

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. Embedded Systems (Branch Code - 54)

Year – II (Semester – III)

Subject: Cortex Processor Architecture and Programming (735403)

Sr. No.	Course Contents	Hours
1	Background of ARM Processors and ARM Architecture: Brief History, Architecture Versions, Processor Naming	4
2	Fundamentals of Cortex-M3 architecture: Registers, Operation Modes, Built-In Nested Vectored Interrupt Controller, Exception and Interrupts, Vector Tables, Memory Map, Reset Sequence, Stack Memory Operation, Bus Interface, Memory Protection Unit, Debugging Support, Characteristics	8
3	Instruction Set: Assembly language basics, Instruction set with description: Moving data, Processing data with Arithmetic and Logic operations, Branch instructions, Pseudo instructions, Instruction Barrier and Memory Barrier Instructions, Saturation Operations, IF-THEN (IT) instructions, Instructions for special operations	12
4	Memory System: Memory System Features Overview, Memory Maps, Memory Access Attributes, Default Memory Access Permissions, Bit-Band Operations, Unaligned Transfers, Exclusive Accesses, Endian Mode	16
5	Cortex-M3 Programming: The Interface Between Assembly and C, Typical Development Flow, Producing Outputs, Using Data Memory, Using Exclusive Access for Semaphores, Using Bit Band for Semaphores, Working with Bit Field Extract and Table Branch	16
6	Porting Applications from the ARM7 to the Cortex-M3: Differences between ARM7 and Cortex-M3 Architecture, System Characteristics, Assembly Language Files, C Program Files, Precompiled Object Files, Optimization	16
	Total	72

Reference Books:

1. The Definitive Guide to ARM Cortex-M3 by Joseph Yiu, Newness Publication, 1st Edition
2. The insider's Guide to the STM32 ARM based Microcontrollers by Trevor Martin, Hitex Publication, 2nd Edition
3. ARM System Developer's Guide Designing and Optimizing System Software by Andrew N. Sloss, Dominic Symes and Chris Wright, Morgan Kaufmann Publishers, 1st Edition