

Review for Final Exam on Tuesday, May 10th 2022 at 2:30PM in E273

A closed-book, closed-notes, no-calculators exam ; **Know whatever is indicated in parentheses ()**

1. Powers of 10 and 2 [PDF](#) -- no video of lecture, but [video review in #7 below](#). (All but **precise** powers of two column)
2. Chip Manufacturing Process [PDF](#) -- no video of lecture, but [video review in #7 below](#) (All of first diagram)
3. Atoms and Transistors [PDF](#) -- no video of lecture, but [video review in #7 below](#) (Doping, and how each type transistor works)
4. Moore's Law [PDF](#) -- no recording of lecture, but [video review in #7 below](#) (All, but no calculations)
5. PAPER: Transistors Stop Shrinking [PDF](#) -- part of an assignment, so no lecture or video, just class discussion (Not on exam)
6. BOOK CHAPTER: Computer History [PDF](#) -- part of an assignment, so no lecture or video, just class discussion (Not on exam)
7. Tech History & Economics [PDF](#) ([MP4* YouTube*](#)) -- videos includes review of #1 to #4 above (in the beginning) (All that is highlighted, except company names)
8. Conceptual Computer Architecture [PDF](#) ([MP4* YouTube*](#)) -- videos include #9 below (All)
9. Levels of Computing, Microcontroller vs Microprocessors, Robotics, IBM quality control [PDF PPT](#) ([MP4* YouTube*](#)) -- videos include #8 above (Only slides 1,8,9,10,11,12,13,16,18,19)
10. Microcontroller vs Microprocessors [PDF](#) ([MP4* YouTube*](#)) (All highlights except page 4) Wunderlich, J.T. (1999). **Focusing on the blurry distinction between microprocessors and microcontrollers**. In *Proceedings of 1999 ASEE Annual Conference & Exposition, Charlotte, NC: (session 3547), [CD-ROM]*. ASEE Publications. [PAPER](#) (Not on exam)
11. IBM/Wunderlich "Controlled Randomness" Quality-Control [PDF PPTX-w/audio](#) ([MP4* YouTube*](#)) -- *EGR433/430 Advanced Computer Engr/Parallel Processing* (not on exam) Wunderlich, J.T. (2003). **Functional verification of SMP, MPP, and vector-register supercomputers through controlled randomness**. In *Proceedings of IEEE SoutheastCon, Ocho Rios, Jamaica, M. Curtis (Ed.): (pp. 117-122)*. IEEE Press. [PAPER](#) (Not on exam)
12. Intro to Cache Design [PDF](#) ([MP4* YouTube*](#)) -- This is just an intro to basics; see this advanced course for much more: *EGR433/430* (Temporal & Spatial Locality of Reference, Cache Block/Line size rationale. SMP and MPP)
13. Number Representations [PDF PPTX-w/audio](#) [MP4](#) [YouTube](#) (All)
14. Fractional part of IEEE Floating Point [PDF PPTX-w/audio](#) [MP4](#) [YouTube](#) (All)
15. IEEE Floating Point example [PDF PPTX-w/audio](#) [MP4](#) [YouTube](#) (All)
16. Design a PC 1 [PDF PPTX-w/audio](#) ([MP4* YouTube*](#)) -- videos include #17 below (All slides except 7,9,10,11,12,13)
17. Design a PC 2 [PDF PPTX-w/audio](#) ([MP4* YouTube*](#)) -- videos include #16 above (All slides except 4 to 12, and 15 to 18)
18. BOOK CHAPTER: RISC vs CISC, HLL vs Assembly [PDF PPTX-w/audio](#) ([MP4* YouTube*](#)) -- videos include #19 below (Not on exam)
19. High Level Language vs Assembly Language 2 [PDF PPTX-w/audio](#) ([MP4* YouTube*](#)) -- videos include #18 above (3 advantages and 3 disadvantages of assembly language)
20. Physics and Technology of Waves [PDF PPTX-w/audio](#) ([MP4* YouTube*](#)) (All but last four questions on slide 10)
21. Human vs. Machine Vision [PDF PPTX-w/audio](#) ([MP4* YouTube*](#)) -- videos include excerpts from #22 below (Beta movement, 4 ways our eyes different from camera capture)
22. "Natural & Man-Made Lighting" from *EGR353 Green Architectural Engineering* [PDF PPTX-w/audio](#) [MP4](#) [YouTube](#) (Not on exam)
23. Physics of Color, and Display Technologies [PDF PPTX-w/audio](#) ([MP4* YouTube*](#)) (All about RGB, CRT, LCD, and plasma)
24. BOOK CHAPTER: Computer Graphics [PDF PPTX-w/audio](#) [MP4](#) [YouTube](#) (Not on exam)
25. Graphics Boards [PDF PPTX-w/audio](#) [MP4](#) [YouTube](#) (All slides except 5, and 11 to 27)
26. BOOK CHAPTER: Memory [PDF PPTX-w/audio](#) [MP4](#) [YouTube](#) (Not on exam)
27. BOOK CHAPTER: Storage [PDF PPTX-w/audio](#) ([MP4* YouTube*](#)) (Not on exam)
28. BOOK CHAPTER: Processors [PDF PPTX-w/audio](#) ([MP4* YouTube*](#)) -- videos include all of #29,30,31,32 below (Not on exam)
29. AMD ZEN core [PDF PPTX-w/audio](#) [MP4](#) [YouTube](#) Video: "How did AMD make Zen 2 faster?" (Know "Neural Net Prediction" and "Smart Prefetch")
30. Amdahl's Law for Parallel Processing [PDF PPTX-w/audio](#) [MP4](#) [YouTube](#) (All)
31. PAPER: Breaking Multicore Bottleneck [PDF PPTX-w/audio](#) [MP4](#) [YouTube](#) (Explain and graph how it relates to Amdahl's Law)
32. Recent Intel microprocessors [Wikipedia](#) Video: "Intel's new processors and GPUs in under 10 minutes | CES 2022" (Not on exam)
33. Routers [PDF PPTX-w/audio](#) [MP4](#) [YouTube](#) (Difference between router and modem)
34. Clean Power 1 [PDF PPTX-w/audio](#) ([MP4* YouTube*](#)) -- videos include #35 below, plus notes on Power Factor (Not on exam)
35. Clean Power 2 [PDF PPTX-w/audio](#) ([MP4* YouTube*](#)) -- videos include #34 above, plus notes on Power Factor (Page 1: what transformer and rectifier do. Page 7: six things about clean power)
36. Intro to Machine Intelligence Symbolic AI vs Neural Networks [PDF PPTX-w/audio](#) ([MP4* YouTube*](#)) -- videos include #37 below, plus video on Machine-Learning Math (Not on exam)
37. Neural Network Code runs (part of my 1991 Neurocomputer chip development) [MP4](#) [YouTube](#) (Not on exam)
38. Virtual & Augmented Reality [PDF PPTX-w/audio](#) [MP4](#) [YouTube](#) (State one good, and one bad thing from each of these three papers)
39. 2020 Etown Oculus Rift VR of Campus in 1924 and Present, and in Revit, by *JJWIV* [YouTube](#) (Not on exam)
40. 2006-present 3D Architectural Renderings + 2012 Wunderlich Minecraft World-Servers [Website](#), Student Builds: [1,2,3,4,5](#) ([MP4* YouTube*](#)) (Not on exam)
Wunderlich, J.T. and Wunderlich, J.J. (2013). **Green architecture and environmental design using rapid-prototyping social-networking sandbox tools, followed by professional architectural software**. *Asian Conference on Sustainability, Energy & the Environment (ACSEE 2013)*, June 6-9, Osaka, Japan. [key-note talk] [TALK PAPER](#) (Not on exam)
Wunderlich, J.T. and Wunderlich, J.J. (2014). **Crowdsourced Architecture and Environmental Design**. *2nd International Conference on Emerging Trends in Engineering and Technology (ICETET'2014)* May 30-31, London, England. [TALK PAPER](#) (Not on exam)
 - Revit vs. Sketchup Architectural Rendering Software by *JJWIV* [YouTube](#) (Not on exam)
41. Human vs Machine Intelligence [PDF PPTX-w/audio](#) ([MP4* YouTube*](#)) (Explain difference between Symbolic AI and Neural Networks)
42. Technology and Humanity III [PDF PPTX-w/audio](#) [MP4 original YouTube](#) ; with class discussion: ([MP4* YouTube*](#)) (Defend one technology that needs minimum regulation, and one that needs maximum regulation/limits, and why) Also watch Star Trek "Measure of a Man" or "Brothers" (Possible extra credit question related to the android "Data")
43. Robotics & Machine Intelligence at Elizabethtown College since 1999 [PDF PPTX](#) [MP4](#) [YouTube](#) (Not on exam)
44. Guest Lecture by U.S. Ambassador John B Craig on U.S. National Security Policy [YouTube](#) (Not on exam)
45. Elizabethtown College "Ware Lecture" Cybersecurity-Symposium, with three of world's top experts [YouTube](#) (Not on exam)
 - 101 Questions compiled from Students and Faculty [PDF](#) (Not on exam)