

Elective 2 : Advanced Computer Organization with Lab

Course ID: CS 6620

Unit 1: (8 hours)

Basics of Computer Organization – Digital Hardware level, Microarchitecture, Instruction Set Architecture Design, Basic Arithmetic Circuits, Assembly programming.

Unit 2: (10 hours)

Memory Management on x86 and ARM platforms, Segmentation, Paging and Virtual Memory, Multi level memory protection, Cache organization, Microkernel design in Assembly for memory management.

Unit 3: (10 hours)

Hardware for Process Management – Hardware support for - Advanced Scheduling concepts, Inter and Intra Process Protection, Interrupt Service Routines, DMA

Unit 4: (10 hours)

Crypto accelerators, Trusted Platform Module, High Assurance Boot and Tamper detect, Hardware based side-channel attacks.

Unit 5: (10 hours)

Embedded system architecture, Input/Output Subsystem: Peripheral Interfaces like SPI, I2C, PCIe, Block devices.

Text books:

1. C.Hamacher, Z.Vranesic and S.Zaky, "Computer Organization", McGraw-Hill, 2002.
2. W.Stallings, "Computer Organization and Architecture - Designing for Performance", Prentice Hall of India, 2002.
3. D.A.Patterson and J.L.Hennessy, "Computer Organization and Design - The Hardware/Software Interface", Morgan Kaufmann, 1998.
4. J .P.Hayes, "Computer Architecture and Organization", McGraw-Hill, 1998.

Lab:

Assembly programming demonstrating assembly programming implementing standard high level language constructs, segmentation, task switching, Interrupt service routines, paging. Embedded ARM kit peripheral interfacing.

Reference Videos:

1. NPTEL : <http://nptel.ac.in/video.php?subjectId=106106092>
2. CMU: <https://www.youtube.com/user/cmu18447/videos>