ITE6008 Advanced Computer Architecture

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Pre-Requisite: NIL

Objectives:

1. To learn the concept of 64-bit architecture, memory management, interfaces and connectivity.
2. To understand Virtualization and Logical Partition (LPAR) concepts.

Expected Outcome:

On completion of this course, student should be able to

1. Design a scalable and parallel 64-bit architecture.
2. Develop Mainframe architecture to solve user problem.

Module	Topics	L Hrs	SLO
1	**Introduction to 64 bit Architecture:** Architecture concepts - System components - Processing units – Virtual address space map - Addressing modes - Dynamic address translation - Registers - Processor mode - Prefix saved area - Instruction formats - Microcode concepts - Interrupts - Interrupt processing - Types of interrupts - Supervisor call interrupt - Storage Protection - CP timer - I/O Configuration - Channel subsystem (CSS) elements - Multiple CSS structure.	7	2
2	**Memory Management:** Overview of z10 - System nomenclature - Processor Unit Instances - Book topology comparison - NUMA topology - Multi-chip module(MCM) - Interconnection architecture of PU cores - Pipeline in z10 EC - Techniques for instruction pipeline - Pipeline branch prediction - HDFU - Storage controller chip - Three Levels of Cache - Software/hardware cache optimization - Central storage design - Infiband interconnect technology	7	2,17
3	**Interface with Enterprise System:** zEnterprise overview - zEnterprise parts - zBX hardware rack components - Blades types and functions - Blades data warehouse roles - Power7 blades - WebSphere datapower appliance blades - Nodes and ensembles - zBX networking and connectivity - IEDN.	5	2,17
4	**z/Enterprise Unified Resource Manager:** zManager location in zEnterprise - zManager Major roles - Energy Management - Operations Control - zenterprise platform performance manager - PPM Virtual Servers.	4	2
5	**System z Connectivity:** Connectivity overview - Channel subsystem connectivity - CSS configuration management - ESCON architecture - Concepts - ESCD Switch functions - FICON channels - Ficon native topologies - Fiber Channel Protocol mode(FCP) FICON Switches - OSA-Express - QDIO architecture - HiperSockets Connectivity - Hardware Configuration Definition.	7	2,5

6	**Virtualization and Logical Partition (LPAR) concepts:** Definitions - Concepts - Physical Resources - Hypervisor Types - Technologies - z/Virtual machine - Power VM virtual servers - LPAR CPC Management - Types of capping - LPAR capped versus Uncapped - Softcapping - Intelligent Resource Director (IRD) - WLM LPAR CPU Management - Dynamic Channel Path Management(DCM) - Hardware Configuration Definition - Functions- Adding Switches - DASD Controller capabilities.	7	2,5
7	**Overview of z13:** z13 highlights - z13 technical overview - Hardware Management Consoles (HMCs) and Support Elements (SEs) - IBM z BladeCenter Extension (zBX) - IBM z Unified Resource Manager - Operating systems and software.	5	2
8	**Expert Talk**	3	17
Total Lecture Hours			
# Mode: Flipped Class Room, [Lecture to be videotaped], Use of physical and computer models to lecture, Visit to Industry, Min of 2 lectures by industry experts.		**45**	

TextBooks:

1. "ABCs of z/OS System Programming", Redbooks, Volume 10, 2012.

Reference Books:

2. "IBM z13 Technical Guide", Redbooks, April 2015.
3. "IBM z13 Technical Introduction", Redbooks, March 2015.
4. "IBM System z Connectivity Handbook", Redbooks April 2015.
5. "z/OS Intelligent Resource Director Redbooks", August 2001.

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