EC6013 ADVANCED MICROPROCESSORS AND MICROCONTROLLERS

DETAILED SYLLABUS

OBJECTIVES:

- To expose the students to the fundamentals of microprocessor architecture.
- To introduce the advanced features in microprocessors and microcontrollers.
- To enable the students to understand various microcontroller architectures.

UNIT I HIGH PERFORMANCE CISC ARCHITECTURE – PENTIUM

CPU Architecture- Bus Operations – Pipelining – Brach predication – floating point unit- Operating Modes –Paging – Multitasking – Exception and Interrupts – Instruction set – addressing modes – Programming the Pentium processor.

UNIT II HIGH PERFORMANCE RISC ARCHITECTURE – ARM

Arcon RISC Machine – Architectural Inheritance – Core & Architectures - Registers – Pipeline - Interrupts – ARM organization - ARM processor family – Co-processors - ARM instruction set- Thumb Instruction set - Instruction cycle timings - The ARM Programmer's model – ARM Development tools – ARM Assembly Language Programming - C programming – Optimizing ARM Assembly Code – Optimized Primitives.

UNIT III ARM APPLICATION DEVELOPMENT

Introduction to DSP on ARM –FIR filter – IIR filter – Discrete fourier transform – Exception handling – Interrupts – Interrupt handling schemes- Firmware and bootloader – Embedded Operating systems – Integrated Development Environment- STDIO Libraries – Peripheral Interface – Application of ARM Processor - Caches – Memory protection Units – Memory Management units – Future ARM Technologies.

UNIT IV MOTOROLA 68HC11 MICROCONTROLLERS

Instruction set addressing modes – operating modes- Interrupt system- RTC-Serial Communication Interface – A/D Converter PWM and UART.

UNIT V PIC MICROCONTROLLER

CPU Architecture – Instruction set – interrupts- Timers- I 2C Interfacing –UART- A/D Converter –PWM and introduction to C-Compilers.

TEXT BOOK:

1. Andrew N. Sloss, Dominic Symes and Chris Wright "ARM System Developer's Guide: Designing and Optimizing System Software", First edition, Morgan Kaufmann Publishers, 2004.

REFERENCES:

1. Steve Furber, "ARM System –On –Chip architecture", Addision Wesley, 2000.

2. Daniel Tabak, "Advanced Microprocessors", Mc Graw Hill. Inc., 1995

3. James L. Antonakos, "The Pentium Microprocessor", Pearson Education, 1997.

4. Gene .H.Miller, “Micro Computer Engineering”, Pearson Education , 2003.

5. John. B.Peatman , “Design with PIC Microcontroller”, Prentice Hall, 1997.

6. James L.Antonakos, “An Introduction to the Intel family of Microprocessors”, Pearson Education, 1999.

7. Barry. B. Brey, “The Intel Microprocessors Architecture, Programming and Interfacing”, PHI,2002.

8. Valvano, "Embedded Microcomputer Systems", Thomson Asia PVT LTD first reprint 2001.
Readings: Web links www.ocw.nit.edu www.arm.com