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). *Distributed Computing.* Cambridge University Press.
   ISBN: 9780521189842.

References

- Liu, M. L. (2004). *Distributed Computing: Principles and Applications.* Addison Wesley, ISBN: 9780201796445.
- Liang, Y. D. (2010). *Introduction to Java Programming*. Prentice Hall, Comprehensive Version, 8th Edition. ISBN: 978-0132130806.

Course Learning Outcomes

- 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

SP20

Outcome →	1	2	3	4	5	6
Assessed →	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}

Latest Revision: Fall 2020