ADVANCED COMPUTER ARCHITECTURE

Introduction: Review of basic computer architecture, quantitative techniques in computer design, measuring and reporting performance;
CISC and RISC processors, Pipelining: Basic concepts, instructions and arithmetic pipeline, data hazards, control hazards and structural hazards, techniques for handling hazards, Exception handling, pipeline optimization techniques;
Hierarchical memory technology: Inclusion, Coherence and locality properties, cache memory organizations, techniques for reducing cache misses, virtual memory organization, mapping and management techniques, memory replacement policies;
Instruction-level parallelism: basic concepts, techniques for increasing ILP, super-scalar, super-pipelined and VLIW processor architectures, array and vector processors;
Multiprocessor architecture: Taxonomy of parallel architectures;
Centralized shared-memory architecture: Synchronization, memory consistency, interconnections networks, Distributed shared-memory architecture, cluster computers.

Books:

1. Henessy and Patterson, "Computer Architecture—A Quantitative Approach", Pearson press, 3rd Edition, 2003.
2. K.Hwang and F.A.Briggs, "Computer Architecture and Parallel Processing", Mc-Graw Hill, 1984.
3. Kai Hwang, "Advanced Computer Architecture: Parallelism, Scalability, programmability", Mc-Graw Hill,
4. M.Singhal and N.G.Sivaratri, "Advanced concepts of Operating Systems", Tata-Mc-Graw Hill Publication, 2001.
5. Crowley, "Operating Systems".