

Distributed Systems

CS437 : 3 (3, 0, 0)

Prerequisites:

CS330

Objectives:

1. Summary of the main learning outcomes for students enrolled in the course.

Upon successful completion of the course, the student should be able to:

- (a) Explain what a distributed system is, why one would design a system as a distributed system, and what the desired properties of such systems are.
 - (b) List the principles underlying the functioning of distributed systems, describe the problems and challenges associated with these principles, and evaluate the effectiveness and shortcomings of their solutions.
 - (c) Explain how the principles are applied in contemporary distributed systems, explain how they affect the software design, and be able to identify features and design decisions that may cause problems.
 - (d) Describe how to design a distributed system that fulfils requirements with regards to key distributed systems properties (such as scalability, transparency, etc.), be able to recognise when this is not possible, and explain why.
2. Briefly describe any plans for developing and improving the course that are being implemented. (eg increased use of IT or web based reference material, changes in content as a result of new research in the field)
- (a) More focus on projects implementations.

Course Description:

- General description in to be used for the Bulletin or Handbook

This course aims to expose students to the complexities involved in designing and building distributed applications. To gain an in-depth understanding of the principle paradigms used in the area. To gain an appreciation of the open research issues in the area. Main themes: Paradigms of distributed computing including message passing; remote procedure call; remote method invocation; client server computing; shared file systems; distributed objects; time and global states; coordination and agreement; Distributed algorithms and parallel computing; and replication and fault tolerance.

Syllabus:

1. Characterization of Distributed Systems
2. System Models
3. Inter-process Communication
4. Distributed Objects and Remote Invocation
5. Operating System Support
6. Peer To Peer Systems
7. Web Services
8. Coordination and Agreement

References:

- 1- Required Textbox :
“Distributed Systems: Concepts and Design” by G. Coulouris, J. Dollimore and T. Kindberg – fifth edition-2011
- 2- Essential References
“Distributed Systems: Principles and Paradigms”, Tanenbaum and Steen, 2nd edition, Prentice Hall, 2006.