**BCT 2307 Distributed Systems**

**Purpose of the Course:**

The course introduces the student to the design concepts and implementation of distributed systems and helps the student to appreciate the use and advantages of distributed systems, as well as their limitations.

**Expected Learning outcomes:**

At the end of the course, the student should be able to:

* Understand characteristics of distributed systems applications.
* Understand design principles of distributed systems and their limitations.
* Explain the need for Security in Distributed systems application areas.
* Implement simple distributed applications using distributed object models such as Java RMI, RPC and CORBA.

**Course Content:**

Distributed systems: Introduction and characteristics. Networking and Internetworking Models: Internet protocols. Inter-process communications: API’s, RPC’s, RMI’s, group communication. Distributed operating systems: processes and threads, Protection, Distributed file systems: File system architecture, replication, fault- tolerance, Sun’s NFS, Andrew file systems. Naming Service: DNS, Directory services, Global name service. Time Synchronization: Clocks, events and process states, synchronization of physical clocks, logical clocks, Time stamp ordering, Atomic commit protocols Distributed shared memory: design and implementation issues, sequential consistency, granularity. Distributed transactions: Transactions and concurrency control. Distributed systems security. Case study CORBA and MACH.

**Mode of Delivery:**

* Class lectures.
* Computer based training / tutorials from E-books
* Practical Laboratory sessions.
* Independent Study.
* Students' group discussion.

**Instruction Materials and/or Equipment:**

* A computer installed with a Distributed operating system (Linux or Unix)

**Course Assessment:**

* Continuous Assessments 40%
* End of Trimester Examinations 60%

**Core Reading Materials:**

* Tanenbaum, A., Steen, M.: *Distributed Systems: Principles and Paradigms*;2nd Edition, Prentice Hall, 2007
* Kindberg, T., Dollimore, J. and Coulouris, G.: *Distributed Systems: Concepts and Design*, 4rd Edition; Addison-Wesley, 2005

**Recommended Reference Material:**

* Tel, G.: *Introduction to Distributed Algorithms*; Cambridge University Press, 2000.
* Tanenbaum, A. S.: *Distributed Operating Systems*; 3rd Edition, Prentice-Hall, 1995.
* Mullender, S. J.: *Distributed Systems*; 2nd Edition, ACM Press,1993.