

# Computer Structure

## Spring 2004 Plan

chapter	hours	topic
Digital Abstraction	2	analog signals, digital signals, noise, static transfer functions
Foundations of Combinational Circuits	3	Boolean functions, gates, combinational circuits - syntax and functionality, simulation theorem, cost, propagation delay
Trees	2	associative Boolean functions, trees of associative Boolean gates, cost and delay analysis, optimality of trees
Decoders & Encoders	3	brute force designs, asymptotically optimal designs
Combinational Modules	4	multiplexers, cyclic shifters, priority encoders, half-decoders, logical shifters
Adders	3	adders (ripple-carry adder, conditional sum adder, compound adder), parallel adder (parallel prefix computation)
Signed addition	3	two's complement representation, signed addition, reduction of signed addition to unsigned addition, detection of overflow and negative result.
Flip-Flops	3	the clock signal, edge triggered flip-flops, characteristics of flip-flops (setup time, hold time, contamination delay, propagation delay), reduction of an "ideal" flip-flop to an arbiter, impossibility of arbiter, memory (RAM & ROM)
Synchronous Circuits	3	syntax and functionality, timing analysis
Buses and Bus Protocols	2	master, slave, bus transaction, simple bus protocol
A Simple DLX Microprocessor	5	instruction set architecture, datapath, control
Introduction to Interrupts	2	operating systems, interrupts, precise interrupt handling
DLX with Interrupt Handling	2	hardware & software support, detailed description of interrupt handling
Correctness of Interrupt Handling	2	specification, correctness proof