Course Calendar

Below is a (tentative) calendar for this quarter's offering of CS166. We're experimenting with some exciting new topics this quarter, so this syllabus is subject to change. Thanks for being understanding!

Date	Topics	Assignments
Part One: Preprocessing / Runtime Tradeoffs		
T April 4	*Why study data structures?* Range Minimum Queries, Part I	PS0 Out
Th April 6	*There aren't many very tiny problems. Can we solve them all?* Range Minimum Queries, Part II The Method of Four Russians	
Part Two: Data Structure Isometries		
T April 11	*Modeling one data structure on one another.* B-Trees 2-3-4 Trees	PS0 Due PS1 Out
Th April 13	*Making the static dynamic.* Red/Black Trees Augmented BSTs	
Part Three: String Data Structures		
T April 18	*Exposing latent structure in strings.* Tries Suffix Trees	PS1 Due PS2 Out
Th April 20	*A deceptively simple solution to string processing problems.* Suffix Arrays LCP Arrays	
Part Four: Amortized Analysis		
T April 25	*A little accounting trickery never hurt anyone, right?* Amortized Analysis Designing for Amortization	PS2 Due PS3 Out
Th April 27	*From arithmetic to data structures.* Binomial Heaps Lazy Binomial Heaps	
T May 2	*Striking a balance between order and chaos.* The Need for Decrease-Key Fibonacci Heaps	
Part Five: Randomized Data Structures		
Th May 4	*Hash tables with worst-case efficient lookups.* Cuckoo Hashing Random Graph Theory	PS3 Due PS4 Out
T May 9	*What makes for a good approximation?* (ε, δ)-Approximations Count-Min Sketches	
Th May 11	*Counting without counting.* Count Sketches The HyperLogLog Estimator	

Part Six: Succinct Data Structures		
T May 16	*Computing prefix sums in minimal space* Succinct Data Structures Succinct Binary Rank	PS4 Due PS5 Out
Th May 18	*Inverting prefix sums in minimal space* Succinct Binary Select Dealing with Density and Sparsity	
Part Seven: Approximate Sets		
T May 23	*How few bits does it take to encode a set?* Bloom Filters Information-Theoretic Lower Bounds	
Th May 25	*Hashing for distribution and fingerprinting.* Cuckoo Filters XOR Filters	PS5 Due
Part Eight: The Quest for the Best BST		
T May 30	Midterm Exam 7PM – 10PM Location TBA	
Th June 1	*When balanced binary search trees aren't enough.* Beyond Balanced BSTs Quantifying BST Operations Precisely	
T June 6	*Is there a single best binary search tree?* Splay Trees The Dynamic Optimality Conjecture	
Th June 8	Fun additional topics!	