MIT Professional Education

Short Program Course

Solving Complex Problems: Structured Thinking, Design Principles and AI

	Understanding Problems	Finding Concepts	Systems Architecting	AI for Systems	Epilogue
	Mon, 7/28	**Tue, 7/29**	**Wed, 7/30**	**Thr, 7/31**	**Fri, 8/1**
8:30-9:00 AM	Light breakfast with informal Q&A (except Monday)				
09:00 – 10:25 AM	**S. Kim** **Session 1**: **Course intro, Systems thinking and understanding complexity** - Functional thinking - Axiomatic Design Framework - AI for Design - Fundamentals of Axiomatic Design (I) - Independence Axiom	**S. Kim** **Session 4**: **Fundamentals of Axiomatic Design** - Independence Axiom - Information Axiom - What is a complex system? Case study: System design approach to healthcare systems	**S.Kim** **Session 7**: **AI Primer for New Users**: - Condensed summary of recent AI and deep learning technology - CNN, NLP and LLM	**S. Kim** **Session 10**: **AI for Industry and Manufacturing** - AI use in design and manufacturing, - New paradigm with hybrid intelligence, - Enterprise-specific LLM	**S. Kim** **Session 13**: **Complexity and Systems Design** - Software system design - Micro/Nano systems - Organizational systems - System architecting, functional thinking and systems integration. Review and wrap up.
	Coffee Break				
10:35 – 12:00 AM	**T. David** **Session 2**: **System Analysis Approach** - LL Projects - Definitions - Basics Problem Definition - Up/Down thinking	**B. Atkins** **Session 5**: **Blue team innovation approach** - innovation approach - Understanding the customer - Find a solution **Story Telling** - Elements of a story - Adding excitement Presentation tips and tricks	**T. David** **Session 8**: **Developing structure**: Pitfalls, Tools, and Techniques for System Analysis Systems analysis Checklist - System Analysis Steps - Example tools	**J. Gans, all** **Session 11**: **Project review I (surgical)** Technical Review with Surgical Assessment. **(Milestone Four-1)**	**S. Kim** **Session 14**: **Final Project Presentations and Reflection** **(Milestone Five)**
12-1 PM	Boxed Lunch				
01:00 – 03:30 PM	**S. Kim, all** **Session 3**: **Project session I**: Choosing Problem to Solve; Concept Generation; Pre-course interview* **(Milestone One)**.	**S. Kim, all** **Session 6**: **Project session II:** Structured problem statement, concepts generation and refinement **(Milestone Two)**.	**S. Kim, all** **Session 9**: **Project session III:** Critical concepts and Solution Generation **(Milestone Three)**	**J. Gans, all** **Session 12**: **Project review II (surgical)**: Technical Review with Surgical Assessment. **(Milestone Four-2)**	**R. Shin, S. Kim** **Session 15**: Final Project Presentations and Reflection (Continued) Summary, Recap & Epilogue *Course concludes at 3:30 PM
3:30 – 5:00 PM	Adjourn and/or extra Q&A (optional), **S. Kim** Self-study				
05:00-07:00 PM				**Course Dinner (MIT Faculty Club)**	