

**4/4 B.Tech. FIRST SEMESTER**

**IT7T5C**

**DISTRIBUTED COMPUTING**

**Credits: 4**

**Lecture: 4 periods/week**

**Internal assessment: 30 marks**

**Tutorial: 1 period /week**

**Semester end examination: 70 marks**

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**Objectives:**

Introduce the students to

- Basic concepts of distributed computing
- Distributed computing paradigms
- Distributed objects (RMI, CORBA)
- Clustering, Pervasive computing and their needs

**Outcomes:**

Students will be able to

- Understand different types of advanced Computing environments
- Understand core concepts of distributed computing
- Understand implementation of distributed computing(RMI, CORBA)

**Syllabus:**

**UNIT I**

**Introduction:** The different forms of computing – Monolithic, Distributed, Parallel and cooperative computing, the meaning of Distributed computing, Examples of Distributed systems, the strengths and weaknesses of Distributed computing, operating system concepts relevant to distributed computing, the architecture of distributed applications.

**UNIT II**

**Inter Process Communication:** The archetypal IPC program interface, event synchronization, timeout and threading, deadlocks and timeouts, data representation, data encoding, text based protocols, request response protocols, event diagram and sequence diagram, connection oriented versus connectionless IPC, the evolution of paradigms for IPC.

**UNIT III**

**Distributed Computing Paradigms:** Paradigms and Abstraction, Paradigms for Distributed Applications – Message Passing Paradigm, The Client-Server Paradigm (Java Socket API), the peer-to-peer Paradigm, the point-to-point message model and the publish/subscribe message model, RPC model, The Distributed Objects Paradigms, The object space, the mobile agent paradigm, the network service paradigm, The collaborative application paradigm, Tradeoffs

#### **UNIT IV**

**The socket API:** The datagram socket API, the stream mode socket API, sockets with non-blocking I/O operations, secure socket API, **The client server paradigm,** client server paradigm issues, software engineering for a network service, connectionless and connection oriented servers, iterative and concurrent server, stateful servers.

#### **UNIT V**

**Distributed Objects (RMI):** Message passing versus Distributed Objects, An Archetypal Distributed Object Architecture, Distributed Object Systems, RPC, RMI, The Java RMI Architecture, the API for Java RMI, A sample RMI Application, steps for building an RMI application, testing and debugging, comparison of RMI and socket API – ORB

#### **UNIT VI**

**Distributed Object Paradigm(CORBA):** The basic Architecture, The CORBA object interface, Inter-ORB protocols, object servers and object clients, CORBA object references, CORBA Naming Service and the Interoperable Naming Service, CORBA object services, object Adapters, Java IDL, An example CORBA application.

#### **UNIT VII**

**Internet applications:** HTML, XML, HTTP, Dynamically generated web content, common gateway Interface (CGI), Web session and session state data, servlets, server pages. Applets, Servlets, Web services and the Simple Object Access Protocol (SOAP).

#### **UNIT VIII**

Advanced Distributed Computing Paradigms. Message queue system, Mobile agents, Network services, Object spaces.

#### **Text Books:**

1. Distributed Computing, Principles and Applications, M.L.Liu, Pearson Education.

#### **Reference Books:**

1. Distributed Systems concept and Design ,G.coulouris,J.Dollimore and Tim Kindbirg, , 3rd edition, Pearson Education.
2. Client Server Programming with Java and CORBA, 2nd edition, R.Orafali& Dan Harkey, John Wiley & Sons
3. Java Network Programming, E.R.Harold, 2nd edition, O'Reilly, SPD.
4. Distributed Systems, Concepts and Design, 3rd edition, G.Coulouris, J.Dollimore and Tim Kindbirg, Pearson Education.
5. Java Programming with CORBA, 3rd edition, Brose, Vogel, Duddy, Wiley