

# SOLVING COMPLEX PROBLEMS: Structured Thinking, Design Principles, and AI

AUGUST 9–13, 2021 | Instructors: Sang-Gook Kim

*Note: All times are US Eastern Daylight Time. Schedule is subject to change.*

	MONDAY, AUGUST 9	TUESDAY, AUGUST 10	WEDNESDAY, AUGUST 11	THURSDAY, AUGUST 12	FRIDAY, AUGUST 13
	FINDING PROBLEMS	FINDING CONCEPTS	SYSTEMS ARCHITECTING	AI FOR DESIGNS	EPILOGUE
9:00–10:25 AM	<b>S. Kim</b> <b>Session 1:</b> Understanding complexity - Functional thinking - Axiomatic Design Framework - AI for Design	<b>S. Kim</b> <b>Session 5: Fundamentals of AD (I)</b> - Independence Axiom - Design domains Mapping Process	<b>S. Kim</b> <b>Session 9: Fundamentals of AD (II)</b> - Information Axiom - What is a good system?	<b>S. Kim</b> <b>Session 13: Cases of System Design</b> - Software design - Micro/Nano systems - Organizational systems	<b>S. Kim</b> <b>Session 17:</b> System architecting, functional thinking and systems integration
COFFEE BREAK					
10:35 AM–12:00 PM	<b>T. David</b> <b>Session 2:</b> Developing structure: Pitfalls, Tools and Techniques for System Analysis	<b>J. Gans</b> <b>Session 6:</b> Blue team innovation approach, System Analysis-Toy problem	<b>S. Kim</b> <b>Session 10:</b> Design of large and complex systems	<b>S. Kim</b> <b>Session 14:</b> AI for Design: A new paradigm with hybrid intelligence	<b>S. Kim</b> <b>Session 18:</b> AI for Manufacturing: A new paradigm with big data for industry
LUNCH					
1:00–3:00 PM	<b>S. Kim, All</b> <b>Session 3:</b> <b>Project practice session I:</b> Choosing Problem to Solve; Concept Generation; Ore-course assignment* ( <b>Milestone One</b> )	<b>S. Kim, All</b> <b>Session 7:</b> <b>Project practice session II:</b> Structured problem statement, concepts generation and refinement ( <b>Milestone Two</b> )	<b>B. Shin, All</b> <b>Session 11:</b> <b>Project practice session III:</b> Critical concepts and Solution Generation ( <b>Milestone Three</b> )	<b>J. Gans</b> <b>Session 15:</b> <b>Project practice session IV:</b> Technical Review with Surgical Assessment ( <b>Milestone Four</b> )	<b>S. Kim, All</b> <b>Session 19:</b> <b>Project practice session V:</b> Final Presentations and Reflection ( <b>Milestone Five</b> )
COFFEE BREAK & FREE DISCUSSION					
3:30–5:00 PM	<b>S. Kim, All</b> <b>Session 4:</b> Concept generation and embodiment in System Architecting; Structured approaches to Systems Design	<b>S. Kim</b> <b>Session 8:</b> <b>Cases of Social System Design:</b> System design approach to Healthcare systems	<b>C. Roeser, J. Gans</b> <b>Session 12:</b> Technical Story Telling; Systems Analysis Checklist	<b>S. Kim</b> <b>Session 16:</b> Software System Design and Physical Integration of Systems for Data Flow	<b>S. Kim</b> <b>Session 20:</b> Summary, Recap & Epilogue  <i>*Course concludes at 4 PM</i>
5:00–5:30 PM	After class Q&A	After class Q&A	After class Q&A	After class Q&A	

\* Pre-class assignment will be distributed a week before the class and discussed individually with the course instructor.