Course Syllabus

Lect 1	F 9/29	Types of types. Making change in Bhutan.	§1, C++ text
Lect 2	M 10/2	C++. What are good programs? Experimental results from Bhutan.	
Disc 1		*C++ fundamentals*	
Lect 3	W 10/4	Time, space complexity. O, Ω, Θ. Solving a recurrence relation. Memoziation	
Lect 4	F 10/6	ADT's. Two views of an array. Associative arrays.	§2
Lect 5	M 10/9	Information hiding and C++ language features to support this. Formal specifications for ADTs.	
Disc 2		*More C++*	
Lect 6	W 10/11	Representation of Associative arrays, C++ implementations. Operator overloading.	
Lect 7	F 10/13	**C++ quiz**. Strings as an ADT. Representing strings.	
Lect 8	M 10/16	KMP algorithm. Stacks as an ADT. Postponed obligations. Matching grouping markers.	§3
	M 10/16	**Program 1 due**	
Disc 3		*Templates. Dictionaries. Skip lists.*	
Lect 9	W 10/18	Maze exploration. Postfix/infix/prefix. Infinite to prefix.	
Lect 10	F 10/20	Course survey. Expression evaluations. Expression trees.	
Lect 11	M 10/23	Survey feedback. Review of lectures 1–10. Queues.	
Disc 4		*C++ I/O. Getting tokens. Midterm review*	
Lect 12	W 10/25	Lists as an ADT. List exotica. LISP-style lists.	§4
MT 1	R 10/26	**First midterm** – evening exam. Covers §1-§4, C++	
Lect 13	M 10/30	Graph terminology. Types of trees. Elementary facts about graphs, trees. Representation of trees.	§5, but may omit S5.3.7, §5.8, §5.11, §5.12
Disc 5		*Equivalence classes. Operations on generalized lists.*	
Lect 14	W 11/1	Tree traversal methods. Relation to expression evaluations. Disjoint set ADT	
Lect 15	F 11/3	Disjoint Sets. Union/Find data structure. Union by size, collapsing find. $\lg^* n$ time bound.	
Lect 16	M 11/6	Sorting. Bubble sort. Insertion sort. Merge sort. Quicksort	§7.1–§7.9
	M 11/6	**Program 2 due**	
Disc 6		*Kruskal's algorithm. Radix sort.*	
Lect 17	W 11/8	Quicksort, continued. Heap ADT. Heapsort.	
Lect 18	F 11/10	Heapsort, cont. Lower bound for comparison-based sorting. Bucket sort, radix sort.	

Lect 19	M 11/13	Hashing. Collision resolution. Dynamic rehashing.	§8.1, §8.2
Disc 7		*Forward Radix Sort.*	
Lect 20	W 11/15	Review of hashing. Cost amortization. Methods of constructing hash functions. Perfect hashing.	
MT 2	R 11/16	**Second midterm** – evening exam. Covers §1–§5, §7–§8.	

Lect 21	M 11/20	Universal hashing. Program checking. Graph representations.	§6, may omit §6.5
	T 11/21	**Program 3 due**	Handout
Lect 22	W 11/22	DFS. BFS. Shortest paths.	

Lect 23	M 11/27	Dijkstra's algorithm. Heaps. Begin binomial heaps.	§9.4–§9.5
Disc 8		*Branch and bound.*	
Lect 24	W 11/29	**Program 3 contest!** Binomial heaps. Amortized analysis.	
Lect 25	F 12/1	Fibonacci heaps and their analysis.	

Lect 26	M 12/4	Binary search trees. Optimal BSTs.	§5.7, §10.1, handout
Disc 9		*Prim's algorithm. More help for program 4.*	
Lect 27	W 12/6	Splay trees. Class Evaluations	§10.7
Lect 28	F 12/8	Digital search trees. Tries. Patricia. Huffman Codes.	§10.8
	F 12/8	**Program 4 due**	Handout on branch and bound

	S 12/9	*Review session*	
	M 12/11	*Final exam*	