Chapter numbers refer to Rouson, Xia & Xu (2011) *Scientific Software Design: The Object-Oriented Way*,	Lecture	Examples	Exercises
Cambridge University Press. Color coding: Lecture (green), Presented examples (blue), Hands-on student exercises (yellow).	(min)	(min)	(min)
Day 1	**Content**		
8:30-8:45	Introductions		
8:45-9:00	Lecture: Setup & Reference Materials	15	
9:00-9:30	Lecture: Chapter 12. Parallel Programming in Modern Fortran	30	
9:30-9:45	Interactive Coding Jam Session ("Code Jam"): Hello, multiverse!		15
9:45-10:15	Lecture: Chapter 1. Programming Costs & Complexity	30	
10:15-10:30	Break		
10:30-12:00	Code Jam: Why use modules, derived types, type extension, and pure procedures?		90
12:00-1:00	Lunch Break		
1:00-1:15	Example: Fireworks simulation		15
1:15-2:00	Lecture: Chapter 2. Object-Oriented Analysis, Design, & Programming	45	
2:00-2:30	Examples: Fireworks via OOP; Colored fireworks via inheritance		30
2:30-2:45	Break		
2:45-3:00	Example: Multicolored fireworks via composition		15
3:00-4:00	Hands-On Student Exercises: Basketball via OOP and inheritance		60
Day 2	**Content**		
8:30-9:00	Available for Q&A		
9:00-9:30	Hands-On Student Exercise: Basketball via composition		30
9:30-9:45	Lecture: Chapter 3. Functional programming	15	
9:45-10:00	Example: Functional fireworks		15
10:00-10:30	Hands-On Student Exercise: Functional basketball		30
10:30-10:45	Break		
10:45-11:00	Lecture: Chapter 4. Design Patterns Basics	15	
11:00-11:15	Lecture: Chapters 5 & 10. The Object Pattern and Formal Constraints	15	
11:15-11:30	Example: Assertions, unlimited polymorphism, and derived type I/O		15
11:30-11:45	Example: Contract fireworks		15
11:45-12:00	Lecture: Chapter 8. Puppeteer Pattern	15	
12:00-1:00	Lunch Break		
1:00-1:15	Example: Puppeteer Fireworks		15
1:15-1:30	Lecture: Chapter 6. The Abstract Calculus Pattern	15	
1:30-1:45	Example: Abstract Calculus Fireworks		15
1:45-2:00	Chapter 7. The Strategy Pattern	15	
2:00-2:15	Example: Strategic Fireworks		15
2:15-2:30	Chapter 9. Factory Patterns	15	
2:30-2:45	Break		
2:45-3:00	Factory Fireworks		15
3:00-4:00	Hands-On Student Exercises: Contract Basketball & Puppeteer basketball		60
Day 3	**Content**		
8:30-9:00	Available for Q&A		
9:00-10:30	Hands-On Student Exercises: Astract calculus basketball, factory basketball, and strategic basketball		90
10:30-10:45	Break		
10:45-11:00	Using OpenCoarrays to influence data locality on many-core architectures	15	
11:00-11:30	Case Study: Mixed Fortran/C/C++ Programming in ForTrilinos	30	
11:30-12:00	Case Study: Design patterns for sparse matrix computations on hybrid CPU/GPU systems	30	
	Total minutes:	**300**	**270**	**270**
	Percentage of Total	**36%**	**32%**	**32%**