Unit	Contents	Page No
I	**OVERVIEW & INSTRUCTIONS**	**1**
	1.1. Introduction	1
	1.2. Eight Great Ideas in Computer Architecture	2
	1.3. Components of a Computer System	7
	1.4. Technology	11
	1.5. Performance	14
	1.6. Power Wall	20
	1.7. Uniprocessors to Multiprocessors	22
	1.8. Instructions	23
	1.9. Operations	23
	1.10. Operands	26
	1.11. Representing Instructions	30
	1.12. Logical Operations	34
	1.13. Control Operations	36
	1.14. Addressing and Addressing Modes	40
II	**ARITHMETIC OPERATIONS**	**41**
	2.1. ALU	41
	2.2. Multiplication	43
	2.3. Division	48
	2.4. Floating Point Operations	55
	2.5. Sub Word Parallelism	68
III	**PROCESSOR AND CONTROL UNIT**	**70**
	3.1. A Basic MIPS Implementation	70
	3.2. Building a Datapath	72
	3.3. Control Implementation Scheme	77
	3.4. An Overview of Pipelining	84
	3.5. Branch Prediction	88
	3.6. Exceptions	103

IV PARALLELISM **106**

4.1. Instruction-Level-Parallelism 106

4.2. Parallel Processing Challenges 107

4.3. Flynn's Classification 110

4.4. Hardware Multithreading 112

4.5. Multicore Processors 114

V MEMORY AND I/O SYSTEMS 117

5.1. Memory Hierarchy 117

5.2. Memory Technologies 118

5.3. Cache Basics 121

5.4. Mapping Functions 122

5.5. Translation Look a Side Buffer (TLBs) 128

5.6. Input/Output System 130

5.7. Interrupts 132

5.8. Direct Memory Access (DMA) 135

QUESTION BANK