Course Outline

1. Document Information

Degree Program	Computer Science
Course Number	CS 420
Course Title	Distributed Systems
Semester Hours	3
Course Coordinator	Koushik Sinha
Revision Term	Spring 2020
Latest Revision	Fall 2020

2. 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.

3. Textbooks

- Kshemkalyani, A.D. & Singhal, M. (2011). Distributed Computing. Cambridge University Press. ISBN: 9780521189842.

4. References

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

5. Course Learning Outcomes

- To learn the basic theoretical concepts of distributed systems.
- To develop practical skills in the area of distributed systems.

6. Assessment of the Contribution to Student Outcomes

Outcome	1	2	3	4	5	6	7
Assessed	X	X	X	X	X	X	

7. Prerequisites by Topic

CS 335 with a grade of C or better or graduate standing..

8. 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.