

Course Number	ECC 6103
Course Title	Advanced Cloud Computing
Course Outline	<p>Introduction to Clouds, Virtualization, and Virtual Machines.</p> <p>Network Virtualization and Geo-distributed Clouds.</p> <p>Leader Election in Cloud, Distributed Systems, and Industry Systems.</p> <p>Classical Distributed Algorithms and Industry Systems.</p> <p>Consensus, Paxos, and Recovery in Clouds.</p> <p>Cloud Storage: Key-value Stores/NoSQL Systems and their Use in Industry Systems.</p> <p>Cloud Applications: MapReduce, Spark, and Apache Kafka.</p> <p>Cloud Native Computing and Micro-services.</p>
Learning Outcome	<p>Cloud Computing as a Distributed Systems: Explain and contrast the role of Cloud computing within this space.</p> <p>Cloud Virtualization, Abstractions and Enabling Technologies: Explain virtualisation and their role in elastic computing. Characterise the distinctions between Infrastructure, Platform and Software as a Service (IaaS, PaaS, SaaS) abstractions, and Public and Private Clouds, and analyse their advantages and disadvantages.</p> <p>Programming Patterns for "Big Data" Applications on Cloud: Demonstrate using Map-Reduce, Vertex-Centric and Continuous Dataflow programming models.</p> <p>Application Execution Models on Clouds: Compare synchronous and asynchronous execution patterns. Design and implement Cloud applications that can scale up on a VM and out across multiple VMs. Illustrate the use of NoSQL Cloud storage for information storage.</p> <p>Performance, scalability and consistency on Clouds: Explain the distinctions between Consistency, Availability and Partitioning (CAP theorem), and discuss the types of Cloud applications that exhibit these features.</p>
Assessment Method	Quiz / Assignment / ESE

Suggested Reading

- Distributed and Cloud Computing From Parallel Processing to the Internet of Things; Kai Hwang, Jack Dongarra, Geoffrey Fox Publisher: Morgan Kaufmann, Elsevier, 2013.
- Cloud Computing: Principles and Paradigms; Rajkumar Buyya, James Broberg, and Andrzej M. Goscinski Publisher: Wiley, 2011.
- Distributed Algorithms Nancy Lynch Publisher: Morgan Kaufmann, Elsevier, 1996.
- Cloud Computing Bible Barrie Sosinsky Publisher: Wiley, 2011.
- Cloud Computing: Principles, Systems and Applications, Nikos Antonopoulos, Lee Gillam Publisher: Springer, 2012.