ADVANCED COMPUTER ARCHITECTURE

Module 1: Processor Architecture   10Hrs
Evolution of Microprocessors, Instruction set processor design, Principles of processor performance, Instruction-level Parallelism, RISC and CISC architectures, Pipelining fundamentals, Arithmetic and instruction pipelining, Pipeline hazards, Minimizing pipeline stalls, Branch Prediction, superscalar and superpipelined architectures.

Module 2: Memory and I/O Architecture 10Hrs
Hierarchical memory technology; Multi-level caches, Data and Instruction caches, Cache optimizations, Memory Management hardware, I/O systems: Peripheral and Processor-Memory buses, Split transaction buses , USB.

Module 3: Multiprocessor Architecture   10Hrs
Basic multiprocessor architecture, Cache coherence, multithreaded processors, VLIW processor architectures. Array and vector processors. Case studies :MIPS architecture, Intel Series of processors, Pentium's Internally RISC and externally CISC, Hyper threading, SPARC and ARM processors.

Text Book
1. David A. Patterson and John L. Hennessy, Computer Organization and Design, Elsevier, Fourth Edition
2. John Paul Shen and Mikko Lipasti, Modern Processor Design, Tata McGraw Hill.

References:
1. Dezso *Sima*, Terence Fountain, and Peter Kacsuk, *Advanced Computer Architecture*: A Design Space Approach, by Addison Wesley
2. John L. Hennessy & David A. Patterson, Computer Architecture, A Quantitative Approach 4th Edition, Morgan Kaufmann.
3. Hwang & Jotwani, Advance Computer Architecture, TMH