

Course Code	Course Name	Teaching Scheme			Credits Assigned			
		Theory	Practical	Tutorial	Theory	Practical/Oral	Tutorial	Total
TEITC602	Distributed Systems	04 Hr/Week	02 Hr/Week	---	04	01	---	05

Course Code	Course Name	Examination Scheme							
		Theory Marks				Term Work	Practical	Oral	Total
		Internal assessment			End Sem. Exam				
		Test1	Test 2	Avg. of 2 Tests					
TEITC602	Distributed Systems	20	20	20	80	25	25	---	150

Course Objectives:

Distributed Systems form a significant field in Information Technology. The course aims to provide solid foundation in the concepts of distributed systems along with its design and implementation. Synchronization, Message Passing, Remote Communication, Consistency Management and Application development using different Distributed Technologies form part of core concepts to be studied under this course.

Course Outcomes:

- The student gains clear understanding of fundamental principles of Distributed Systems along with design and implementation of key mechanisms, Clock Synchronization, Election Algorithms, Mutual Exclusion, Message Communication, Process and Resource Scheduling etc.
- The student understands the message communication, remote procedure call and Remote method invocation (RPC and RMI) along with group communication.
- Emphasis is on developing applications using current distributed computing technologies like EJB, CORBA and .NET.
- Student should be able to develop/design distributed system/applications for an enterprise using SOA

DETAILED SYLLABUS:

Sr. No.	Module	Detailed Content	Hours
1	Fundamentals	Introduction, Distributed Computing Models, Software Concepts, Issues in designing Distributed System, Client – Server Model	4
2	Communication	Message Passing , Introduction to Message Passing, Advantages and features of Message Passing, Message Format, Message Buffering, Multi Data gram Messaging , Group Communication Remote Procedure Call (RPC): Basic RPC Operations, Parameter Passing, Extended RPC Models Remote Object Invocation: Distributed Objects, Binding a Client to an Object, Static Vs Dynamic RMI, Parameter Passing, Java RMI Message Oriented Communication: Persistence and synchronicity in communication, Message Oriented Transient and Persistent Communications	8
3	Processes	Threads, Code Migration: Approaches to Code Migration, Migration and Local Resources, Migration in Heterogeneous Systems	4
4	Synchronization	Clock Synchronization, Physical and Logical Clocks, Global State, Election Algorithms, Mutual Exclusion, Distributed Transactions, Deadlocks	8
5	Consistency and Replication	Introduction, Data-Centric Consistency Models, Client Centric Consistency Models, Distributed Protocols	8
6	Distributed Technologies and Frameworks	Overview of EJB S/W Architecture, view of EJB Conversation, Building and Deploying EJB, Roles in EJB, Types of Enterprise Beans, Lifecycle of Beans , Developing Applications using EJB Framework.	5

		Introduction to CORBA, CORBA Components and architecture, Method Invocation, Static and Dynamic Invocation in CORBA, CORBA IDL, Developing Application using CORBA	4
		Introduction to .NET, .NET architecture, . NET Remoting	3
		Comparison of RMI, CORBA, EJB, .NET	1
7.	Service Oriented Architecture	Defining SOA, Business value of SOA, SOA characteristics, Concept of a service, SOA Architecture, Deploying SOA applications.	3

Text Books:

- Sunita Mahajan, Seema Shah, “ Distributed Computing”, Oxford, second edition.
- Andrew S. Tanenbaum & Maarten van Steen “ Distributed Systems : Principles and paradigms” Prentice Hall of India Private Limited
- G. Sudha Sadasivam, Radha Shankarmani, "Middleware and Enterprise Integration Technologies " , Wiley Precise Textbook

References:

1. Pradeep K. Sinha “Distributed Operating Systems”, Prentice Hall of India Private Limited
2. Thomas Erl "Service Oriented Architecture : Concepts, Technology and Design" Prentice Hall
3. G. Coulouris, J. Dollimore and T. Kindberg “Distributed Systems :

Term work: 25 marks

Term work should consist of at least 10 practical experiments with 1 mini project and assignments covering the topics of the syllabus

Distribution of marks for term work shall be as follows:

Laboratory work (10 Experiments)	10 Marks
Mini Project	05 Marks
Assignments	05 Marks
Attendance	05 Marks

Suggested Practical List :

1. Client Server based program using RPC
2. Client Server based program using RMI
3. Implementation of Clock Synchronization (logical/physical)
4. Implementation of Election algorithm.
5. Implementation of Mutual Exclusion algorithms
6. Program multithreaded client/server processes.
7. Program to demonstrate process/code migration.
8. Write a distributed application using EJB
9. Write a program using CORBA to demonstrate object brokering.
10. Use .Net framework to deploy a distributed application.
11. Mini Project : For Eg. using SOA

Theory Examination:

1. Question paper will comprise of 6 questions, each carrying 20 marks.
2. Total 4 questions need to be solved.
3. Q.1 will be compulsory, based on entire syllabus wherein sub questions of 2 to 3 marks will be asked.
4. Remaining question will be randomly selected from all the modules.
5. Weightage of marks should be proportional to number of hours assigned to each module.