BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, Pilani
Pilani Campus
Instruction Division

FIRST SEMESTER 2015-2016
Course Handout (Part II)

In addition to part-I (General handout for all courses appended to the timetable) this portion gives further specific details regarding the course:

COURSE NO	:	**CS G623**
COURSE TITLE	:	**ADVANCED OPERATING SYSTEMS**

Instructor In-charge	:	**Avinash Gautam** [avinash@pilani.bits-pilani.ac.in]
Course Web Page	:	**http://csis/faculty/avinash/**

1. COURSE OBJECTIVE
To introduce the design and implementation issues of distributed operating systems

2. PRE-REQUISITES
It is assumed that the students have done a basic course on operating systems and computer networks. Also the students should have good programming experience in C/C++/Java languages.

3. SCOPE
Distributed Operating Systems work in an environment where we have independent machines (both hardware and software) connected with each other over a network. A Distributed OS makes a Distributed System a virtual uni-processor system. The distributed OS to be studied in this course is microkernel based. It's just that the user level processes that are separated from the kernel can run on remote machines. Also, the OS has some sort of idea what machines are hooked up, and can make decisions about where to run things based on the relative speed of the machines.

4. BOOKS
Text Book
[T1] M. Singhal & N. Shivaratri, "Advanced Concepts in Operating Systems: Distributed, Database and Multiprocessor Operating Systems", Tata McGraw Hill, 2001.

Reference Books
[R1]   Distributed Systems Principles and Paradigms 2/E by A. S. Tanenbaum, PHI
[R2]   P. K. Sinha, "Distributed Operating Systems" Pearson Education, 1998.
[R3]   Distributed Operating Systems – The Logical Design by A. Goscinski, AW
[R4]   Distributed Systems-Concepts and Design by G. Coulouris, AW
[R5]   Distributed System Design by Jie Wu, CRC Press.

5. PLAN OF STUDY

S#	TOPICS	REFS (Text)	LECT
1.	**Overview of Advanced O.S**: Design approaches, Motivation, Types of Advanced OS.	Chapter 1	1
2.	**Architecture:** Motivation, Issues, Communication Networks, Communication Primitives.	Chapter 4	2

3.	**Theoretical Foundations**: Limitations, Lamport's logical clock, vector clock, causal ordering, global state, Cuts.	Chapter 5	3
4.	**Distributed Mutual Exclusion**: Lamport, Recart-agrawala, and Maekawa's algorithms; Suzuki-kasami broadcast algorithm, and Raymond's tree based algorithm.	Chapter 6	4
5.	**Distributed Deadlock Detection**: Resource Vs. Communication deadlock, Strategies to handle deadlock, Ho-Ramamoorthy, Path-Pushing, Edge-Chasing, Diffusion Computation-based algorithms.	Chapter 7	4
6.	**Agreement Protocols**: System model, Classification of agreement problems, Solutions to Byzantine agreement problems.	Chapter 8	4
7.	**Distributed File Systems**: Mechanisms for building DFSs, Design Issues, Sun DFS, and Sprite DFS.	Chapter 9	4
8.	**Distributed Scheduling**: Issues in Load Distribution, Components of a load distribution algorithm, Load Distribution Algorithms, V-system, Sprite, and Condor.	Chapter 11	4
9.	**Distributed Shared Memory**: Algorithms for implementing DSMs, Memory Coherence, and Coherence Protocols, IVY.	Chapter 10	4
10.	**Recovery:** Classification of failures, Synchronous and Asynchronous Checkpointing and Recovery.	Chapter 12	3
11.	**Fault Tolerance:** Commit Protocols, Voting Protocols, Failure Resilient Processes.	Chapter 13	3
12.	**Protection and Security**: Access Matrix Model, Implementation of access matrix, Unix, and Amoeba, Introduction to Data Security.	Chapter 14	3

6. A. EVALUATION SCHEME:

S#	Component & Nature	Duration	Weight	Date and Time
1(a)	** Two Assignments (OB)	Assigment-1	15%	TBA
		Assigment-2	20%	TBA
OR				
1(b)	**Term Paper (OB)	To be announced in class	35%	TBA
2.	Mid Sem Test (CB)	90 Minutes	30%	8/10 4:00 - 5:30 PM
3.	Compre. Exam (CB)	120 Minutes	35%	9/12 AN

6.B. Term Paper and Assignments [**]

- Pilani campus students can choose if they want to submit the two assignments or they want to submit a term paper. Students from Hyderabad campus should submit the two assignments.
- For the term paper, the teams of at most two students should be formed.
- Assignments can be carried out individually or in a team of two. Students will have to appear for viva (defense) for their assignment submissions. All submitted assignments will go through plagiarism detection. There is zero tolerance on plagiarism (You will be awarded NC in the course).

7. Chamber Consultation: Mail me and take appointment

8. Notices: All notices for this course will be displayed on the department notice board.

9. Make-Up Policy: Makeup for assignments and term paper is not permitted. Makeup for Mid semester test can be given only in the case of hospitalization. Comprehensive exam makeup requests should come through Instruction Division.