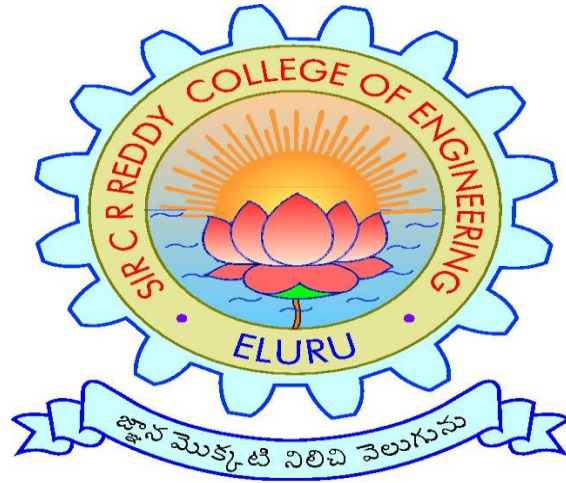


SIR C.R.REDDY COLLEGE OF ENGINEERING, ELURU
DEPARTMENT OF INFORMATION TECHNOLOGY
LESSON PLAN



SUBJECT: (IT 4.1.3) ADVANCED OPERATING SYSTEM

CLASS: 4/4 B.Tech. I SEMESTER, A.Y.2017-18

INSTRUCTOR: CHALLA YALLAMANDA

Sir C R Reddy college of Engineering
DEPT. OF INFORMATION TECHNOLOGY

PROGRAMME: B.Tech

SEMESTER: IV -I Semester

Academic YEAR: 2016-17

Course: (IT 4.1.3) ADVANCED OPERATING SYSTEM

Instructor: Challa Yallamanda

Course Contents

Category of Course	Course Title	Course Code	Credits- 4 C	Theory Paper
Departmental - IT 4.1.3	ADVANCED OPERATING SYSTEM	IT 4.1.3	L-3 T-1	Max.Marks-70 Duration-3hrs.

Course objectives:

1. Learn the advanced topics in process scheduling.
2. Identify Multiprocessor and real-time scheduling. Concurrent programming fundamentals.
3. Review of inter-process communication, semaphores and monitors.
4. Learn the methods of Synchronization and communication. Fault tolerance. Recent advances in operating systems.

Course Outcomes:

- Comprehend the basic concepts of modern operating systems.
- Describe the role and purpose of networking concepts in operating systems.
- Discuss the concept of a process and concurrency problems: synchronization, mutual exclusion, deadlocks.
- Identify real time process scheduling policies, file & memory management.

ONLINE REFERENCES:

1. Operating System Concepts. 7th Ed., A. Silberschatz, G. Galvin and P.B. Gagne, 2005, ISBN 0471694665.
2. Modern Operating Systems, Andrew S. Tanenbaum, 2nd Ed, Prentice-Hall, 2001, ISBN 0130313580.

3. Operating Systems, Gary Nutt, Addison-Wesley, 2004, ISBN-10: 0201773449.
4. Operating Systems: Internals and Design Principles, 6/e, Prentice Hall, by Stallings, 2008. ISBN-10: 0136006329
5. Operating Systems: A Systematic View, 6/e by Davis & Rajkumar, Addison-Wesley , 2004, ISBN-10: 0321267516

Prerequisite :

OPERATING SYSTEMS
COMPUTER ORGANISATION
COMPUTER NETWORKS

Internal Assessment Details:

Attendance: 5 Marks

Internal Test 1& 2: 15 Marks

Assignment-1: 5 Marks

Assignment-2: 5 Marks

Total: 30 Marks

(IT 4.1.3)ADVANCED OPERATING SYSTEM

Instruction: 3 Periods & 1 Tut /week

University-Exam: 3 Hours

Credits: 4

Sessional Marks: 30

Univ-Exam Marks: 70

SYLLABUS

Introduction to Distributed Systems: Goals – Advantages of distributed systems overcentralized systems – disadvantages of distributed systems, Hardware & Software Concepts, loosely coupled systems, network operating systems, Network file systems, design Issues – transparency – Flexibility – performance – scalability.

Network and protocols: An introduction to Computer networking, Network technologies, LAN, WAN, Protocols, Technology case study, ATM, The Client – Server Model

Remote Procedure Calling: Introduction, Features of RPC, User package, Design issues, Classes of RPC system, Interface definition language, exception handling, delivery guarantees, implementation, interface processing, binding, locating the binder, RPC in UNIX system

Synchronization in Distributed systems: Clock synchronization, Logical Clocks, Physical Clocks, Clock synchronization algorithms, Mutual exclusion, A centralized algorithms, A distributed algorithms, A token ring algorithms, comparison of the three algorithms, Election algorithms, The Bully algorithms, Ring algorithms, Dead Locks in distributed systems, Distributed deadlock detection.

Process and Processors in distributed systems: Threads, Introduction, Usage, Design issues for thread packages, An example for thread packages, System models, The workstation model, The processor pool model, The hybrid model, Processor allocation, Allocation models, Design issues, Implementation issues.

Distributed File and Directory Services: Distributed file service requirements, File service components, Flat file service, Directory Service, Client module, Design issues, implementation techniques.

Distributed shared memory Introduction: Shared memory, Consistency models, Page based Distributed shared memory, Shared – variable Distributed shared memory, Object based Distributed Shared Memory.

Text Books:

Distributed Operating Systems, A. S. Tanenbanm, Prentice-Hall, 1995, ISBN 0-13-219908-4

Reference:

1. Advanced Concepts in Operating Systems(Paperback) 2008, Mukesh Singhal and Niranjan Shivaratri, ISBN - 0070472688

Other sources:

1. Operating System Concepts. 7th Ed., A. Silberschatz, G. Galvin and P.B. Gagne, 2005, ISBN 0471694665.
2. Modern Operating Systems, Andrew S. Tanenbaum, 2nd Ed, Prentice-Hall, 2001, ISBN 0130313580.
3. Operating Systems, Gary Nutt, Addison-Wesley, 2004, ISBN-10: 0201773449.
4. Operating Systems: Internals and Design Principles, 6/e, Prentice Hall, by Stallings, 2008.
5. ISBN-10: 0136006329
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SIR C R REDDY COLLEGE OF ENGINEERING :: ELURU
DEPARTMENT OF INFORMATION TECHNOLOGY
COURSE SCHEDULE

The schedule for the whole course/subject is:

Unit No	Description of the Chapter	Description of the Topics	Total no of periods (L+T)
1	Introduction to Distributed Systems	Goals – Advantages of distributed systems overcentralized systems – disadvantages of distributed systems, Hardware & Software Concepts, loosely coupled systems, network operating systems, Network file systems, design Issues –transparency – Flexibility – performance – scalability.	8+1
2	Network and protocols	An introduction to Computer networking , Network technologies , LAN,WAN, Protocols, Technology case study, ATM, The Client – Server Model	7+1
3	Remote Procedure Calling	Introduction , Features of RPC, User package, Design issues,Classes of RPC system , Interface definition language, exception handling, delivery guarantees, implementation , interface processing , binding, Locating the binder, RPC in Unix system	6+1
4	Synchronization in Distributed systems	Clock synchronization, Logical Clocks, Physical Clocks, Clock synchronization algorithms, Mutual exclusion, A centralized algorithms, A distributed algorithms, A token ring algorithms, comparison of the three algorithms, Election algorithms, The Bully algorithms, Ring algorithms, Dead Locks in distributed systems, Distributed deadlock detection.	10+1
5	Process and Processors in distributed systems	Threads, Introduction, Usage, Design issues for thread packages, An example for thread packages, System models, The workstation model, The processor pool model, The hybrid model , Processor	10+1

		allocation, Allocation models, Design issues, Implementation issues.	
6.	Distributed File and Directory Services:	Distributed file service requirements, File service components, Flat file service, Directory Service, Client module, Design issues, implementation techniques.	8+1
7.	Distributed shared memory Introduction	Shared memory, Consistency models, Page based Distributed shared memory, Shared – variable Distributed shared memory, Object based Distributed Shared Memory.	8+1

Total no of instructional periods available for the course : 70 periods
Total no of estimated periods : 57(L)+7(T) periods

Signature of the H.O.D

Signature of the Faculty
Date:

LECTURE PLAN

DEPARTMENT	INFORMATION TECHNOLOGY
NAME OF LECTURER	CHALLA YALLAMANDA

Sl.No	Topics to be covered	No. of Lecture hours	Teaching method	Program Outcomes
1	Goals , Advantages of distributed systems overcentralized systems.	1	BB	a,c
2	Disadvantages of distributed systems	1	BB	a,c
3	Hardware & Software Concepts	1	BB	a,b,c
4	Loosely coupled systems, network operating systems, Network file systems	1	BB	a,b,c
5	design Issues	1	BB	b,c,d
6	transparency – Flexibility –	1	BB	b,c,d
7	performance – scalability	1	BB	b,c,d
8	Revision on unit1	1	PPT with LCD	b,c,d
9	An introduction to Computer networking	1	BB	b,c,d
10	Network technologies	1	BB	b,c,d
11	LAN,WAN, Protocols	1	BB	b,c,d,e
12	Technology case study	1	BB	b,c,d,e
13	ATM	1	BB	b,c,d,e
14	The Client – Server Model	1	BB	b,c,d,e
15	Revision on unit 2	1	PPT with LCD	b,c,d,e
16	Introduction , Features of RPC , User package	1	BB	b,c,d,e
17	Design issues, Classes of RPC system ,	1	PPT with LCD	b,c,d,e

18	Interface definition language	1	BB	b,c,d,e
19	Exception handling, delivery guarantees	1	BB	b,c,d,e
20	Implementation , interface processing	1	BB	b,c,d,e
21	Binding, Locating the binder, RPC in Unix system	1	BB	b,c,d,e
22	Clock synchronization, Logical Clocks, Physical Clocks	1	PPT with LCD	b,c,d,e
23	Clock synchronization algorithms	1	BB	b,c,d,e
24	Mutual exclusion	1	BB	b,c,d,e
25	A centralized algorithms A distributed algorithms A token ring algorithms	1	BB	b,c,d,e
26	comparison of the three algorithms	1	BB	b,c,d,e
27	Election algorithms	1	BB	b,c,d,e
28	The Bully algorithms	1	BB	b,c,d,e
29	Ring algorithms	1	BB	b,c,d,e
30	Dead Locks in distributed systems,	1	BB	b,c,d,e
31	Distributed deadlock detection	1	PPT with LCD	b,c,d,e
32	Threads, Introduction,	1	BB	b,c,d,e
33	Thread Usage	1	BB	b,c,d,e
34	Design issues for thread packages	1	PPT with LCD	b,c,d,e
35	An example for thread packages	1	BB	b,c,d,e
36	System models, The workstation model,	1	BB	b,c,d,e
37	The processor pool model,	1	BB	b,c,d,e
38	The hybrid model	1	BB	b,c,d,e
39	Processor allocation,	1	BB	b,c,d,e
40	Allocation models	1	BB	b,c,d,e
41	Design issues	1	BB	b,c,d,e
42	Implementation issues.	1	BB	b,c,d,e
43	REVISION on UNIT 5	1	BB	b,c,d,e
44	Distributed file service requirements	1	BB	b,c,d,e
45	File service components,	1	BB	b,c,d,e
46	Flat file service	1	BB	b,c,d,e

47	Directory Service	1	BB	b,c,d,e
48	Client module	1	BB	b,c,d,e
49	Design issues	1	PPT with LCD	b,c,d,e
50	Implementation techniques	1	BB	b,c,d,e
51	REVISION on UNIT 6	1	BB	b,c,d,e
52	Shared memory	1	BB	b,c,d,e
53	Consistency models	1	BB	b,c,d,e
54	Page based Distributed shared memory	1	BB	b,c,d,e
55	Shared – variable Distributed shared memory	1	PPT with LCD	b,c,d,e
56	Object based Distributed Shared Memory.	1	BB	b,c,d,e
57	REVISION on UNIT 7	1	BB	b,c,d,e
	Total classes	57		

ADVANCED OPERATING SYSTEMS

UNIT WISE QUESTIONS

UNIT 1: INTRODUCTION TO DISTRIBUTED SYSTEMS:-

SHORT QUESTIONS

1. Define distributed system. Give example.
2. Define Hardware and software concepts of distributed systems.
3. What are advantages of distributed systems over centralized ones?
4. What is meant by an open system? Why some systems are open?
5. Define in brief distributed system environment.
6. What is scalability?
7. Explain switched multi computers.

ESSAY QUESTIONS

1. Explain the goals and design issues of distributed systems.
2. Explain the difference between a distributed operating system and network operating system.
3. Discuss various advantages and disadvantages over distributed systems.
4. Explain the difference between multi-processor and multi-computer.
5. Explain the difference between loosely coupled system and tightly coupled systems.

UNIT 2: NETWORK AND PROTOCOLS:-

SHORT QUESTIONS

1. What are blocking and non-blocking primitives in client-server model?
2. What is a server? How many ways to construct a server?
3. What is meant by protocol?
4. Explain about LAN and WAN

ESSAY QUESTIONS

1. Explain 3-tiered architecture for client-server model.
2. Explain ATM networks
3. What is the difference between connection oriented and connection less communication protocol?
4. Describe client-server model.
5. Explain OSI model.
6. Describe different network technologies.

UNIT 3: REMOTE PROCEDURE CALLING:-

SHORT QUESTIONS

1. What is RPC?
2. When a client crashes in RPC, how it is handled?
3. What is meant by Blast protocol in RPC?
4. Explain stub-generation.
5. Define Micro Kernel.
6. Explain binding

ESSAY QUESTIONS

1. Explain RPC in UNIX system.

2. Explain various implementation issues in RPC.
3. Explain the working of RPC protocol.
4. Explain classes in RPC system.

UNIT 4: SYNCHRONIZATION IN DISTRIBUTED SYSTEMS:-

SHORT QUESTIONS

1. What is physical clock?
2. What are the properties of transactions?
3. What is meant by deadlock?
4. What is interface processing?
5. What is mutual exclusion?
6. What are logical clocks?
7. What is real time system?

ESSAY QUESTIONS

1. Explain the communication primitives in distributed systems.
2. Explain how mutual exclusion is implemented in distributed systems.
3. Explain distributed algorithm for mutual exclusion.
4. Explain deadlock detection and prevention in distributed systems.
5. Describe clock synchronization.
6. Describe logical clocks.

UNIT 5: PROCESS AND PROCESSES IN DISTRIBUTED SYSTEMS:-

SHORT QUESTIONS

1. Define scheduling in distributed systems.
2. Explain bidding algorithm in processor allocation.
3. What is a thread? What is its use?
4. What is meant by thread package?
5. What is meant by processor allocation?

ESSAY QUESTIONS

1. Explain processor allocation methods in distributed systems.
2. Explain work station model and hybrid model.
3. Describe processor allocation algorithms.
4. Describe design issues of processor allocation algorithms.
5. What is the need of software interrupts in implementation of threads package.
6. Discuss various issues in designing a thread package.
7. Explain processor pool model.
8. Explain about scheduling in distributed systems.

UNIT 6: DISTRIBUTED FILE AND DIRECTORY SERVICES:-

SHORT QUESTIONS

1. What is diff between state full and stateless servers?
2. What is caching?
3. List out three categories of stable storage.

4. Write about flat file service.
5. What is meant by segmentation?
6. What is the use of directory service?
7. What is the use of exception handling?

ESSAY QUESTIONS

1. Explain the distributed file system requirements.
2. Explain file service components and client module.
3. Describe the semantics of file sharing.
4. What are the different forms of transparency followed in distributed file system?
5. Describe NFS architecture.
6. What is the need for transactions in a file service?
7. Explain about Flat file service

UNIT 7: DISTRIBUTED SHARED MEMORY:-

SHORT QUESTIONS

1. What is consistency model?
2. Define memory consistency model.
3. What are the advantages of Distributed shared memory?
4. What is shared memory?

ESSAY QUESTIONS

1. Explain the suitability of distributed shared memory to a client-server system.
2. What is shared memory? Explain page based shared memory system.
3. Explain LINDA.
4. Describe the working of object-based shared memory system.
5. What is consistency model? Explain various types of consistency models.