CST426	CLIENT SERVER ARCHITECTURE	CATEGORY	L	T	P	CREDIT	YEAR OF INTRODUCTION
		PEC	2	1	0	3	2019

Preamble: The syllabus is prepared with the view of preparing the Engineering Graduates to build effective Client/Server applications. This course aims at providing a foundation in decentralized computer systems, using the client/server model. The course content is decided to cover the essential fundamentals which can be taught within the given slots in the curriculum.

Prerequisite: Computer Networks

Course Outcomes: After the completion of the course the student will be able to

CO 1	Explain the basics of client/server systems and the driving force behind the development of client/server systems **(Cognitive Knowledge Level: Understand)**
CO 2	Outline the architecture and classifications of client/server systems **(Cognitive Knowledge Level: Understand)**
CO 3	Choose the appropriate client/server network services for a typical application **(Cognitive Knowledge Level: Understand)**
CO 4	Describe management services and issues in network **(Cognitive Knowledge Level: Understand)**
CO 5	Compare and summarize the web extensions and choose appropriate web services standards for an application **(Cognitive Knowledge Level: Understand)**

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	⊘	⊘										⊘
CO2	⊘	⊘										⊘
CO3	⊘	⊘			⊘							⊘
CO4	⊘											⊘
CO5	⊘	⊘	⊘									⊘

Abstract POs defined by National Board of Accreditation			
PO#	**Broad PO**	**PO#**	**Broad PO**
PO1	Engineering Knowledge	**PO7**	Environment and Sustainability
PO2	Problem Analysis	**PO8**	Ethics
PO3	Design/Development of solutions	**PO9**	Individual and team work
PO4	Conduct investigations of complex problems	**PO10**	Communication
PO5	Modern tool usage	**PO11**	Project Management and Finance
PO6	The Engineer and Society	**PO12**	Life long learning

Assessment Pattern

Bloom's Category	Continuous Assessment Tests		End Semester Examination Marks
	Test 1 (Marks)	**Test 2 (Marks)**	
Remember	30	30	30
Understand	70	70	50
Apply			
Analyse			
Evaluate			
Create			

Mark distribution

Total Marks	CIE Marks	ESE Marks	ESE Duration
150	50	100	3 hours

Continuous Internal Evaluation Pattern:

Attendance : 10 marks

Continuous Assessment Test 1 (for theory, for 2 hrs) : 20 marks

Continuous Assessment Test 2 (for lab, internal examination, for 2hrs) : 20 marks

Internal Examination Pattern: There will be two parts; Part A and Part B. Part A contains 5 questions with 2 questions from each module (2.5 modules x 2 = 5), having 3 marks for each question. Students should answer all questions. Part B also contains 5 questions with 2 questions from each module (2.5 modules x 2 = 5), of which a student should answer any one. The questions should not have sub- divisions and each one carries 7 marks.

End Semester Examination Pattern: There will be two parts; Part A and Part B. Part A contain 10 questions with 2 questions from each module, having 3 marks for each question. Students should answer all questions. Part B contains 2 questions from each module of which a student should answer any one. Each question can have maximum 2 sub-divisions and carry 14 marks.

Sample Course Level Assessment Questions

Course Outcome 1 (CO1):
   1. Explain the driving forces behind the development of Client/ Server system from different perspectives.

Course Outcome 2 (CO2):
   1. How two-tier computing and three-tier computing improves the performance of Client/Server system.

Course Outcome 3(CO3):
   1. Explain the role of client in Client/Server computing and also explain the various services provided by client.
   2. What is the primary motivation behind the RPC facility ? How does a RC facility makes the job of distributed application programmers simpler?
   3. Implement RPC concept using suitable language/tool(Assignment)

Course Outcome 4 (CO4):
   1. Explain Connectivity and Communication Interface Technology in Client/Server application. How does transmission protocol work in Client/Server application?

Course Outcome 5 (CO5):
   1.Discuss the role of web browser for providing web service in Client/Server environment.
   2. Identify and explain the social relevance of web services (Assignment)

Syllabus

Module – 1 (Introduction)

Introduction to Client/Server computing - Driving forces behind Client/ Server, Client/ Server development tools, Development of client/server systems, Client/Server security, Organizational Expectations, Improving performance of client/server applications, Single system image, Downsizing and Rightsizing, Advantages of client server computing, Applications of Client/Server.

Module -2 (Client/Server Application Components)

Classification of Client/Server Systems- Two-Tier Computing, Middleware, Three-Tier Computing- Model View Controller (MVC), Principles behind Client/Server Systems. Client/Server Topologies. Existing Client/Server Architecture. Architecture for Business Information System.

Module -3 (Client/Server Network)

Client- Services, Request for services, RPC, Windows services, Print services, Remote boot services, other remote services, Utility Services. Dynamic Data Exchange (DDE). Object Linking and Embedding (OLE). Common Object Request Broker Architecture (CORBA).

Server- Detailed server functionality, Network operating system, Available platforms, Server operating system.

Module -4 (Client/ Server Systems Development)

Services and Support- System administration, Availability, Reliability, Scalability, Observability, Agility, Serviceability. Software Distribution, Performance, Network management. Remote Systems Management- RDP, Telnet, SSH, Security. LAN and Network Management issues, Training, Connectivity, Communication interface technology, Interprocess communication, Wide area network technologies, Network Acquisition, PC-level processing unit, X-terminals, Server hardware.

Module -5 (Client/Server Technology and Web Services)

Web Services History. Web Server Technology- Web Server, Web Server Communication, Role of Java for Client/Server on Web. Web Services- MicroServices, APIs, API Gateway, Authentication of users/clients, Tokens/Keys for Authentication, Service Mesh, Message Queues, SaaS, Web Sockets.
Client/Server/Browser – Server Technology, Client/Server Technology and Web Applications, Balanced Computing and the Server's Changing Role. Thin client computing - Computing models-Comparison-Computing Environment.
 Future of client/ server Computing Enabling Technologies, Transformational system.

Text Books

1. Patrick Smith & Steave Guengerich, "Client / Server Computing", PHI
2. Dawna Travis Dewire, "Client/Server Computing", TMH

Reference Books

1. Jeffrey D.Schank, "Novell's Guide to Client-Server Application & Architecture" Novell Press
2. Robert Orfali, Dan Harkey, Jeri Edwards, Client/Server Survival Guide, Wiley-India Edition, Third Edition
3. W. H. Inman, Developing Client Server Applications, BPB

Model Question Paper

QP CODE:

Reg No: _____

Name: _____   **PAGES : 4**

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

EIGHTH SEMESTER B.TECH DEGREE EXAMINATION, MONTH & YEAR

Course Code: CST426

Course Name : Client Server Architecture

Max. Marks : 100   **Duration: 3 Hours**

PART A

Answer All Questions. Each Question Carries 3 Marks

1. How client/server computing environment is different from mainframe based computing environment?

2. Write short notes on single system image and downsizing.

3. Discuss the topologies of Clients/Server system with suitable examples.

4. Discuss the relevance of Clients/Server system in adopting open system standards. Justify your answer.

5. Enumerate the services provided in a client/server system.

6. List out the features of network operating system.

7. How interposes communication is established?.

8. Write short note on x-terminals.

9. Explain the history of web services.

10. With an example, explain the role of java for client/server on web **(10x3=30)**

Part B

(Answer any one question from each module. Each question carries 14 Marks)

11. (a) Explain the driving forces behind the development of Client/ Server system from different perspectives. **(10)**

    (b) Explain the various Clients/Server system development tools. **(4)**

OR

12. (a) Explain Client/Server System development methodology and explain various phases and their activities involved in System Integration Life Cycle. **(10)**

    (b) Write short notes on the following. (a) Single system image. (b) Downsizing and Client/Server computing. **(4)**

13. (a) How two-tier computing and three-tier computing improves the performance of Client/Server system. **(10)**

    (b) List out the principles behind client/server systems . **(4)**

OR

14. (a) Explain the architecture of Business Information System. **(10)**

    (b) Explain different ways to improve performance in Client/Server developed applications. **(4)**

15. (a) In Client/Server computing, explain the following with example in detail (a) Dynamic Data Exchange (b) RPC (c) Remote Boot Service (d) Object-linking and embedding. **(10)**

(b) Explain the role of client in Client/Server computing and also explain the various services provide by client. **(4)**

<div align="center">OR</div>

16. (a) Explain the architecture of CORBA. **(10)**

(b) Explain the server functionality in detail, for Client/Server computing. **(4)**

17. (a) Explain Connectivity and Communication Interface Technology in Client/Server application. How does transmission protocol work in Client/Server application? **(10)**

(b) Comment on the network service acquisition mechanism for the client/service model. **(4)**

<div align="center">OR</div>

18. (a) In client server architecture, what do you mean by Availability, Reliability, Serviceability and Security? Explain with examples **(10)**

(b) How remote systems management security is ensured in a Client/Server application. **(4)**

19. (a) What is the future of Client/Server computing in the following technologies (i) Electronic Document Management. (ii) Full Text Retrieval. (iii) Geographic Information System. **(10)**

(b) Discuss the role of web browser for providing web service in Client/Server environment. **(4)**

<div align="center">OR</div>

20. (a) Explain end-to-end working of Client/Server web model. **(10)**

(b) Explain the architecture of Transformational system. **(4)**

Teaching Plan

Sl No	Contents	No. of Lecture Hours (35)
Module- 1(Introduction) (7 hours)		
1.1	Driving forces behind Client/ Server	1 hour
1.2	Client Server development tools	1 hour
1.3	Development of client/server systems	1 hour
1.4	Client/Server security, Organizational Expectations	1 hour
1.5	Improving performance of client/server applications	1 hour
1.6	Single system image, Downsizing and Rightsizing	1 hour
1.7	Advantages and Applications of client server computing	1 hour
Module- 2(Client/Server Application Components) (8 hours)		
2.1	Classification of Client/Server Systems	1 hour
2.2	Open System Standards	1 hour
2.3	Two-Tier Computing	1 hour
2.4	Three-Tier Computing, Middleware	1 hour
2.5	Principles behind Client/Server Systems	1 hour
2.6	Client/Server Topologies	1 hour
2.7	Existing Client/Server Architecture	1 hour
2.8	Architecture for Business Information System	1 hour
Module- 3(Client/Server Network) (6 hours)		
3.1	The client: Services, Request for services, RPC, Windows services, Print services	1 hour
3.2	Remote boot services, Utility Services & Other Services	1 hour
3.3	Dynamic Data Exchange (DDE), Object Linking and Embedding (OLE)	1 hour
3.4	Common Object Request Broker Architecture (CORBA)	1 hour

3.5	The server: Detailed server functionality, the network operating system	1 hour
3.6	Available platforms, the server operating system	1 hour
Module- 4(Client Server Systems Development) (7 hours)		
4.1	Services and Support, System administration	1 hour
4.2	Availability, Reliability, Scalability, Observability, Agility Serviceability, Software Distribution, Performance	1 hour
4.3	Network management, Remote Systems Management, RDP,Telnet,SSH	1 hour
4.4	Security ,LAN and Network Management issues	1 hour
4.4	Training, Connectivity, Communication interface technology	1 hour
4.5	Interposes communication, wide area network technologies	1 hour
4.6	Network Acquisition, PC-level processing unit, x-terminals, server Hardware	1 hour
Module -5(Client/Server Technology And Web Services) (7 hours)		
5.1	Web Services History , Web Server Technology , Web Server	1 hour
5.2	Web Server Communication , Role of Java for Client/Server on Web	1 hour
5.3	Web Services , MicroServices, APIs, API Gateway, Authentication of users/clients	1 hour
5.4	Tokens/Keys for Authentication ,Service Mesh, Message Queues	1 hour
5.5	SaaS, Web Sockets ,Client/Server Technology and Web Applications	1 hour
5.6	Balanced Computing and the Server's Changing Role ,Thin client computing , Computing models, Computing Environment	1 hour
5.7	Future of client/ server Computing Enabling Technologies, Transformational system	1 hour