesday Thursday 7:00-8:20 PM, 154 Light Engineering

**Text:** David A. Patterson and John L. Hennessy "Computer Organization & Design The Hardware/Software Interface," Fifth Edition by David A. Patterson and John L. Hennessy, 2014 by Elsevier Inc. ISBN:978-0-12-407726-3

### Recommended Books on the VHDL:

1. Peter J. Ashenden. The Designer's Guide to VHDL, 3rd edition, Morgan Kaufmann Publishers, 2008, ISBN: 978-0-12-088785-9.

**Project Deadline:** Last week of classes

**Course Grading:** Homeworks: 12%  
Exams: (two in-class midterms): 66%  
Project: 22%

### Course Learning Outcomes:

Upon completion of this course, students will learn: 1) computer performance and instruction set design principles, 2) MIPS architecture and basics of assembly language programming, 3) integer and floating-point arithmetic, 4) processor, caches, and memory design, and 5) use of VHDL/Verilog languages in the processor datapath design and verification.