### Objectives of the Course:
- IT systems are more and more integrated with other software systems.
- The knowledge of integrating these systems by using middleware technologies can be a key competence for IT engineers. Middleware is commonly understood as an intermediary software layer between the application and the operating system, which encapsulates the heterogeneity of the underlying communication network, operating system or hardware platform.
- This course provides details about the modern component platforms. Based on practical examples, details about modern middleware technologies are studied. Students get the chance to gain in-depth knowledge popular middleware platforms.

1. **Introduction to Object Oriented Systems**

2. **Introduction to Middleware Technologies**
   General Middleware, Service Specific Middleware, Client/Server Building blocks – RPC - Messaging – Peer – to – Peer, Java RMI.

3. **Introduction to Distributed Objects**
   Computing standards, OMG, Overview of CORBA, Overview of COM/DCOM, and Overview of EJB.

4. **EJB Architecture**
   Overview of EJB software architecture, View of EJB Conversation, Building and Deploying EJBs, Roles in EJB.

5. **EJB Applications**
   EJB Session Beans, EJB entity beans, Lifecycle of Beans, EJB clients, Steps in developing an application with EJB, EJB Deployment.

6. **CORBA**
Introduction and concepts, distributed objects in CORBA, CORBA components, architectural features, method invocations, static and dynamic: IDL (Interface Definition Language) models and interfaces. Structure of CORBA IDL, CORBA's self-describing data; CORBA interface repository. Building an application using CORBA.

7. CORBA Services and CORBA Component Model
Overview of CORBA Services, Object location Services, Messaging Services, CORBA Component Model.

8. COM and .NET
Evolution of DCOM, Introduction to COM, COM clients and servers, COM IDL, COM Interfaces, COM Threading Models, Marshalling, Custom and standard marshalling, Comparison COM and CORBA, Introduction to .NET, Overview of .NET architecture, Remoting.

9. Service Oriented architecture(SAO) Fundamentals
Defining SOA, Business value of SOA, SOA characteristics, Concept of a service, Basic SOA, Enterprise Service Bus (ESB), SOA enterprise Software Models.

10. Web Services Technologies
XML Technologies - XML, DTD, XSD, XSLT< XQUERY, XPATH, Web Services and SOA, WSDL, SOAP, UDDI, WS Standards (WS-*), Web Services and Service Oriented Enterprise (SOE), WS _ Coordination and Transaction, Business Process Execution Language for Web Services (BPEL4WS)

Text Books

References
5. Sudha Sadasivam “Component Based technology”, Wiley India
8. Jason Pritchard, "COM and CORBA side by side”, Pearson Education
9. Introduction to C# Using .NET Pearson Education
10. C# How to program, Pearson Education
12. Don Box, "Essential COM", Pearson Education.
Term Work
Term work shall consist of at least 10 assignments/programming assignments and one written test.

Marks
1. Attendance (Theory and Practical) 05 Marks
2. Laboratory work (Experiments and Journal) 10 Marks
3. Test (at least one) 10 Marks

The final certification and acceptance of TW ensures the satisfactory performance of laboratory Work and Minimum Passing in the term work.

Suggested Topics for Experiment
1. RPC Messaging
2. Creating a distributed Object Application using RMI (DNS, distributed game, some business application etc)
3. Concept addressing COM/DCOM
4. Component framework
5. Mini projects, one business application each to be programmed using CORBA, EJB, COM, .NET
6. One mini project for creating a web service