

**THE REVIEW FOR EGR/CS230 "Microcomputer Architecture" ("Technology Fundamentals") 2017 FINAL EXAM** (on MONDAY MAY 8 at 2:30PM) will be on Wednesday May 3, and is shown below (plus any clarifications added on Wednesday, or on Friday via email since Friday class is optional):

- 1) Memorize handout on **Powers of 10 and powers of 2** except exact number values
- 2) In brief lecture on **Transistors and Logic Gate fundamentals**  
[http://users.etown.edu/w/wunderjt/230%20Atoms\\_and\\_transistors%202.pdf](http://users.etown.edu/w/wunderjt/230%20Atoms_and_transistors%202.pdf) (A) Sketch and describe Doping Silicon; (B) Sketch and describe the function of CMOS and BiPolar Transistors; (C) List three types of Logic Gates (e.g., AND,OR,XOR)
- 3) EVERYTHING in lecture on **"Waves"** <http://users.etown.edu/w/wunderjt/waves2.pdf> except last slide on "Wave Limits"
- 4) In 2017 IEEE publication: **"Breaking the Multi-Core Bottle neck"**, draw and label the graph showing three curves:
  - The old speedup curve for scaling SMP (Symmetric MultiProcessing) machines (i.e., Amdahl's Law) which adheres to the Law of Diminishing Returns
  - The old idea of "Ideal Speedup"
  - The new curve showing anticipated speedup using hardware instead of software for IPC (Inter-Processor/Core Communication) in a fashion similar to the scalability of more nodes on the internet.
- 5) EVERYTHING in lecture on **"Design and Build a Personal Computer"** except Datagram details: <http://users.etown.edu/w/wunderjt/PC8.pdf>
- 6) EVERYTHING in lecture on **"Cache"** <http://users.etown.edu/w/wunderjt/Cache%20Design%201.pdf>
- 7) In lecture on **"Human Vision"** <http://users.etown.edu/w/wunderjt/Human%20Vision.pdf>  
(A) Define "Beta Movement"; (B.) The four ways human vision is different from camera/computer capture of a "frame"; (C) The definition of human vision "Blind Spot" and the two ways humans compensate
- 8) EVERYTHING in lecture on **"Computer Monitors"** <http://users.etown.edu/w/wunderjt/Computer%20Monitors2.pdf> including additive and subtraction colors (like discussed in lecture)
- 9) EVERYTHING in lecture on **"Graphics Boards"** [http://users.etown.edu/w/wunderjt/GRAPHICS\\_BOARDS\\_3.pdf](http://users.etown.edu/w/wunderjt/GRAPHICS_BOARDS_3.pdf)
- 10) From lecture on Dr. W's 1999 publication:  
**"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.*  
[http://users.etown.edu/w/wunderjt/ITALY\\_2009/PUBLICATION\\_ASEEPAPetown2.pdf](http://users.etown.edu/w/wunderjt/ITALY_2009/PUBLICATION_ASEEPAPetown2.pdf)  
(A) Memorize everything about the "Minimal Computer Architecture" on page two including the drawing, and descriptions of every part; (B) Equation 1 and everything in the paragraph below it; and (C) The main concept of Table 1 and the related class discussion we had about Integers vs. Floating Point numbers when considering number ranges for Microprocessors vs Microcontrollers
- 11) EVERYTHING in lecture on **"Machine Instruction Cycle and Simplest CPU Pipeline"**  
<http://users.etown.edu/w/wunderjt/Machine%20Instruction%20Cycle%202.pdf>
- 12) From lecture **and large handout on "How to Design a PC, Part 2"** (A) Be able to list everything in all but two of each of the numbered lists for each main part of a PC; (B) EVERYTHING about RISC vs. CISC; (C) All four characteristics of Solid State Drives (SSD's) (D) What a Router does, and define "Dual Band"
- 13) Essay about the future of the augmented and virtual reality, citing in a meaningful way each of the related papers we read, plus our visit from the Director of Game Development for Firaxis Games
  - [1] In the 2017 IEEE publication: **"Moving Closer to Reality"**, about full-immersion Virtual Reality (VR) experiences
  - [2] In the 2017 IEEE publication: **"How Augmented Reality (AR) is changing the way we work"**, about the "Smart Helmet"
  - [3] In the 2017 IEEE publication: **"Second Life Founders Second Act"** about this new software
  - [4] Dr Wunderlich's 2014 publication:  
**"Crowdsourced Architecture and Environmental Design."** *2nd International Conference on Emerging Trends in Engineering and Technology (ICETET'2014)* May 30-31, London (United Kingdom).  
[http://users.etown.edu/w/wunderjt/CrowdSourced%20Architecture%20and%20Environmental%20Design\\_PAPER\\_15\\_FINAL\\_SUBMITTED\\_EDITTED\\_Wunderlich.pdf](http://users.etown.edu/w/wunderjt/CrowdSourced%20Architecture%20and%20Environmental%20Design_PAPER_15_FINAL_SUBMITTED_EDITTED_Wunderlich.pdf)
- 14) A question about your semester project (**and contribution if you were on an interdisciplinary Brain-Wave-Reader or Braille-Printer team with BA373 "Managing Technology & Innovation" students**)