

ARM BASED SYSTEM DESIGN

Subject Code: 10CS843
Hours/Week: 4
Total Hours: 52

I.A. Marks: 25
Exam Marks: 100
Exam Hours: 3

PART – A

UNIT 1

6 Hours

Introduction: The RISC design philosophy; The ARM design philosophy; Embedded system hardware and software. ARM processor fundamentals: Registers; Current Program Status Register; Pipeline; Exceptions, interrupts and the Vector Table; Core extensions; Architecture revisions; ARM processor families.

UNIT 2

7 Hours

ARM Instruction Set and Thumb Instruction Set: ARM instruction set: Data processing instructions; Branch instructions; Load-store instructions; Software interrupt instruction; Program Status Register functions; Loading constants; ARMv5E extensions; Conditional execution. Thumb instruction set: Thumb register usage; ARM –Thumb interworking; Other branch instructions; Data processing instructions; Single-Register Load-Store instructions; Multiple-Register Load-Store instructions; Stack instructions; Software interrupt instruction.

UNIT 3

6 Hours

Writing and Optimizing ARM Assembly Code: Writing assembly code; Profiling and cycle counting; Instruction scheduling; Register allocation; Conditional execution; Looping constructs; Bit manipulation; Efficient switches; Handling unaligned data.

UNIT 4

7 Hours

Optimized Primitives: Double-precision integer multiplication; Integer normalization and count leading zeros; Division; Square roots; Transcendental functions; Endian reversal and bit operations; Saturated and rounded arithmetic; Random number generation.

PART - B

UNIT 5

7 Hours

Exception and Interrupt Handling: Exception handling; Interrupts and interrupt handling schemes

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UNIT 6**7 Hours**

Caches : The memory hierarchy and the cache memory; Cache architecture; Cache policy; Coprocessor 15 and cache; Flushing and cleaning cache memory; Cache lockdown; Caches and software performance.

UNIT 7**6 Hours**

Memory – 1: Memory Protection Units: Protected regions; Initializing the MPU, cache and write buffer; Demonstration of an MPU system. Memory Management Units: Moving from MPU to an MMU; How virtual memory works; Details of the ARM MMU.

UNIT 8**6 Hours**

Memory – 2: Page tables; The translation lookaside buffer; Domains and memory access permission; The caches and write buffer; Coprocessor 15 and MMU configuration; The fast context switch extension.

Text Books:

1. Andrew N. Sloss, Dominic Symes, Chris Wright: ARM System Developer's Guide – Designing and Optimizing System Software, Elsevier, 2004.

Reference Books:

1. David Seal (Editor): ARM Architecture Reference Manual, 2nd Edition, Addison-Wesley, 2001.
2. Steve Furber: ARM System-on-Chip Architecture, 2nd Edition, Addison-Wesley, 2000.

SERVICES ORIENTED ARCHITECTURE**Subject Code: 10CS844****Hours/Week: 4****Total Hours: 52****I.A. Marks: 25****Exam Marks: 100****Exam Hours: 3****PART – A****UNIT 1****7 Hours**

Introduction o SOA, Evolution of SOA: Fundamental SOA; Common Characteristics of contemporary SOA; Common tangible benefits of SOA; An SOA timeline (from XML to Web services to SOA); The continuing evolution of SOA (Standards organizations and Contributing vendors); The roots of SOA (comparing SOA to Past architectures).



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