Unit 1: Introductory Topics, Julia Language

KEY

SA	could be used as a stand alone lesson, provided prior knowledge is met
Time	approximate # of 45-50 min periods
SC/GC	Scientific/Graphing calculator
C+L	Computer with desired language installed
Coding	These lessons are geared towards Julia; lessons will need modification for other languages. "Coding" includes: basic commands, loops, if/else.
(T)	May need extra time for tech troubleshooting

Title	Topics	Prior knowledge	Equipment	Sequence	Slides	Practice Problems	Time
1.1 Optimization	• What is optimization? • Types of optimization problems • About the course	• Algebra	0	SA	25	5	1
1.2 Vectors	• What is a vector? • New point = old point + scalar*vector	• Algebra	0	SA	12	4	1
1.3 Iteration and Recursion 1	• Definition • Examples: Fibonacci numbers, others	• Pre-Algebra	SC	SA	14	4	1
1.4 Iteration and Recursion 2	• Finding a root with secant method	• Algebra	SC ok GC preferred	SA	16	5	1.5
1.5 Iteration and Recursion 3	• Finding a 3-point interval containing a max/min	• Algebra	SC	SA	19	4	1
1.6 Julia Basics	• About the Julia language • Downloading Julia and IDEs • Basic operations • Output • Functions • Documenting and saving	• Algebra	Computer: private laptop, or C+L	SA	21	2	1.5 (T)
1.7 If-Else	• If/elseif/end structure in Julia • Test conditions: ==, >, <, !=, etc	• Pre-Algebra • Basic coding	C+L	SA	8	2	1
1.8 Iterative Loops	• For and While loops in Julia	• Pre-Algebra • Basic coding • If/else	C+L	1.7	21	7	2
1.9 Arrays	• Definition • Commands and operations	• Algebra • Vectors • Coding	C+L	SA	9	4	1.5
1.10 Secant Method	• Write a program to find roots using secant method	• Algebra • Coding	C+L GC nice	SA	4	1	1-

Total time, not including assessment/extra: 12.5 days