SYSTEM ON CHIP ARCHITECTURE
(ELECTIVE – I)

Course Code: 13EC2206 **L P C**
4 0 3

Pre requisites: Micro controllers, Embedded Systems

Course Educational Objectives:

1. To analyze the memory management issues for similar processor core.
2. To identify the applications where the ARM processor can be implemented.

Course Outcomes:

1. To understand SOC of ARMProcessor and its instruction set, architecture and to write assembly programs.

UNIT-I
INTRODUCTION TO PROCESSOR DESIGN:
Abstraction in hardware design, MUO a simple processor, Processor design trade off, Design for low power consumption.

UNIT-II
ARM PROCESSOR AS SYSTEM-ON-CHIP:
Acorn RISC Machine – Architecture inheritance –ARM programming model – ARM development tools – 3 and 5 stage pipeline ARM organization – ARM instruction execution and implementation – ARM Co-processor interface.

UNIT-III
ARM ASSEMBLY LANGUAGE PROGRAMMING:
ARM instruction types – data transfer, data processing and control flow instructions – ARM instruction set – co-processor instructions.
Architectural Support for High Level Language - Data types – Abstraction in software design – Expressions – Loops – Functions and Procedures – Conditional Statements – Use of Memory.

UNIT-IV
MEMORY HIERARCHY:
Memory size and speed –on chip memory –caches-cache design an example-Memory management

Architectural Support for System Development-Advanced Microcontroller bus architecture-ARM Memory Interface-ARM Reference Peripheral specification –Hardware System Prototyping tools – Emulator –Debug architecture

UNIT-V

ARCHITECTURAL SUPPORT FOR OPERATING SYSTEM:

An introduction to Operating Systems-ARM System Control coprocessor-CP15 Protection unit registers-ARM protection unit-CP15 MMU registers-ARM Architecture-Synchronization-Context Switching input and output

TEXT BOOKS:

[1] Steve Furber, "*ARM system on chip Architecture*", 2nd ed., Addison Wesley Professional, 2000.

REFERENCES:

[1] Michael J Flynn,Wayne Luck, "*Computer System Design: System onChip*", Wiley India Edition.

[2] PrakashRashinkar, Peter Paterson and Leena Singh L., "*System on Chip Verification – Methodologies and Techniques*", Kluwer Academic Publisher, 2001.

[3] Ricardo Reis, "*Design of System on a Chip: Devices and Components*" 1st ed., Springer, 2004.