



Cloud Computing and Distributed Systems

Computer Science and Engineering

Instructor Name: Dr. Rajiv Misra

Institute: IIT Patna

Department: Computer Science and Engineering

Course Intro: : Cloud computing has become the de facto platform on which enterprises are fueling digital transformations and modernizing IT portfolios. Today's Cloud systems are built using a common set of core techniques, design aspects, models and algorithms – all centered around distributed systems. This course provides an in-depth understanding of such fundamental distributed computing concepts and its underlying theory, algorithms and system in particular for cloud computing model. The concepts and models covered in course includes: virtualization, cloud networking, classical distributed algorithms, distributed key-value stores, advanced distributed algorithms, scalability etc. Upon completing this course, students will have intimate knowledge about cloud computing and the underlying theory of distributed systems concepts work inside clouds.

Pre Requisites: : Computer Architecture, Operating System, Computer Networking

Core/Elective: : Core_Elective

UG/PG: : Both

Industry Support : Companies like Amazon, Microsoft, Google, IBM, Facebook

Reference : Text Books: Cloud Computing: Principles and Paradigms, Editors: Rajkumar Buyya, James Broberg, Andrzej M. Goscinski, Wiley, 2011 Distributed Computing: Principles, Algorithms, and Systems- Ajay D. Kshemkalyani and Mukesh Singhal Distributed Computing: Fundamentals, Simulations and Advanced Topics-Hagit Attiya and Jennifer Welch Reference Book: Distributed Algorithms-Nancy Lynch Cloud Computing Bible, Barrie Sosinsky, Wiley-India, 2010 Cloud Computing: Principles, Systems and Applications, Editors: Nikos Antonopoulos, Lee Gillam, Springer, 2012

About Instructor: Dr. Rajiv Misra is an Associate Professor in Department of Computer Science and Engineering at Indian Institute of Technology Patna, India. He obtained his Ph.D degree from IIT Kharagpur, M.Tech degree in Computer Science and Engineering from the Indian Institute of Technology (IIT) Bombay, and Bachelors of engineering degree in Computer Science from MNIT Allahabad. His research interests spanned a design of distributed algorithms for Mobile, Adhoc and Sensor Networks, Cloud Computing and Wireless Networks. He has contributed significantly to these areas and published more than 60 papers in high quality journals and conferences, and 2 book chapters. His h-index is 10 with more than 500 citations. He has authored papers in IEEE Transactions on Mobile Computing, IEEE Transaction on Parallel and Distributed Systems, Adhoc Networks, Journal of Parallel and Distributed Computing.



COURSE PLAN

| SL.NO | Week | Module Name |
|-------|------|--|
| 1 | 1 | Cloud: A model for Distributed systems |
| 2 | 2 | Virtualization |
| 3 | 3 | Cloud Networking |
| 4 | 4 | Logical Time and Ordering |
| 5 | 5 | Distributed Consensus and Agreement Algorithms |
| 6 | 6 | Distributed Leader Election Algorithms |
| 7 | 7 | Checkpointing & Rollback Recovery |
| 8 | 8 | Big Data Platform using Cloud |