

Course Number	CS 420	Course Title	Distributed Systems				
Semester Hours	3	Course Coordinator SP20	Koushik Sinha				
Catalog Description	A top-down approach addressing the issues to be resolved in the design of distributed systems. Concepts and existing approaches are described using a variety of methods including case studies, abstract models, algorithms and implementation exercises.						
Textbooks							
FA18							
Kshemkalyani, A.D. & Singhal, M. (2011). <i>Distributed Computing</i> . Cambridge University Press. ISBN: 9780521189842.							
References							
<ul style="list-style-type: none"> • <i>Distributed Computing: Principles and Applications</i>. Liu, M. L. Addison Wesley, 2004. ISBN: 9780201796445. • <i>Introduction to Java Programming</i>. Liang, Y. Daniel. Prentice Hall, Comprehensive Version, 8th Edition. ISBN: 978-0132130806. 							
Course Learning Outcomes							
<ul style="list-style-type: none"> • To learn the basic theoretical concepts of distributed systems • To develop practical skills in the area of distributed systems. 							
Assessment of the Contribution to Student Outcomes							
FA13							
Outcome →	1	2	3	4	5	6	7
Assessed →	X	X	X	X	X	X	
Prerequisites by Topic							
CS 335 with a grade of C or better or graduate standing.							

Major Topics Covered in the Course

1. Introduction to distributed systems: characterization, models, networking and internetworking {5 classes}
2. Inter process communication: data representation, group communication, remote procedure calls, etc. {5 classes}
3. Operating system support: layers, protection, communication and invocation, OS architecture {3 classes}
4. Time and global states: events, process states, logical time, logical clocks, and global state {6 classes}
5. Coordination and agreement: mutual exclusion, elections, consensus, and related problems {6 classes}
6. Transaction and concurrency control {3 classes}
7. Distributed transactions: atomic commit protocols, distributed deadlocks, transaction recovery, etc. {4 classes}
8. Peer-to-peer systems: middleware, routing overlays, etc. {4 classes}
9. Distributed file systems {2 classes}
10. Security issues in distributed systems {2 classes}

NOTE: When course is taken as 500-level credit (CS 591 “Special Topics”), there will be additional requirements such as a research project.